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SETU WATERFORD

COMPUTING EXPO '26

PROJECT SHOWCASE

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Welcome

It gives me great pleasure to welcome you all to this year's Computing Expo, proudly sponsored by Kargo. Today is a celebration of innovation, collaboration, and the incredible talent nurtured within our community here at SETU.

Our Expo is built around three exciting themes, each showcasing the very best of what makes this event so special.

First, our **Student Projects Showcase** — where Undergraduate, Postgraduate, and Masters students share the impressive results of their hard work, creativity, and determination. To all our students: I want you to know how proud the staff in the department are of you all. You have poured so much of yourselves into these projects, and today is your moment to shine. Your commitment to learning and pushing boundaries is truly inspiring.

Secondly, we are thrilled to welcome our **Industry Showcase** — featuring some of our premiere partners who bring fresh perspectives, real-world opportunities, and invaluable connections for our students. Your presence here today highlights the importance of bridging academia and industry, and we are incredibly grateful for your ongoing support.

Lastly, we come together to celebrate excellence through our **Student Awards**, generously sponsored by our valued partners, including Sun Life, Unum, Dataworks, and DCH Consulting Services Ltd.

These awards reflect not only achievement, but the bright future that lies ahead for our graduates.

A heartfelt thank you to Mick O'Brien and all at Kargo for sponsoring this event, and to all of our industry partners who continue to invest in the next generation of computing professionals. Your support is key to making days like this possible.

Finally, I would like to thank Lucy White, Noelle Dalton, Kieran Murphy, Laura McGibney, Rob O'Connor, Colm Dunphy and all the staff in the computing department for the immense work they have put in to ensure that this Computing Expo is a success. Your dedication year after year is really appreciated.

Let's celebrate the incredible innovation and collaboration that defines our community.

Enjoy the Expo!

Warm regards,



Amanda Freeman-Gater,
Assistant Head of Computing & Mathematics Department,
South East Technological University (SETU)

Welcome from Lucy White, the FYP Co-ordinator

It is with great pleasure and deepest pride that we in the Computing and Maths department at SETU Waterford, present to you, our colleagues, students and industry partners, the outstanding work of our final year in computing students.

The final year project allows students to demonstrate what they have learned over the course of their studies, integrate their knowledge in a capstone project, and produce a significant piece of work to ultimately showcase at the Computing Expo.

As the students have studied across a range of different programmes that specialise in their own distinct disciplines and subject areas they have cumulatively produced an extensive catalogue of innovative and creative projects that range in type, discipline and complexity. This Project Showcase will help you to easily navigate the final year projects by course or subject area. You're in for a treat!

A final word to our students ...

A heartfelt congratulations to you all on completing your final year project. I know the road was sometimes long but your consistent work, drive, determination and unwavering commitment to the process has brought you to this point.

The Computing Expo is your chance to showcase your project. We are delighted to celebrate with you and we are looking forward to seeing your hard work come to fruition.

Enjoy and have fun!

Lucy



Welcome from Colm Dunphy, the HDip Project Co-ordinator

The multi award-winning Higher Diploma in Computer Science (online) was the first fully online programme from WIT, now SETU, and pioneered the innovative Agile Semester (multi-sprint) approach to delivery. The programme was designed to be delivered online, with an emphasis on student experience, engagement, and building a learner community that promotes peer learning and openness. Our graduates have a remote-first mentality, greater maturity from wider learning experiences, and strong capability.

Students graduate as full-stack-oriented developers, primed with the foundations on which to build and exploit the new-gen AI, vibe-coded, spec-driven, and agentic AI software development world we now inhabit. Students on the programme complete their studies and a capstone project while on a six-month work placement/internship. This makes them available to be retained by your company (without returning). Students and graduates continue to be highly sought after. If your company is interested in providing a work placement/internship where the student will be mentored, please contact joan.mangan@setu.ie.

This year's projects span six broad categories: healthcare and life sciences, business and operational systems, AI and intelligent software, infrastructure and developer tooling, IoT and embedded systems, and consumer, civic, and creative apps. Across the portfolio, many projects are web-based, including backend, full-stack, and hybrid mobile/web applications, alongside work in systems, networking, security, MLOps, DevOps, cloud CI/CD, and IoT/physical computing. The collection also includes workplace projects built with platforms such as AWS, Azure, Linux, Kubernetes, and Red Hat OpenShift, as well as AI-driven solutions. Several projects contributed to open source, including FlightCtl. Many student projects integrate multiple APIs and deploy across different environments. Some projects have workplace details withheld under NDA.

For the HDip in Computer Science (online) section of this booklet, student thumbnails link to project videos, and student names link to the project page. Project pages summarise the project and include a link to a project landing page where additional links can be found to the GitHub repo, project videos on YouTube, the final report, the final presentation, and more. QR codes for each project are also provided.

In summary, we are often asked what our course is about and what you can do after completing it. Well, this showcase answers both questions through our students' hard work. Enjoy the diversity, innovation, and creation. From the entire team, we would like to thank our students for their work over the last few years, their tenacity and resilience in completing what is a flexible but intensive full-time programme delivered in an accelerated mode, part time, all the while working in a different discipline, preparing for a future in computing. From all the team, we wish you every success, which you will no doubt have in the future.

Regards,
Colm Dunphy



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Section 1

UNDERGRADUATE PROGRAMMES

BSc (HONS)

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BSc (Hons) in Applied Computing

The BSc (Hons) in Applied Computing is a 4-year ab-initio Level 8 programme.

The aim of the BSc (Honours) in Applied Computing is

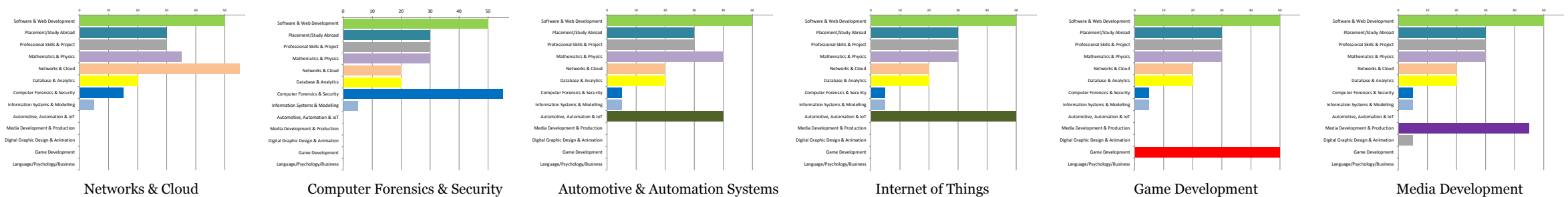
to provide a broad but focused, curriculum of computing and software development concepts. This is complemented by the study of particular problem domain areas (e.g. Games Development, Cloud Computing). The intention is for the student to not only learn the technical skills, but also to form an appreciation for the context in which the technologies are used and the processes involved in successful development.

At the start of their study, the student will be introduced to a broad range of subject material, with an emphasis on applying the scientific method. Later, the student will be exposed to challenging and rigorous study of system development (from analysis to design to implementation and verification) and apply these principles to small to medium sized systems. The student will be given a foundation in an application area of their choosing (from Media Development, Computer Forensics & Security, Cloud Infrastructures, Automotive & Automation Systems, Game Development, and the Internet of Things) and gain strong proficiency in developing systems in this area.

It is important that the student be conversant with current trends and paradigms when they enter the job market. However, it is equally important that they will have transferable skills that will facilitate their career progression (e.g. project management, communication skills). To this end, throughout their study, the student will be introduced to these topics so that the practice of these skills will occur in a seamless and integrated way throughout the program.

A graduate of the BSc (Honours) in Applied Computing will be an enthusiastic and confident practitioner, comfortable with their ability to learn, and adapt to the ever-changing world of computing. They will be ready to embark on a challenging and rewarding career either in research or in the computing industry.

The breakdown of course credits across the four years on each specialism is illustrated by the following charts.





Logly

#1 / TL2.49

Academic Title

AI-Powered Batch Failure Analysis and Reporting System

Project Areas

- AI/ML Development
- Cloud Computing
- Database and Analytics
- Information Systems and Modelling
- Work Based Project
- Software Development: (Back End / Front End)

Project Supervisors

Patrick McInerney, Dr Anita Kealy

Logly is an AI-powered log analysis system to help engineering teams respond to batch processing failures faster. In large enterprises, diagnostic data scatters across logs, emails, and ticketing systems, forcing teams to repeatedly investigate the same failures. Logly addresses this by centralising data into a single source of truth, using a RAG pipeline to generate plain-language failure summaries and detect recurring patterns. My goal is to reduce triage time from hours to minutes through an interactive dashboard surfacing trends, KPIs, and filterable incidents.



Technologies: GitHub, Docker, Kubernetes, AWS, FastAPI, React, Spinnaker, Jenkins, Grafana, Hashicorp Vault

<https://davinbarron.github.io/FYP-Landing-Page/>

by Davin Barron

The landing page for 'Logly' features a dark blue header with a QR code on the left, the title 'AI-Powered Batch Failure Analysis and Reporting System - Logly' in the center, and a small portrait of Davin Barron on the right. Below the header, the page is organized into several sections:

- Introduction:** Describes the problem of batch job failures and the need for a unified view.
- Objective:** Lists goals such as centralising data, applying AI-powered analysis, and creating an interactive dashboard.
- Methodology:** Explains the use of Agile Scrum and bi-weekly architecture reviews.
- Benefits:** Highlights reduced triage time, elimination of repeated investigations, and better understanding of failure patterns.
- Architecture:** Shows a complex diagram of the system's components and data flow.
- Technologies:** Lists various tools used, including GitHub, Docker, Kubernetes, AWS, FastAPI, React, Spinnaker, Jenkins, Grafana, Hashicorp Vault, and others.
- Dashboard:** Displays a screenshot of the system's interactive dashboard with various charts and filters.
- AI Assistant:** Shows a screenshot of the AI-powered interface for generating summaries.

At the bottom of the page, there are logos for SE TU (South East Technological University), the Department of Computing and Mathematics, and Sun Life.



Coach A.I.

#2 / TL2.52

Academic Title

Coach A.I - A.I. Powered Plyometric Workouts

Project Areas

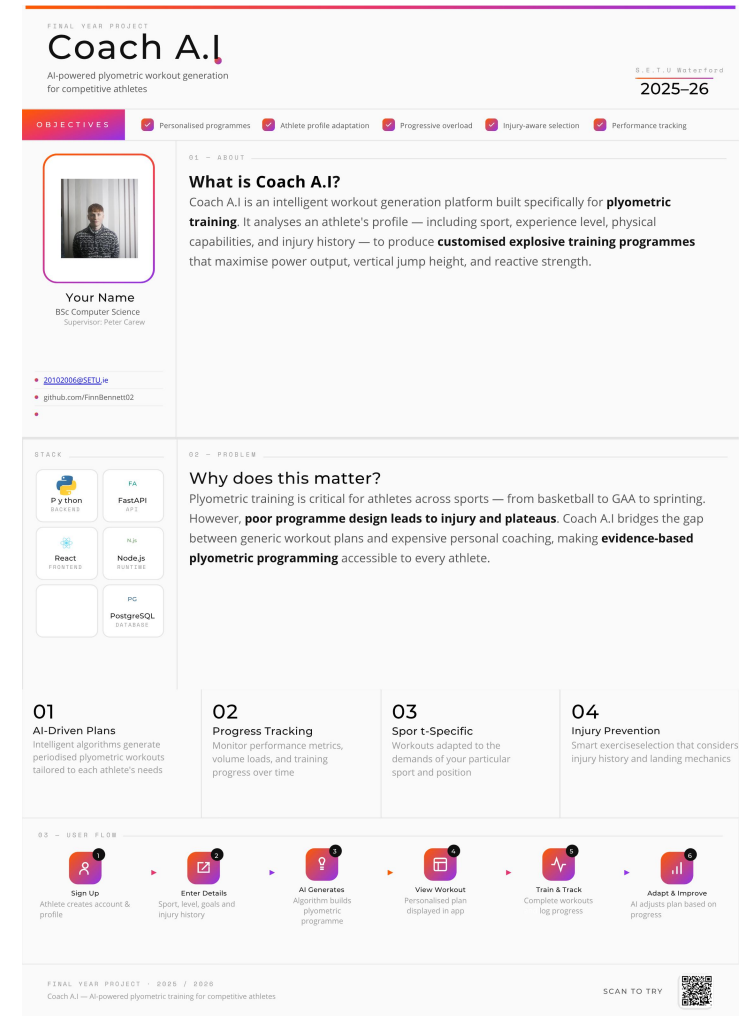
- AI/ML Development

Project Supervisor

Dr Peter Carew

by Finn Bennett

Coach A.I. plans to be an AI powered chat bot, with the sole purpose to provide strong plyometric workouts for its users. Coach A.I.'s backend will run on python and will use Open AI to power it. User data will be safely secured in a Postgres database to allow for more personalisation and uniqueness. Users will be able to login, create a plan, generate workouts, add in past injury history and get personalised workouts based on their specific needs. Coach A.I. is not just for athletes as plyometrics can benefit anyone anywhere in whatever aspects of life the user sees fit.



Technologies: python, fastapi, react, postgres

<https://github.com/FinnBennett02/FinalYearProject.git>





Academic Title

Fools Hand TD

Project Areas

- Game Development

Project Supervisor

Dr Denis Flynn

Fools Hand TD

#3 / TL2.28

by Jessica Browne

Fools Hand TD is a Roguelite tower defence game. The aim is to defend against waves of approaching enemies with randomised towers each run. The player is given a choice of towers at intervals throughout the run using the towers to defeat enemies to gain money to repeat the cycle. Half way through the defence the player will have to move to a new map with their currently unlocked towers, forcing them to adapt to a different path and different enemy types. If the player fails to defeat too many enemies they lose. Once a run is complete permanent upgrades can be unlocked through the main menu.



Technologies: Unity, Blender, Vscope, C#, Canva

<https://github.com/Jessica-browne/Fyp-Tower-Defence-Game>





Academic Title

A Gamified Mindfulness Application Using Real-Time Eye Tracking and Gaze-Based Interaction in Unity

Project Areas

- Game Development
- Media Development and Production
- Personal Independent Project
- Software Development: (Mobile Native)

Project Supervisor

Brendan Lyng

WANDER

#4 / TL2.52

by Jeremiah Casey

WANDER is a mobile mindfulness experience that uses real-time eye tracking and blink detection as interactive tools for stress and anxiety management. Built in Unity for Android with C#, it places the player in a calm, hand-drawn forest where focus-based encounters encourage steady attention and present-moment awareness. Through gentle visual feedback and neuroinclusive design, WANDER aims to reduce cognitive load and explore how playful digital experiences can support emotional regulation and mindfulness.



Technologies: Unity, C#, Android, BlazeFace, Unity Sentis, GitHub, Trello

<https://20101456.github.io/wander-landing-page/>





Academic Title

A Procedurally Generated 2D Unity Roguelite Game with Dynamic Difficulty and Adaptive AI

Project Areas

- Animation
- Game Development
- Software Development: (Back End / Front End)

Project Supervisor

Brendan Lyng

The Four Treasures

#5 / TL2.49

by Emma Clarke

The Four Treasures is a 2D Unity Roguelite game set in a mythical rendition of Celtic Ireland. Its characters are inspired by Irish mythology, with their stories reimaged to give players a new experience. Playing as the protagonist Tarann, you must traverse through four procedurally generated levels, encountering various enemies and bosses in a quest to find the four Treasures of the Tuatha, which have been stolen from you. These encounters are kept engaging through the use of dynamic difficulty adjustments and adaptive AI implemented using Unity's behaviour graphs.



A Procedurally Generated 2D Unity Roguelite Game with Dynamic Difficulty and Adaptive AI



Procedural Generation

'The Four Treasures' features four procedurally generated levels which ensure the player has a unique experience every game. Each level contains two types of procedural generation; dungeon generation creates the level layout and perlin noise generates the background. Levels reward the player for exploring.



Adaptive AI

'The Four Treasures' features adaptive AI using Unity Behaviour Graphs. Using a custom node the enemy's random decisions are weighted. These weights are adapted in accordance with the player's actions during battle. The change in the enemy's response keeps the player engaged and the encounters more challenging.



Dynamic Difficulty

'The Four Treasures' features dynamic difficulty adjustment which tailors the game to the player's ability. The player's performance is tracked and the difficulty of the game adjusts accordingly. This keeps the player in a state of flow by changing variables such as the enemies' health and the player's strength.



Agile Methodology

'The Four Treasures' is developed using Scrum methodology. Development is split into two week sprints. Planning takes place at the start of each sprint, with a progress review at the end of every sprint. This approach, combined with the use of Trello, allows for effective project adjustments and time management.

Emma Clarke, BSc (Hons) Applied Computing, Department of Computing and Mathematics, SETU



Technologies: Unity, C#, Github, Visual Studio Code, GIMP, Audacity, Trello

<https://emmac1804.github.io/The-Four-Treasures-LandingPage/>



Academic Title

Puzzle-Adventure Unity 2D Game with Level Editor

Project Areas

- Game Development

Project Supervisor

Brendan Lyng

Echo Orb

#6 / TL2.49

by Sinéad Cleary



Puzzle-Adventure Unity 2D Game with Level Editor

ECHO ORB

Echo Orb is a puzzle-adventure game with a custom level editor, which was not only used to design and create Echo Orb's levels, but is also featured in-game, allowing players to create their own levels using existing gameplay elements. The central Echo Orb/Holder mechanic controls the game's dungeon environment and its mechanisms. It works both with and against the player, serving as both a puzzle solving tool and a part of the puzzle itself. Creatures roam the dungeon, controlled using behaviour trees. Custom levels and combinations of puzzle mechanics lead to emergent gameplay.

Gameplay

The central Echo Orb/Holder mechanic is what makes this game unique. It works both with and against the player, serving as both a puzzle solving tool and a part of the puzzle itself. **Echo Holders** control the dungeon environment and its mechanisms. They are powered with **Echo Orbs**, and listen for activation events which trigger different effects depending on the type of holder. Creatures bring the enchanted world to life, each with their own unique behaviours, controlled using **behaviour trees**.

Level Editor

Echo Orb contains a custom level editor, which was not only used to design and create Echo Orb's levels, but is also featured in-game, allowing players to create their own levels using existing gameplay tiles and items. Due to the modular nature of the puzzle elements, players may find new ways of combining the game's mechanics to create new and unique scenarios that are not found in the base game levels, leading to **emergent gameplay**.

Methodology

The Scrum-based Agile methodology was used in the development of Echo Orb. Work was organised into two-week sprints, with each sprint beginning with a progress review and meeting. This structure helped maintain focus, ensured steady progress, and enabled effective time management. Trello was used to manage sprints, tasks, and the product backlog.



Technologies: Unity, C#, Pixilart, Audacity

<https://sineadcleary.github.io/FYPLandingPage/>

Sinéad Cleary
BSc (Hons) in Applied Computing
Department of Computing and Mathematics, SETU Waterford





Academic Title

AI-Powered Multi-Agent System for Code Repository Management

Project Areas

- AI/ML Development
- Cloud Computing
- Open Source
- Software Development: (Back End)

Project Supervisor

Malik Faizan

Git Agents

#7 / TL2.51

by Tommy Condon

GitAgents is a GitHub App that uses AI agents to review your pull requests. When a PR is opened, the app can execute a Code Review Agent and (optionally) a Dependency Review Agent, passing the results through a Feedback Agent before posting the final review on GitHub. This tool serves as an initial screening layer, reducing Pull Request review time. It supports both OpenAI and Anthropic (Claude) models. You can configure which model to use and how the agents behave through a YAML config file in your repository. The project is completely Open-Source and available on GitHub.

AI-Powered Multi-Agent System for Code Repository Management

SCAN ME

Diagram showing the workflow: User (client) interacts with Github Servers, which connect to the Github App (TS). The Github App interacts with the Primary Agent (AI) and the Feedback Agent (AI). The Primary Agent also interacts with the Feedback Agent. The Github App also interacts with Github Servers.

"GitAgents" is a multi-agent GitHub App that autonomously manages and maintains your codebase. Powered by agentic AI, it performs intelligent code reviews, audits your repositories, and handles manifest files, resolving conflicts before they become problems. Each pull request is analysed file by file. Agents address potential bugs, suggest improvements, and flag issues that need attention. Configuration is fully customizable through a simple YAML file, giving you control over your AI environment, preferred model, token limits, and more.

Technologies: TS, JS, GitHub, OpenAI, Claude

Agile Development Cycle:

- 01 Requirements
- 02 Plan
- 03 Design
- 04 Develop
- 05 Release
- 06 Track & Monitor

Feedback Loop: Agents use a feedback loop. For example, when a code review occurs, the response is reviewed by another agent that uses the same/a different model.

Context Awareness: When a pull request is created agents are granted access to all associated files. They can also request supplementary files from the repository when further context is required.

Accuracy: The agents have been benchmarked extensively, consistently achieving accurate results.

Tommy Condon
Student Number: 20101844
BSc Hons Applied Computing
Department of Computing and Maths

SE TU
Official Technological University of South East Technological University



Technologies: OctokitJS, Typescript, NodeJS, YAML, JavaScript, GitHub API, Claude SDK, OpenAI SDK, Bash

<https://gitagents.super.site/>





Academic Title

A Unity-Based Turn Resolution System for Discord Wargaming Communities in Video Game Format

Project Areas

- Game Development
- Personal Independent Project
- Software Development: (Core)

Project Supervisor

Michael McMahon

#8 / TL2.49

Lineage Virtual Wargaming

by Adam Costigan Dooley

Virtual Wargaming adapts a turn-based strategy gameplay found in Discord wargaming communities, intended to be in aid of reducing multi-day turn resolution to minutes for users designing and adapting their own Lineage format, or playing a provided preset. Built in Unity with C#, the system features a territory hex map, asymmetric faction design with unique units, and sophisticated combat mechanics including casualty resolution and unique ability interactions. Players coordinate attacks through an intuitive UI, while Photon Fusion networking enables real-time multiplayer with 2-6 players.

Virtual Wargames

A turn-based multiplayer 2D strategy game based on traditional tabletop formats.

INTRODUCTION

War Games automates traditional strategy games, reducing typical turn resolution times. Built in Unity with cloud multiplayer support, the system handles authentication, turn processing, and combat resolution automatically. Players submit turns asynchronously, enabling persistent strategic gameplay without manual game master intervention.

TILE-BASED STRATEGY

Players control factions across a tiled map with varying movement rules. Combat uses tags assigned to each unit to gauge varying levels of combat ability based on the circumstances of a conflict between players. Territory control generates resources for unit recruitment, creating strategic economic depth.


FACTIONS & SCENARIOS

Asymmetric faction design creates distinct strategic playstyles through varied unit compositions and abilities. Factions differ in mobility, combat strength, and unit costs, enabling reactive versus aggressive approaches. The modular scenario system supports multiple themed settings with customizable maps, faction archetypes, and victory conditions for diverse strategic experiences.

METHODOLOGY

This project employed Agile methodology with two-week sprints across the project timespan. Each sprint followed a complete cycle: planning out the development goals for the sprint, iterative development of core features, integration testing and bug resolution, sprint review demonstrations, and retrospectives for process improvement for the next sprint.






Adam Costigan-Dooley, Bsc. (Hons) Applied Computing, Department of Computing and Mathematics, School of Science, SETU



Technologies: Unity, C#, Photon Fusion, Git, JSON, Aseprite

<https://adam-costigan-dooley.github.io/VirtualWargame/>



#9 / TL2.28



ScamSnap

Academic Title

Mobile Scam Detection Using Machine Learning

Project Areas

- Computer Security

Project Supervisor

Richie Lyng

by Calum Cullen

FINAL YEAR PROJECT SOUTH EAST TECHNOLOGICAL UNIVERSITY

SCAM DETECTION APPLICATION

ScamSnap – AI Powered Scam Message Analyser

Student: Calum Cullen - 20102180 | Department: Computing & Mathematics | Platform: Android

METHODODOLOGY
This project follows an **Incremental Development** approach. Features are built and tested in small, manageable stages. Each component is verified before the next is introduced, ensuring a clear development pathway and allowing issues to be identified early.

SYSTEM ARCHITECTURE

- Screenshot Upload**: User submits screenshot via UI
- OCR – Google ML Kit**: On device text extraction from image
- Text Processing – NLP**: Cleaning, normalisation, stop word removal
- Scam Classification**: Naive Bayes model – keyword & pattern scoring
- Results & Feedback**: Scam/Safe verdict · Confidence score · Highlights
- Local Storage – JSON**: Scan History saved on device, no cloud upload

KEY FEATURES

- MESSAGE SCANNER
- NAIVE BAYES AI MODEL
- URL CHECKER
- SCAM CONFIDENCE SCORE
- SCAN HISTORY
- PHONE NUMBER CHECKER
- VIRUSTOTAL INTEGRATION
- FEEDBACK BUTTON

KEY TECHNOLOGIES

- Kotlin
- ML Kit
- Python
- JSON
- GitHub
- NLP

Calum Cullen · 20102180@setu.ie | FYP 2026 | Department of Computing and Mathematics | BSc Computing · 2025

ScamSnap is an app designed to help users identify scam messages on their devices. The app uses a Naive Bayes machine learning model trained on a dataset of real scam and legitimate messages. Users can type a message directly into the app or upload a screenshot which is processed using OCR to extract the text before analysis. The model then classifies the message and returns a confidence score indicating how likely it is to be a scam. Any URLs found within the message are automatically checked against VirusTotal's API, giving the user a more complete picture of whether a message is dangerous.



Technologies: Kotlin, Android Studio, Python, scikit-learn, ML Kit, Room, OkHttp, VirusTotal API

<https://github.com/Calc6/Scam-Detection-App>





PiSentry

#10 / TL2.51

Academic Title

ML-Powered Network Intrusion Detection

Project Areas

- AI/ML Development
- Computer Networks
- Computer Security

Project Supervisor

Kurt Pumares

by Liam Doocey

Traditional network intrusion detection systems rely on known attack signatures, leaving networks exposed to new threats. This project leverages machine learning to detect and classify network attacks as they occur. Trained on 2.5 Million flows from the CIC-IDS-2017 Dataset, a ML classifier identifies 13 different attack types such as DoS, DDoS and brute force. Deploying the system out-of-band on a raspberry pi 5, cuts the single network bottleneck while also sending alerts when processed traffic is flagged as malicious.

ML-Powered Network Intrusion Detection

Introduction
Traditional signature-based intrusion detection systems struggle to identify sophisticated and zero-day attacks, leaving networks open to emerging threats.
This project demonstrates a machine learning powered detection system trained on the CIC-IDS-2017 dataset to detect and classify network attack vectors in quick time. The system monitors live network Traffic, extracts flow-level features and classifies activity across 13 attack categories such as DoS, DDoS, port scanning and brute force attacks.
Deployed on a Pi 5 the system provides a lightweight, dedicated security solution for home and small network environments.

System Architecture

```

    graph TD
        A[Packet capture  
Flow assembly] --> B[Feature extraction  
ML model training]
        B --> C[Layer 1: AbusedPorts  
ML model]
        C --> D[Layer 2: Random Forest  
ML model]
        D --> E[Log benign flow  
Flow assembly]
        E --> F[Dashboard  
Network activity]
        C --> G[Alert  
Network activity]
        D --> G
    
```

Key Features

- Live Network Monitoring
- ML-Powered Threat Detection
- Attack Classification
- Automated Alerting
- Threat Intelligence Integration
- Lightweight Deployment

Technologies

Python, Flask, Scapy, Raspberry Pi, Git, AWS, scikit-learn

Deployment

```

    graph TD
        A[Home Router] --> B[Raspberry Pi 5  
ML Model]
        B --> C[Pi 5  
ML Model]
        C --> D[Router]
    
```

Methodology

An Agile approach was selected for this project allowing continuous testing and feedback along the development timeline.

Footer: Liam Doocey (20094146) BSc (Hons) Computer Science ljdoocey@gmail.com



Technologies: Python, Flask, Scapy, Raspberry Pi, Git, AWS, scikit-learn

<https://liamdoocey.github.io/ml-nids/>



#11 / TL2.25

AI-Driven Log Analysis Tool



Academic Title

AI-Driven Log Analysis Tool

Project Areas

- Computer Networks
- Database and Analytics

Project Supervisor

Dr John Sheppard

by Dominik Falkowski

AI-Driven Log Analysis Tool Using Prompt-Based Querying



Abstract

- AI-based log analysis tool
- Uses natural language querying
- Reduces manual investigation effort
- Combines LogBERT + Qwen models

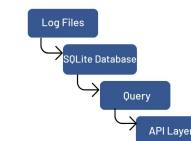
Problem Statement

- Large volumes of log data
- Manual analysis is time-consuming
- Difficult to detect anomalies
- Lack of explainability in tools

Data & Preprocessing

- Logs stored in SQLite
- Sliding window sequencing
- Tokenised for model input

Data Pipeline



System Features

- Prompt-based querying
- Real-time log analysis
- Integrated AI pipeline
- User-friendly interface

Methodology

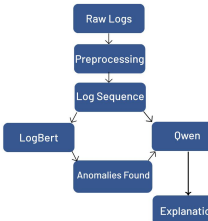
LogBERT

- Learns normal system behaviour
- Detects anomalies in sequences
- Unsupervised learning approach

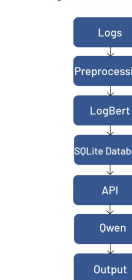
Qwen (LLM)

- Interprets user queries
- Converts to structured searches
- Generates explanations

AI Workflow



System Architecture



System Components



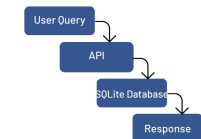
System Evaluation

- Processed 50,000+ logs
- Detected anomalies using LogBERT
- Generated explanations with Qwen
- Enabled real-time querying

Discussion

- Reduces manual workload
- Combines detection + explanation
- Improves usability of log analysis

Query Flow



Limitations

- Hardware Limitations
- Depends on log quality
- LLM output varies with prompts

This project develops an AI-driven log analysis tool that ingests system logs in real time, detects suspicious activity, and generates natural language explanations. Logs are continuously collected from a host machine and processed. An AI model is used to identify anomalies in log patterns, while a fine-tuned large language model interprets these events and explains their significance in plain language. The system is presented through a user interface, allowing users to query logs, monitor activity, and gain insights into potential security threats.



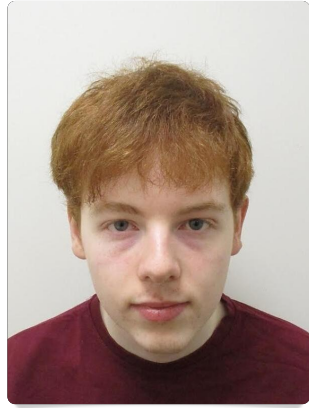
Technologies: FastAPI, Streamlit, SQLite, LogBERT, Qwen LLM, Hugging Face, Python

<https://github.com/FalkowskiDom/FYP>

Dominik Falkowski
20102969

SETU Waterford
Department of Computing

Bachelor of Applied Computing(Honours)
Computer Science (Forensics and Security)



Academic Title

Procedurally Generated 2D Roguelite Using Kubernetes for Online Multiplayer with Complex Enemy AI

Project Areas

- Cloud Computing
- Computer Networks
- Game Development

Project Supervisor

Brendan Lyng

Planet Hunter

#12 / TL2.51

Planet Hunter is a 2D roguelite top-down twin stick shooter set in an uncharted space system. The player can fight aliens on small randomly generated planets to take over these uncharted planets and collect new equipment/weapons. Planet Hunter procedurally generates looping planet levels using Perlin noise and cellular automata. It also uses behaviour trees for smart enemy AI that have different “personalities” (e.g. aggressive, defensive). There is also co-op online multiplayer that orchestrates game rooms using Kubernetes with the help of Agones.

PLANET HUNTER
Procedurally Generated 2D Roguelite using Kubernetes for Online Multiplayer with Complex Enemy AI

INTRODUCTION	PROCEDURAL GENERATION	COMPLEX ENEMY AI	MULTIPLAYER WITH KUBERNETES
<p>This game is a 2D roguelite top-down twin stick shooter set in an uncharted space system.</p> <p>Fight aliens on small randomly generated alien planets in a rush to take over these uncharted planets and collect new equipment/weapons!</p>	<p>Procedural generation involves using a process to generate content. In <i>Planet Hunter</i>, each level is a procedurally generated looping planet.</p> <p>Perlin noise is used to generate a random map and uses cellular automata to make the tiles on the map spread out based on a set of rules to generate natural-looking planet terrain. This also allows for the edges of the generated map to connect together properly to give the appearance of a seamlessly looping planet.</p> <p>Once the map has been generated, it can be manipulated to form different biomes and other parts of the game.</p>	<p>In <i>Planet Hunter</i>, there are smart, organised enemies that use equipment they pick up against you.</p> <p>They have different “personalities” (aware, defensive, aggressive, etc.), and they have complex enemy AI that makes decisions with the use of behaviour trees.</p> <p>Enemies have different parameters determining their tendency to search for weapons or attack the player.</p> <p>The modular nature of behaviour trees makes it easier for enemies to choose which tasks to perform based on this.</p>	<p>This game has co-op multiplayer where players can play through the game together that uses a client-server topology, where players (clients) play on servers.</p> <p>Players can create rooms that other players can join. These rooms are in containers orchestrated using Kubernetes with the help of the Agones library, which is an open-source library that helps with scaling, hosting and running game servers on Kubernetes.</p> <p>Multiplayer netcode is also implemented for the in-game multiplayer using Mirror, an open-source library for netcode in Unity.</p>



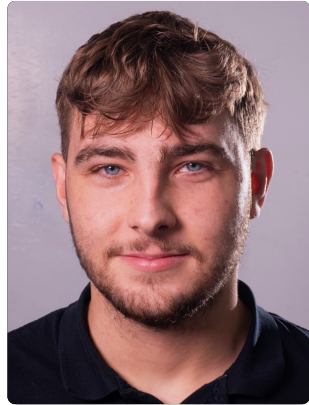
Technologies: Unity, C#, Visual Studio, Agones, Kubernetes, Mirror, Trello, GIMP, GitHub, ArgoCD, AWS

<https://paul123111.github.io/>



Paul Fitzgerald, BSc (Hons) Applied Computing, Department of Computing and Mathematics, SETU

#13 / TL2.35



Academic Title

QueryOps AI

Agentic AI for Natural Language Querying & Insights from Time Series Monitoring Data

Project Areas

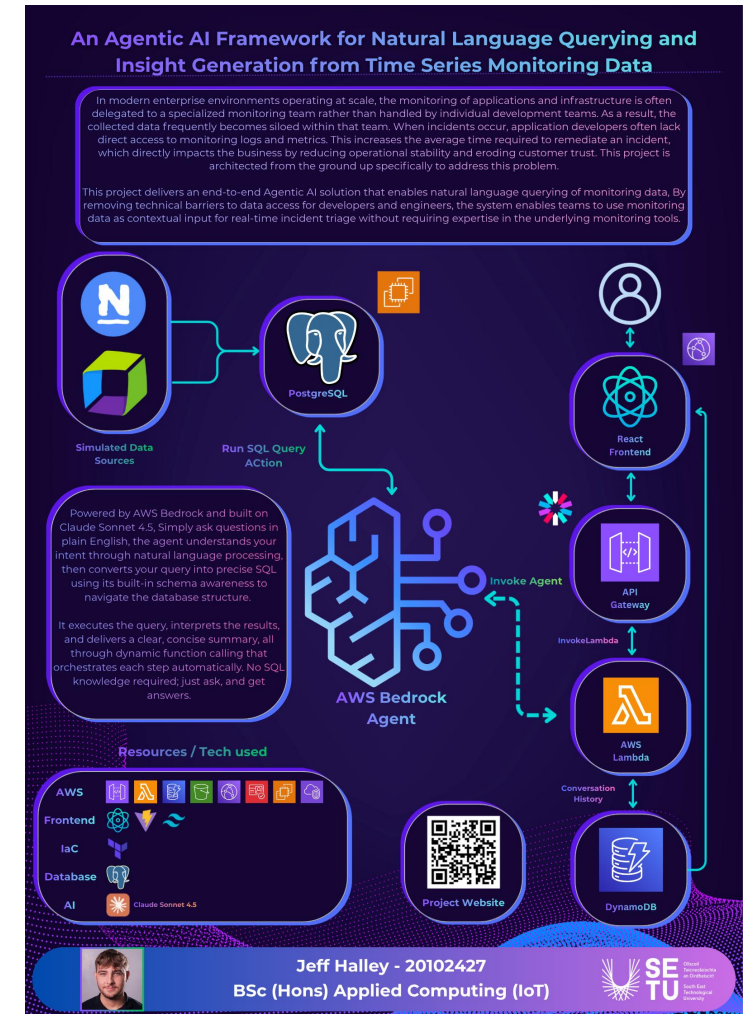
- AI/ML Development
- CI/CD & Testing
- Cloud Computing
- Database and Analytics
- Software Development: (Back End / Front End)

Project Supervisor

Dr Frank Walsh

by Jeff Halley

QueryOps AI is a tool that lets any engineer query their monitoring data using plain English during live incidents. When an alert fires, the on-call engineer rarely has the full context they need to diagnose what's happening. Related checks or historical patterns all sit behind monitoring tools they can't access themselves. Every minute without that context is costly, research puts the hourly cost of downtime as high as \$5 million for 41% of large enterprises. QueryOps AI removes that bottleneck by letting engineers ask questions in plain English and get clear answers immediately.



Technologies: AWS Bedrock, Terraform, Lambda, DynamoDB, API Gateway, Cognito, React, PostgreSQL, Agentic AI

<https://d3212o90xjuosc.cloudfront.net/>



Academic Title

An Event Driven Azure Cloud Architecture for Automated Static Malware Triage

Project Areas

- Automotive and Automation
- CI/CD & Testing
- Cloud Computing
- Computer Security
- DevOps
- Open Source

Project Supervisor
Malik Faizan

This project displays the implementation of a automated malware analysis pipeline using Azure Cloud. This aims to improve the safety, privacy and speed of malware triage with an event based automated pipeline. Its practical use is for keeping file triage safe and quick as public systems like VirusTotal store the file and allow it for download while company's do not want employees wasting too much time manually triaging these files. This is where my project may come of benefit, providing a base for automated malware triage.

Automated Malware Analysis Pipeline

#14 / TL2.25

by **Graham Heeney**

An Event-Driven Cloud Architecture for Automated Static Malware Triage

Graham Heeney
20102466



Project: Automated Azure Malware Analysis Pipeline

BSc (Hons) in Applied Computing
(Forensics and Security)

<h3>1. Introduction</h3> <p>Malware triage is the process of classifying files to identify their threat. Manual triage is time consuming and difficult to scale, while many public tools expose sensitive file data which poses a threat when dealing with internal company files. This project presents an automated, event-driven Azure pipeline that analyses uploaded samples using techniques such as hashing, calculating the entropy and YARA matching, then returns a report including the verdict. The result is a more scalable, and security minded approach to malware triage.</p>	
<h3>2. Problem</h3> <ul style="list-style-type: none"> • Manual analysis is slow and resource dependant. • Difficult to scale with growing volumes. • Public tools such as VirusTotal may expose sensitive file contents and limit privacy. • No open-source cloud-based solutions exist. • Private solutions are expensive for growing security teams. 	<h3>3. Research Objectives</h3> <p>This project:</p> <ul style="list-style-type: none"> • Detect and automatically process uploaded files • Classify potential malware using YARA rule matching • Generate structured reports to clearly present analysis results • Deploy scalable infrastructure using Bicep Infrastructure as Code and allow for ephemeral deployment • Protect uploaded samples with a layered security model for secure handling
<h3>4. System Components</h3> <ul style="list-style-type: none"> • Storage Layer: Azure Blob Storage stores uploaded samples and generated results • Event Processing: Event Grid detects new uploads and automatically triggers the storage queue. • Analysis Engine: The FLARE VM retrieves queue messages, downloads samples, does SHA256 hashing and YARA scanning and generates a structured report. • Networking: A Virtual Network with an analysis subnet, Bastion, NSG, Private Endpoint, and Private DNS secures internal traffic. • Deployment: Infrastructure is defined in Bicep to support repeatable deployments. 	<h3>5. System Architecture</h3> <pre> graph TD User[User Upload] --> Blob[Azure Blob Storage samples container] Blob --> Event[Azure Event Grid] Event --> Queue[Azure Storage Queue samplequeue] Queue --> VM[Analysis VM - FLARE VM SHA256 - YARA Scanning - Risk Scoring - Report] VM --> Results[Azure Blob Storage results container] Results --> Restore[VM restores to original base image] </pre>
<h3>6. Outcome</h3> <div style="border: 1px solid black; padding: 5px;"> <p>Matched Rule: Ransom.WannaCry</p> <p>SHA256 Hash: ed01eb...4c5a</p> <p>Risk Score: 98 / 100 (High)</p> </div> <p>The uploaded sample has matched with the following rules: Ransom.WannaCry. The SHA256 hash is ed01eb...4c5a. This has been determined to have a risk score of 90 / 100</p>	<h3>7. Conclusion</h3> <p>The use of Azure's event driven infrastructure with automation tools such as YARA, PowerShell, and Task Scheduler, provides a scalable, efficient, and secure pipeline for static malware triage. By eliminating manual steps, using managed identities to remove the need of hardcoded credentials, deploying through Bicep as IaC and cutting out any risk of exposure, this project demonstrates that cloud-based security automation is both practical and effective in controlled security environments.</p>



Technologies: Azure Blob, Event Grid, Storage Queues, Bicep IaC, YARA, PowerShell, FlareVM

<https://github.com/grahamheeney2-spec/AzureAutomatedMalwareAnalysis>



<https://github.com/grahamheeney2-spec/AzureAutomatedMalwareAnalysis>





PARS-Prediction and Response System

#15 / TL2.52

Academic Title

Real Time Trajectory Prediction and Response for Quadruped Robots

Project Areas

- AI/ML Development
- Digital Graphic Design
- Internet of Things
- Personal Independent Project
- Open Source
- Software Development: (Core)

Project Supervisor
Jason Berry

by Igor Kapusniak

This project focuses on enabling a quadruped robot to detect and respond to fast moving objects in real time. A camera and lidar sensor are used to identify and track objects within the robot’s surroundings. A YOLOv8s detection model processes the camera feed to locate targeted objects. This data is then used to align the robot with the detected object using movement logic. Two demonstration systems are developed. The first attempts to keep a balloon airborne by positioning the robot and striking it upward. The second detects incoming fast moving hazards and moves the robot out of their path.

SE TU
Real-Time Trajectory Prediction & Response for Quadruped Robots
P.A.R.S. - Prediction and Response System

Overview
The aim of this project is to enable a Uintree Go2 robot to detect moving objects using camera and LIDAR sensors, estimate their trajectories, and respond dynamically with physical movement.
Through the analysis of camera and lidar data and with the use of trajectory prediction algorithms, and motion control, the system allows the robot to interact intelligently with its surroundings, whether tracking, intercepting or avoiding a moving object.
The camera feed is processed in real time by a YOLOv8s object detection model trained on balloon images. While a Kalman filter tracks the balloon's motion and extrapolates its future trajectory, producing the visualisation below.

Methodology
The development methodology used for this project is the V-Cycle model, which pairs each development stage directly with a corresponding testing and validation phase. This is particularly well suited to robotics as it ensures each subsystem; object detection, trajectory prediction, and motion response is fully validated before moving on to the next, preventing errors from propagating through the pipeline.
This structured approach is especially important given the sequential nature of the system. Each subsystem depends on the output of the previous one, meaning a fault in the detection stage would directly impact the accuracy of the trajectory prediction, which in turn would affect the quality of the robot's response.

Tools
Raspbian, OnShape, Creatlly, Hailo, Python, WebRTC, UiniMaker Cura, Shell, Github

Igor Kapusniak
Applied Computing (Internet of Things)
Department of Science & Computing
Supervisor: Jason Berry
Email: 20102236@setu.ie

APPLIED ROBOTICS LAB



Technologies: Python, Shell, OnShape, Utimaker-Cura, YOLO v8s, WebRTC, Hailo, Raspbian, Github

<https://t25623.github.io/>



Academic Title

2D RPG with Turn Based Combat

Project Areas

- Game Development

Project Supervisor

Brendan Lyng

The Mist

#16 / TL2.28

by Brona Keevers-Roux

The Mist is a 2D top-down RPG adventure made in Unity for Windows PC. Players follow Eryn and their hamster companion Milo through a forest consumed by a spreading dark mist. The game features a dual gameplay system with top-down exploration and turn-based combat, plus side-scrolling sections where Milo accesses tight spaces. It uses procedural generation to create varied elemental temples and a reactive AI system where enemies adapt their behaviour in combat, creating dynamic and replayable encounters.



Technologies: Unity, JetBrains Rider, Github, Aseprite, Trello

<https://hillyleopard133.github.io/Landing-Page/>



#17 / TL2.35

Can You Trust That Voice?



Academic Title

Real-Time Detection of AI-Generated Speech in WhatsApp Voice Messages

Project Areas

- AI/ML Development
- Cloud Computing
- Computer Security
- Software Development: (Back End)

Project Supervisor

Rob O'Connor

by Christopher Kelleher

Deepfake voice technology is increasingly common in scams and fraud, with AI-generated speech convincing enough to impersonate real people. This project tackles that problem by building a system that detects synthetic speech in real time, accessible to everyday users through WhatsApp. Users simply forward a suspicious voice note to the bot, which analyses the audio and replies with a verdict and confidence score. The system uses deep learning models trained to distinguish genuine human speech from AI-generated audio, and is deployed to the cloud for fast, scalable detections.

Can you trust that voice?
Real-time deepfake audio detection via WhatsApp

Chris Kelleher,
BSc (Hons) Applied Computing,
Department of Computing and Maths,
South East Technological University

Abstract
Synthetic voice technology has advanced to the point where AI-generated speech is nearly indistinguishable from a real human voice, creating a growing risk of audio-based scams and fraud. This project develops a real-time deepfake audio detection system capable of identifying AI-generated speech in voice messages forwarded through WhatsApp.

Methodology
An incremental Agile approach is used throughout, with development broken into weekly milestones covering data preparation, model training, evaluation, and deployment. Each model architecture is trained independently on the ASVspoof 2019 dataset and evaluated using two standard metrics, the Area Under the Receiver Operating Characteristic Curve (ROC-AUC) and Equal Error Rate (EER).
To assess how well each model generalises beyond its training data, additional testing is carried out using real speech from Mozilla Common Voice and synthetic speech from text-to-speech tools. The best performing model is deployed to an Amazon SageMaker endpoint and integrated into the WhatsApp bot for user testing.

Project Diagram

```

    graph LR
      User[User] -- "User forwards voice note" --> Bot[WhatsApp Bot]
      Bot -- "Bot sends data through backend" --> Server[Backend Server]
      Server -- "Provides AI/ML capabilities" --> Bot
      Bot -- "Confidence score information returned" --> User
      Bot -- "Deepfake detection" --> Bot
      Bot -- "Response message" --> Bot
  
```

Technologies Used

learn, Amazon SageMaker, jupyter, Hugging Face, Amazon EC2, PYTORCH, node, FastAPI, Baileys



Technologies: Python, PyTorch, HuggingFace Transformers, FastAPI, Node.js, AWS SageMaker, AWS EC2, WhatsApp

<https://chriskelleher1947.github.io>



Academic Title

Echoes of the Labyrinth (An In-depth Look at Procedurally Generated 3D Dungeons)

Project Areas

- Game Development

Project Supervisor

Dr Denis Flynn

#18 / TL2.35

by Adam Kenny

Echoes of the Labyrinth is a 3D , Unity-based procedural dungeon crawler. Players explore dynamically generated floors, battle enemies using AI-driven behaviours, and collect loot while progressing deeper into an evolving labyrinth. The project emphasises modular systems, and replayability through procedural generation, combat mechanics, and adaptive AI encounters. Every action has consequences that could lead to victory in battle or the player's character becoming just another Echo in the Labyrinth



Technologies: Unity Engine, Blender, Audacity, GIMP

<https://github.com/AdamKenny098/Final-Year-Project>

ECHOES OF THE LABYRINTH

PROCEDURAL DUNGEON CRAWLER
BUILT IN UNITY 6

No two runs are the same

- PROCEDURAL DUNGEON GENERATION
- ⚔ CLASS BASED COMBAT
- 👜 DYNAMIC LOOT SYSTEM
- 🔵 FLOOR PROGRESSION
- 💀 NAVMESH AI AGENTS (BEHAVIOR TREE)

GOAL: BUILD A REPLAYABLE
PROCEDURAL DUNGEON CRAWLER

OUTCOME: PLAYABLE VERTICAL SLICE
WITH GOALS AND CHALLENGES

VIEW PROJECT

Adam Kenny (20102588)

#19 / TL2.50



SUSk8s

Academic Title

Sustainable Kubernetes Extension Stack

Project Areas

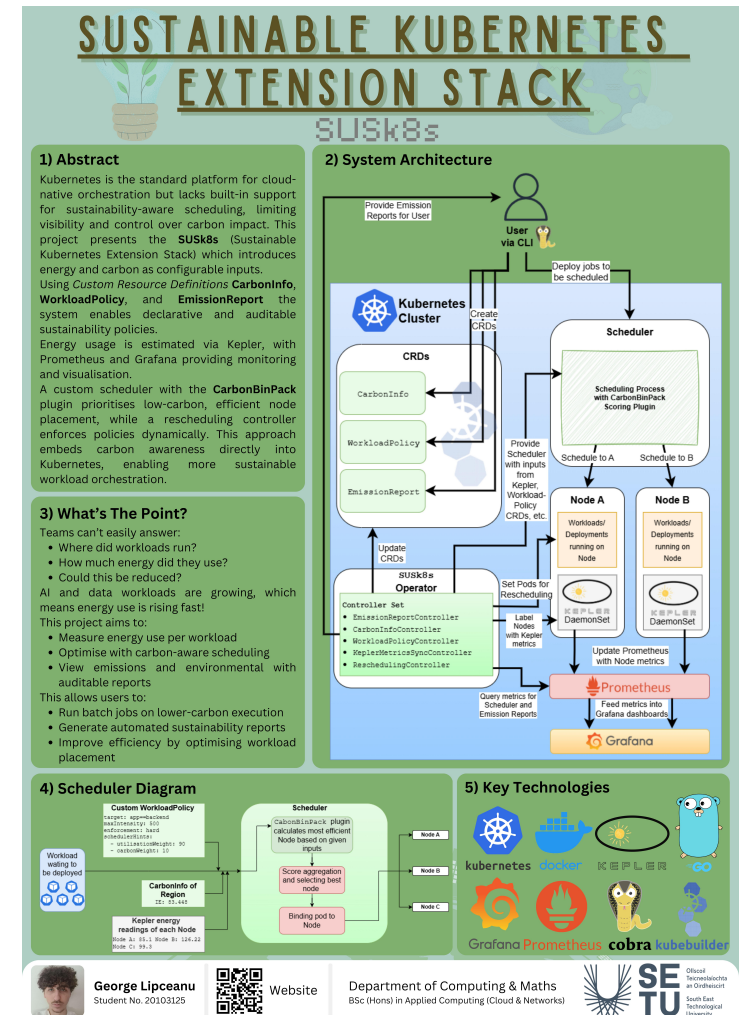
- Cloud Computing
- DevOps
- Personal Independent Project
- Software Development: (Core)

Project Supervisor

Richard Frisby

Kubernetes natively lacks mechanisms to manage the carbon impact of growing cloud workloads. SUSk8s addresses this by turning energy into a configurable signal which can be installed in Kubernetes clusters. It uses Custom Resource Definitions for declarative policy enforcement and a custom operator to manage these, with Kepler, Prometheus and Grafana providing supporting telemetry. A custom scheduler runs alongside the default, prioritising low-carbon nodes via a custom scoring plugin, with the custom operator running a rescheduler controller continuously evicts non-compliant pods.

by George Lipceanu



Technologies: Golang, Kubernetes, Docker, Kepler, Kubebuilder, Prometheus, Grafana, Cobra CLI Framework

<https://georgelipceanu.github.io/fyp/>



Academic Title

Real-Time Eye Tracking Horror Game Using Webcam-Based Blink Detection and Head Tracking

Project Areas

- Game Development

Project Supervisor

Kurt Pumares

Eyes Wide Open

#20 / TL2.49

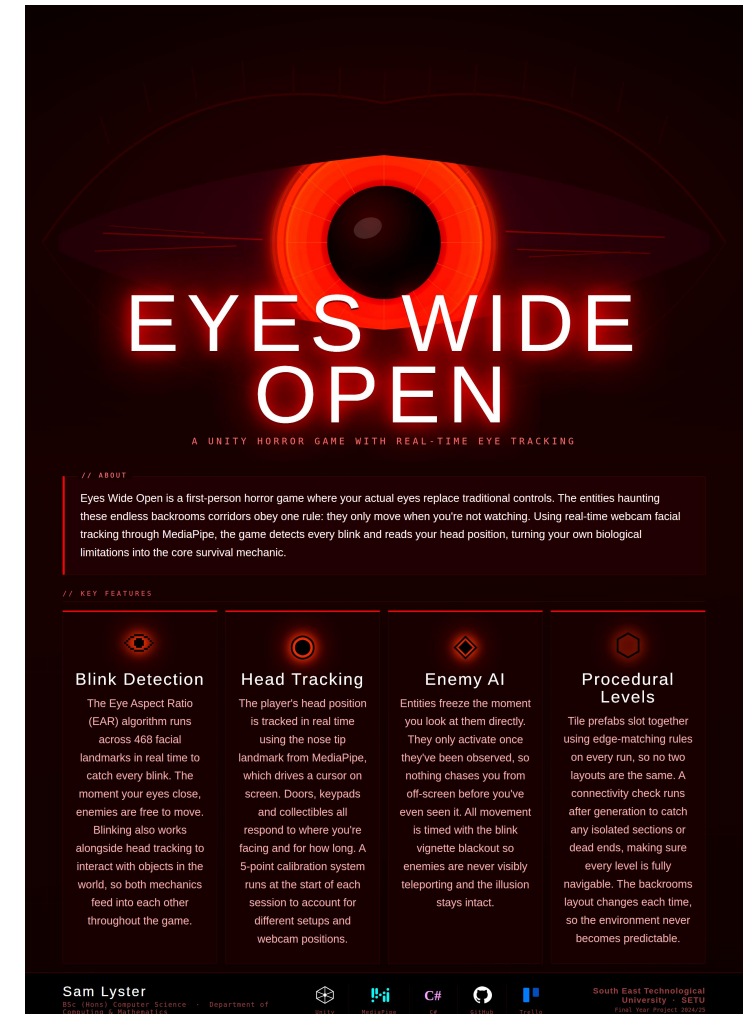
by Samuel Lyster Cummins

Eyes Wide Open is a first-person horror game where your actual eyes replace traditional controls. Using a standard webcam and the MediaPipe framework, the game tracks head position in real time to drive an on-screen cursor for interaction, while blink detection controls enemy behaviour. Players explore procedurally generated backrooms environments, collecting hidden codes and inputting them at keypads to progress through each level. Enemies can only move when the player is not observing them, making blink detection and head tracking central to survival.



Technologies: Unity, MediaPipe, Visual Studio, GitHub, Trello, C#

<https://samuellystercummins0.github.io/EyesWideOpen-FYP/>





Academic Title

Design and Development of a Facial Interface for AI Agents

Project Areas

- AI/ML Development
- Internet of Things
- Open Source
- Software Development: (Back End / Core)

Project Supervisor

Dr Kieran Murphy

This project is a facial interface for AI agents that displays real-time emotional expressions during conversation. It processes live audio input and uses vector embeddings to detect sentiment and tone, which are mapped to dynamic facial animations rendered in C++ using Raylib on a Raspberry Pi. AI responses are generated using Llama Stack, converted to speech, and streamed back for playback, enabling a fully voice-based interaction with no text display. The system is deployed with a Kubernetes backend using a Bun-based service for faster processing.



Technologies: Python, C++, TypeScript, Raylib, Bun, PyTorch, Kubernetes, Llama Stack, Raspberry Pi

<https://2000krzysztof.github.io/final-year-project/>

Facial Interface for AI Agents

#21 / TL2.50

by Krzysztof Malczuk

Facial Interface

“An LLM chat bot interface”
Real-time emotion-aware interaction via live audio embeddings

The Stack: Distributed Intelligence

- Intelligence: Python & PyTorch (Model Training)
- Orchestration: Kubernetes (Scaling the Llama inference)
- Runtime: Bun (High-speed backend glue)
- Interface: Raylib on Raspberry Pi

The Neural Engine: Audio-Driven Emotion

Custom-trained audio embedding model that translates vocal tonality into facial metadata.

- The Brain: Llama Stack hosted on Hetzner.
- The Sync: Server-side Wav2Lip processing generates lip movement with phoneme-level granularity.
- The Result: Latency-optimized streaming that aligns audio, lip-sync, and micro-expressions in near real-time.

The Edge Interface: Hardware & Rendering

To keep the “face” responsive and portable, the frontend runs on a Raspberry Pi using Raylib.

- Low Latency: Lightweight C++-based rendering ensures smooth animations.
- Edge Processing: The Pi handles the final animation blending and audio playback, keeping the interface fluid even while the remote LLM “thinks”.

The Vision: Giving AI a Pulse

Most AI interactions feel like typing into a void. This project bridges the gap between digital intelligence and human emotion. By mapping live audio vectors to micro-expressions in real-time, we've created an LLM interface that doesn't just talk — it reacts.

Krzysztof Malczuk, BSc (Hons) in Applied Computing, SETU

#22 / TL2.28

RunHub



Academic Title

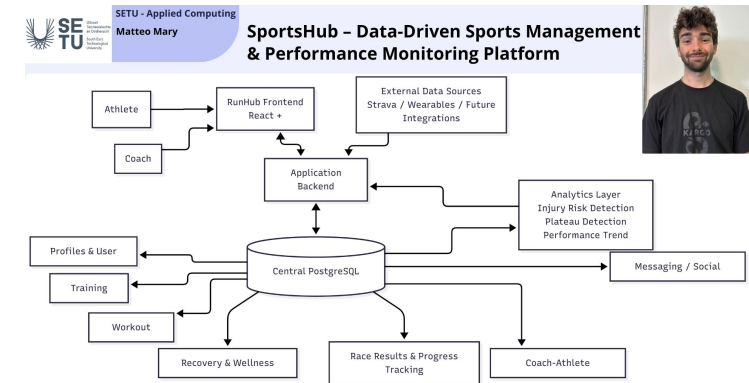
RunHub-Data-Driven Sports Management & Performance Monitoring Platform

Project Areas

- Cloud Computing
- Database and Analytics
- Software Development: (Web)

Project Supervisor
Richard Lacey

by Matteo Mary



Problem	Solution
<ul style="list-style-type: none"> • Athlete data is often scattered across multiple apps, notes, and training logs • Coaches struggle to efficiently manage and monitor multiple athletes simultaneously. • Generic platforms do not combine training, recovery, and progression data into a unified system 	<ul style="list-style-type: none"> • RunHub centralises training plans, workout logs, recovery metrics, and athlete performance history • Tracks HRV, sleep quality, and caloric intake to predict potential injuries or plateauing . • The platform supports both athlete self-monitoring and coach-athlete collaboration

Technology Stack

<p>Frontend React TypeScript</p> <p>Backend FastAPI, SQLAlchemy</p> <p>Infrastructure PostgreSQL database Docker containerisation</p> <p>AI Integration OpenAI for injury and plateau prediction</p>	
--	--

Key Features

Athlete Features	Coach Features	Results & Impact
<p>Coach Dashboard Coaches can manage multiple athletes, view progress, and adjust plans in real-time.</p> <p>AI Adaptation AI analyses performance data and will give you recommendations to prevent potential injuries.</p>	<p>Strava Sync Strava integration syncs activities automatically for seamless tracking.</p> <p>Health Metrics Track HRV, sleep, and calories to optimise recovery and performance.</p>	<p>Functional, scalable system delivering data-driven training insights.</p> <p>Streamlined communication between Coach and Athlete</p>

RunHub is a full-stack web app for runners and coaches that brings everything into one place. Training plans, workouts, recovery data, and performance tracking. Instead of using multiple apps, everything is connected in a single system so you can easily monitor progress and manage training. It also includes some smart features using AI that analyse your data such as HRV, training intensity, sleep score and caloric intake to flag things like injury risk or performance plateaus, helping athletes and coaches make better decisions.



Technologies: React, TypeScript, Python, FastAPI, Docker, PostgreSQL and OpenAI

<https://matteomary.github.io/>



Academic Title

A Client-Server Based Media Centre Focused on Ease of Use

Project Areas

- Database and Analytics
- Open Source
- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

David Drohan

This project provides both frontend and backend applications as a home media centre solution. While various solutions already exist, some have unwanted monetisation, while others include complex features and present a confusing UI, which can be difficult for people less experienced with technology to understand and manage. This program strikes a balance between these: no core functionality requires payment, yet it is easy to set up and navigate the features of the application. It supports various types of media, which are stored in the server's database and accessible from the web client.



Technologies: C++, TypeScript, FFmpeg, React, Next.js, Node.js, SQLite, Visual Studio Code, GitHub

<https://stephenmcgrath20103121.github.io/fyp-website/>

MediaRoot

#23 / TL2.35

by Stephen McGrath

Stephen McGrath
BSc. (Hons) in Applied Computing
(Computer Forensics & Security Stream)
Department of Computing and Mathematics
South East Technological University

Client-Server Based Media Centre

Description

In an age where streaming is becoming more expensive due to the growing amount of platforms, along with a greater interest in owning media amid an environment of impermanence, more people are interested in setting up their own media centre.

This program aims to solve two common issues with existing solutions: no core functionality requires payment and it is easy to set up and navigate the features of the application.

Full control over your favourite media

Self-Hosted

Accessible UI

No intrusive fees €

Methodology

Key Technologies



Academic Title

Unity-Based Virtual Reality Escape Room Game

Project Areas

- Game Development

Project Supervisor

Brendan Lyng

Castle Puzzle Mysteries VR is a game developed using Unity and C#. The player's goal is to navigate through the procedurally generated rooms and solve puzzles that are stopping them from progressing down the castle. The player encounters enemies that spawn and try to prevent the player from leaving. The enemies can be dealt with by using weapons found throughout the level. The game is played in VR using the provided controllers. The player can choose to switch to hand-tracking mode for a more immersive feel and use hand gestures to teleport, grab and interact with objects in the level.



Technologies: Unity, Visual Studio, C#, GitHub, Trello, Blender, Meta

<https://radvydasm.github.io/>

Castle Puzzle Mysteries VR

#24 / TL2.28

by Radvydas Mikalauskas

Castle Puzzle Mysteries VR

A Unity-based virtual reality escape room video game with procedurally generated rooms

Procedurally Generated Rooms

The game features procedurally generated rooms. Each room has a unique layout of puzzles chambers and enemy spawn points. The layout of the room is procedurally generated before the player loads into the game.

Hand-tracking

Players can use the VR controllers or choose to play with hand-tracking. Hand-tracking allows players to play with more immersion while having the ability to perform actions the same way as the VR controllers do.

Project Methodology

The game development was done using the Scrum methodology. Sprints were planned and reviewed at the beginning and end of a two week period. Each sprint consisted of work that improved the game every two weeks.



Radvydas Mikalauskas, BSc. (Hons) Computer Science, Department of Computing and Mathematics, SETU



#25 / TL2.35

Athena-KB



Academic Title

Development of a Secure, Multi-Source RAG Platform for Offensive Security Knowledge Management

by Ava Neary

Project Areas

- AI/ML Development
- Cloud Computing
- DevOps
- Work Based Project
- Software Development: (Back End)

Project Supervisor

Dr Bernard Butler

Athena-KB is a proof-of-concept implementation of a fully self-hosted Retrieval-Augmented Generation (RAG) system. It includes an external ingestion component and a self-managed AI inference stack, built entirely on open-source software. It provides full end-to-end control over data, ingestion and retrieval through configurable pipelines, allowing operators to curate, manage and query knowledge bases from both internal and external sources, and receive transparent, source-backed answers.



AVA NEARY | BSC (HONS) APPLIED COMPUTING | SUPERVISOR: DR. BERNARD BUTLER

01 ABSTRACT
 Athena-KB is a proof-of-concept implementation of a fully self-hosted Retrieval-Augmented Generation (RAG) system. It includes an external ingestion component and a self-managed AI inference stack, built entirely on open-source software. It provides full end-to-end control over data, ingestion and retrieval through configurable pipelines, allowing operators to curate, manage and query knowledge bases from both internal and external sources, and receive transparent, source-backed answers.

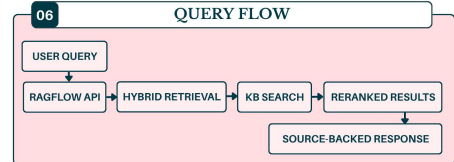
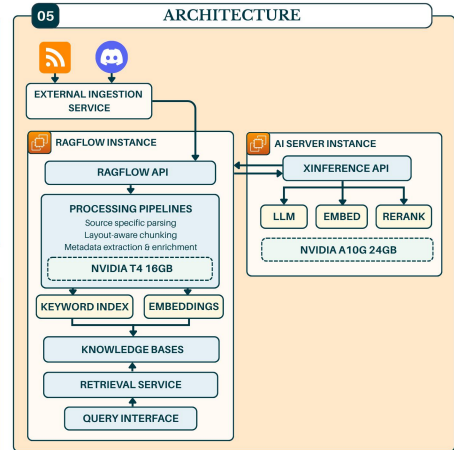
02 MOTIVATION

- Cybersecurity evolves rapidly, making knowledge maintenance a constant challenge.
- Entry-mid level red team operators lack access to deep, tactical knowledge that seasoned operators have curated over years.
- Commercial AI solutions can't be trusted with sensitive data.
- LLMs can tailor responses to a user's experience level, making knowledge accessible across all skill levels.

03 KEY FEATURES

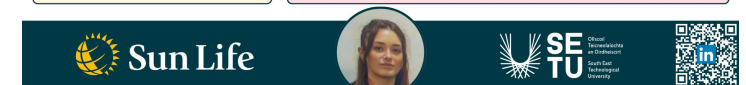
- Scoped knowledge bases.
- External ingestion initially supporting RSS and Discord, with most file types accepted via direct upload
- Ingestion pipelines with metadata enrichment for improved retrieval.
- AWS infrastructure provisioned through IaC.
- Web UI for knowledge base management, pipeline configuration and querying.

04 TECHNOLOGIES



Technologies: Python, RAGflow, XInference, vLLM, MySQL, Elasticsearch, Docker, AWS

<https://ayyvahh.github.io/FYP-Website/>



#26 / TL2.25



SETTime

Academic Title

Improve the Experience of SETU Students

Project Areas

- Open Source
- Software Development: (Mobile Native)

Project Supervisor

Dr Anita Kealy

by Daniel O'Brien

This project is an android application for Students of SETU that want a better experience during their time here. It displays a better timetable for students than what's shown on the official timetable website by removing modules and lectures that the student doesn't have, which the official timetable includes. There's an assignment submission tracker and reminder, if the student wishes to use them, a meeting scheduler for group projects, or any other meetings students may want to schedule, and a messaging feature for students to communicate with each other.

The screenshot displays the SETTime application interface. At the top, a text box explains the project's purpose: providing a better timetable and additional features like assignment trackers and meeting schedulers. Below this, there are three main sections:

- Technologies:** A grid of icons representing the tools used: Visual Studio Code, Android Studio, Kotlin, Python, and Firebase.
- Timetable:** A list of scheduled classes for Monday, including 'PROG-0094 Functional Programming' and 'CRIM-0008 Criminal Evidence'.
- Module Select:** A list of available modules with checkboxes for selection, such as 'PROG-0094 Functional Programming' and 'COMP-0572 Data Mining II'.

 The interface also includes an 'Initial Startup Screen' with a student number input field and a 'Module Select' screen with a 'Submit Modules' button. A QR code and the URL 'https://settime.ie' are provided for access. The SETU logo is visible in the bottom right corner.



Technologies: AWS, Python, VSCode, Kotlin, Android Studio

<https://www.settime.ie>



Coverage Mapper Ireland

#27 / TL2.25

Academic Title

Irish Broadband Information and Mapping Application

Project Areas

- Cloud Computing
- Software Development: (Back End / Front End / Web)

Project Supervisor

Komal Komal

Coverage Mapper Ireland is a broadband information full-stack web application tailored towards Irish consumers with a focus on user experience and simplicity, which provides users with the tools and information to help them research and hopefully select an Internet Service Provider that best suits their own personal needs. The application displays a side-by-side comparison of available providers, showing key information such as connection speeds, monthly pricing, setup fees, contract lengths, and technology types (fibre, 5G).

by John O'Mahony

Coverage Mapper Ireland

Abstract

Coverage Mapper is a broadband information full-stack web application tailored towards Irish consumers with a focus on user experience and simplicity, which provides users with the tools and information to help them research and hopefully select an Internet Service Provider that best suits their own personal needs.

Users select their county and town to discover which broadband providers serve their area. The application displays a side-by-side comparison of available providers, showing key information such as connection speeds, monthly pricing, setup fees, contract lengths, and technology types (fibre, 5G). Users can filter and sort results by price, speed, or other criteria to find the best option for their needs.

The platform aggregates data from provider websites and CombEng reports into a single, easy-to-use interface, eliminating the need to visit multiple provider websites individually. All information is presented clearly with coverage quality indicators and helpful notes about availability, with direct links to provider websites for users to verify exact address availability and complete their purchase.

Tools Used

Development Methodology

The Coverage Mapper Ireland project follows an Agile-inspired iterative approach, structured into focused development sprints that enable incremental progress, continuous testing, and flexible prioritization. While not adhering to strict Scrum ceremonies, each sprint concentrates on specific deliverables with clear acceptance criteria.

Progress is tracked using GitHub Projects with a Kanban-style board organizing tasks into Backlog, In Progress, Review, and Done columns. This visual task management approach helps identify blockers early, prevent scope creep, and maintain alignment with core project objectives.

John O'Mahony
20098626
07jmahony@gmail.com

BSc (Hons) in Computer Science (Cloud & Networks)
Computing and Maths
South East Technological University

Official Technobricks on Oribaccart
South East Technological University



Technologies: React Native, AWS, PostgreSQL, Knex.js, Mapbox GL

<https://20098626j.github.io/Coverage-Mapper-Ireland/>



GoKey

#28 / TL2.52



Academic Title

Design and Implementation of a Secure Phone-as-Car-Key Platform for Car Rental Services

Project Areas

- Automotive and Automation
- Cloud Computing
- Computer Networks
- Computer Security
- Software Development: (Back End / Core / Front End / Mobile Native)

Project Supervisor

Brendan Jackman

by Shane Power

This project aims to design and implement a secure smartphone-based digital car key system, with a focus on car rental and car fleet management. The aim of the system is to replace traditional physical keys with securely provisioned digital keys. This will improve user convenience and reduce the administrative overhead and the security risks associated with handling physical keys. This is inspired by the shift in the car industry towards keyless vehicle access, and the growth of contactless, app-based car rental services.



Technologies: Android, Python, Vector CANoe, Bluetooth BLE, Firebase, Firestore

<https://shanepower22.github.io/car-key-app/>



#29 / TL2.52



Agorex

Academic Title

Escrow System to Combat Ticket Touting

Project Areas

- AI/ML Development
- Computer Security
- Database and Analytics
- Software Development: (Back End / Front End / Mobile Hybrid)

Project Supervisor

Rob O'Connor

Agorex is a secure mobile marketplace for reselling event tickets that eliminates scalping and fraud. Built with React Native and Supabase, the app uses Google Gemini AI to analyse event data and enforce a face-value price cap on every listing, ensuring buyers never overpay. To guarantee safe exchanges, utilising a Stripe webhook architecture that locks ticket inventory during checkout, effectively acting as an escrow system. Funds and tickets transfer only when payment clears, creating a transparent, peer-to-peer ticketing ecosystem built entirely around fairness and trust.



Technologies: Gemini said React Native, Expo, TypeScript, Supabase, PostgreSQL, Stripe API, Google Gemini API

<https://reifiionn.github.io/FYP-Pages/>

by Fionn Reilly

The poster features the Agorex logo and title at the top, followed by a brief description of the project. It includes a 'What is Agorex?' section explaining the regulated marketplace and the use of Google Gemini AI. A 'Why make Agorex?' section lists the problems with current resale platforms and the solution provided. The 'System Architecture' section shows a diagram with Expo, React Native, Stripe, Gemini, Supabase, AUTH, and STORAGE. The 'How would purchasing a ticket work?' section contains a detailed sequence diagram showing the interaction between User A, User B, Supabase Postgres, Supabase Realtime, and Stripe API. The 'App Layout' section shows a screenshot of the mobile application interface. At the bottom, it lists the author's name and affiliation, along with QR codes for the project site, GitHub, and LinkedIn.



Cicada

#30 / TL2.51

Academic Title

Behavioural Editing of Large Language Models

Project Areas

- AI/ML Development
- Automotive and Automation
- CI/CD & Testing
- Cloud Computing
- Database and Analytics
- Information Systems and Modelling
- Personal Independent Project
- Software Development: (Back End / Core / Front End)

Project Supervisor

Dr Peter Carew

CICADA is a framework for controlling the behaviour of large language models without retraining or fine-tuning. It analyses a model's internal structure to identify components responsible for specific behaviours and enables precise, surgical modification. Multiple interventions can be applied simultaneously without degrading existing capabilities. CICADA also supports injecting new capabilities while preserving original function, and has been validated across model scales with consistent results and no loss in baseline performance.



Technologies: Python, Pytorch, HuggingFace, TransformerLens, NumPy, scikit-learn, CUDA, Git, matplotlib, Jupyter

<https://cicada-flame.vercel.app/>

by Wolfgang Romanowski

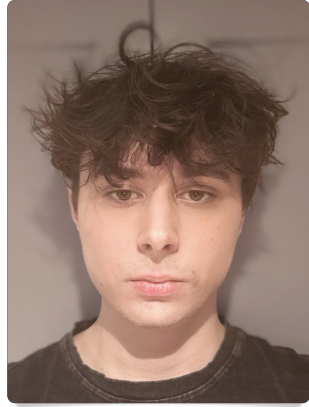
Cicada is a pipeline of algorithms built on redefining the behaviors of AI language models. By targeting specific operations in the LLM, you can upon AI pitfalls like hallucinations and repetition, without retraining the model.

Screen → Group → Decompose → Track → Edit

SE TU Oilscoll
Technolaíochta
an Oirdheisirt
South East
Technological
University

python NumPy

Wolfgang Romanowski W20101931
Supervisor: Peter Carew
SE600 Computer Science (Common Entry)
Department of Science & Computing



Academic Title

Distributed Intrusion Detection System with Consensus-Based Anomaly Validation

Project Areas

- AI/ML Development
- Cloud Computing
- Computer Networks
- Database and Analytics
- Software Development: (Core / Front End / Mobile Hybrid)

Project Supervisor

Dr John Sheppard

SentinelMesh

#31 / TL2.25

by Adam Thompson

Distributed Intrusion Detection System with Consensus-Based Anomaly Validation SentinelMesh

Description

SentinelMesh is a distributed intrusion detection system that spreads traffic analysis across three independent nodes, each running a different machine learning model - Logistic Regression with PCA, a Decision Tree, and a Multilayer Perceptron. When a node flags suspicious traffic, it consults its peers and a majority vote determines the final classification. Each node captures live packets using GoPcap, extracts 21 statistical flow features, and scores flows locally using models trained on the CICIDS2017 dataset and exported to JSON for native Go inference - no Python dependency at runtime. Detections, per-node votes, and node health are persisted to PostgreSQL and surfaced through a React dashboard.

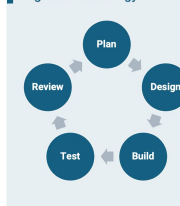
Motivation

- Traditional IDS relies on centralised monitoring - a single point of failure
- Signature-based detection cannot identify novel or zero-day attacks
- Machine learning enables pattern-based detection of previously unseen threats
- Distributing detection across multiple independent nodes improves resilience and reduces false positives through consensus

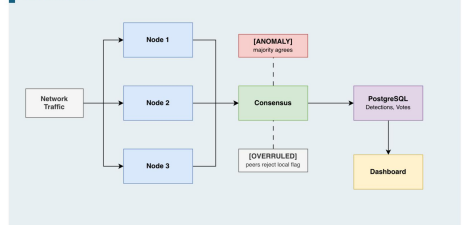
Dataset – CICIDS2017

- Canadian Institute for Cybersecurity, publicly available
- 2.8 million labelled flows across 8 days of captures
- Covers a broad range of attack types: DoS, port scan, brute force, botnet, web attacks
- Provides both raw PCAP files and pre-labelled flow-level CSV data
- Models trained on full 8-day dataset, evaluated on a held-out test set
- Decision thresholds tuned on a held-out validation set

Agile Methodology



Architecture



Detection Pipeline

- Anomaly Detection**
 - Flows identified by 5-tuple, expired on FIN/RST or 30s idle timeout
 - 21 statistical features per flow (packet rates, byte rates, inter-arrival times, TCP flags, packet length stats)
 - Each node runs a different model - LRF+PCA (node1), Decision Tree (node2), MLP 64-32 (node3)
 - All ML inference runs natively in Go from exported JSON. No Python at runtime
 - When a flow score exceeds the node's tuned threshold, a consensus round is initiated
- Brute Force Detection**
 - Runs in parallel with anomaly detection, independent of the ML pipeline
 - Sliding window counts TCP connections per (source IP, destination port)
 - Alert fires when count exceeds threshold within the window (default: 50 connections / 60s)
 - Produces [BRUTE-FORCE] - not subject to consensus vote

Consensus Mechanism

- When a node flags a flow as suspicious, it broadcasts a vote request containing the raw 21-feature vector and its local anomaly score to all peer nodes via POST /vote
- Each peer independently runs its own model on the same features and returns a vote. Votes are collected concurrently within a 2-second timeout.
- A majority rule determines the outcome
- Since each node uses a different model, linear, tree-based, and neural, disagreement is meaningful. Unanimous votes indicate high confidence.

Node Diversity

Node	Model	F1	Recall	Precision	FPR
node1	LR+PCA	0.968	92.6%	71.7%	6.3%
node2	Decision Tree	0.992	99.2%	99.2%	0.2%
node3	MLP	0.986	98.8%	98.3%	0.4%

Node 1's weaker linear boundary means it disagrees with nodes 2 and 3 on borderline flows, ensuring consensus is earned rather than assumed. A unanimous vote indicates genuine confidence; a split vote exposes flows where classification is uncertain.

Technology



SentinelMesh is a distributed intrusion detection system that spreads traffic analysis across three independent nodes, each running a different machine learning model - Logistic Regression with PCA, Decision Tree, and MLP. When a node flags suspicious traffic, it consults its peers and a majority vote determines the final classification, reducing false positives without sacrificing recall. Each model draws different decision boundaries, so disagreement on borderline flows is meaningful. All ML inference runs natively in Go from exported JSON meaning there is no Python at runtime.



Technologies: Python, Go, scikit-learn, AWS, PostgreSQL

<https://adamthompson43.github.io/distributed-ids/>

Adam Thompson - 20103347
Applied Computing (Forensics and Security)
Department of Computer Science & Mathematics
South East Technological University Waterford
Supervisor: Dr. John Sheppard



Code-A-Bot

#32 / TL2.28

Academic Title

Accessible & Cost-Effective Large-Scale Educational Robotics Platform

Project Areas

- Internet of Things

Project Supervisor

Jason Berry

by Robert Walsh

This project is a robotics platform designed to help teachers introduce programming and robotics to young students in a simple and engaging way. It includes ready to use tools and lesson plans that explore topics like machine learning, vision systems, and telepresence through hands-on activities. Using the Micro:Bit, beginners can start with visual coding in MakeCode, while more advanced learners can use MicroPython or JavaScript. The aim is to make STEM learning accessible, interactive and enjoyable from an early age.

Technologies: Micro:Bit, MakeCode, MicroPython, JavaScript, Teachable Machine, LOFI Robots Suite

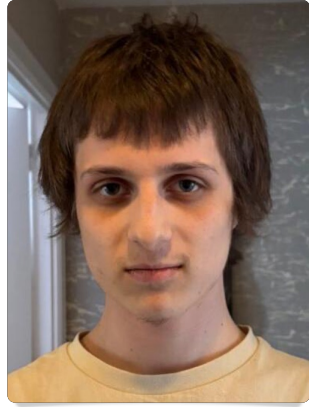
The infographic is titled "Accessible & Cost-Effective Large-Scale Educational Robotics Platform" and is attributed to Robert Walsh, BSc (Hons) in Applied Computing (IoT), Department of Science and Computing, SE TU. It features a central image of the Code-A-Bot robot, which is purple and white, with a Micro:Bit board visible on top. The robot has a height of 43cm and a width of 65cm. The infographic includes several text boxes and icons:

- What is Code-A-Bot?** Code-A-Bot is a robotics platform designed to help teachers teach programming and robotics concepts to young learners. The internal Micro:Bit allows for the use of multiple programming languages and communication through Bluetooth and Radio.
- Building Minds with Robotics** Strong evidence shows robotics enhances conceptual understanding, motivation, and STEM competencies in young learners. Hands-on, tangible interaction helps students learn complex topics using the bot and their own devices, improving problem-solving and cognitive development.
- Technologies:** Micro:Bit, MakeCode, MicroPython, JavaScript, Teachable Machine, LOFI Robots Suite.
- Features:** Stop-Go Vision System, Telepresence, Lesson Plans, Hand Gesture Control.
- Logos:** micro:bit, JS, Teachable Machine, LOFI!



<https://robert-walshh.github.io/code-a-bot/>

#33 / TL2.51



Academic Title

Digital Open-Source (OSINT) Web Application for Information Gathering with Vulnerability Assessment

Project Areas

- Computer Forensics
- Computer Security

Project Supervisor

Opeyemi Bamigbade

by Alan Zaharia

The project aims to implement a digital open-source intelligence web application for information gathering on publicly available data relating to domains and online systems. The project incorporates multiple digital OSINT functions such as DNS record lookups, IP address lookups, WHOIS data, mail policies, mail exchange, etc into a single application using APIs. A risk assessment logic with the use of a weighing system, identifies any potential vulnerabilities for a domain searched on the application.

DIGITAL OPEN-SOURCE (OSINT) WEB APPLICATION FOR INFORMATION GATHERING WITH RISK AND VULNERABILITY ASSESSMENT

Digital OSINT Application

PROJECT DESCRIPTION

The project aims to implement a digital open-source intelligence web application for information gathering on publicly available data relating to domains and online systems. A risk assessment logic with the use of a weighing system, identifies any potential vulnerabilities for a domain searched on the application. The project additionally has an information tab for beginners to learn OSINT

SYSTEM DIAGRAM

System Architecture of the Digital OSINT Application

METHODOLOGY

Flexible and staged approach for development

- Trello
- Gantt Diagram

KEY FEATURES

The Digital OSINT Application includes various OSINT functions such as:

- Domain Lookup
- IP address Lookup
- Email Security Checks
- Technology Stack (TXT Records)
- Risk Scoring
- Information for education

KEY TECHNOLOGIES

- Frontend: Html, CSS, JavaScript
- Backend: Node.js
- Version control: GitHub

Alan Zaharia – Supervisor: Opeyemi Bamigbade– School of Science and Computing – Bachelor of Science (Hons) In Applied Computing – Computer Forensics and Security – SETU



Technologies: HTML, CSS, JavaScript, GitHub

<https://alaine127.github.io/FYP-LandingSite/>

BSc (Hons) in Computer Forensics and Security

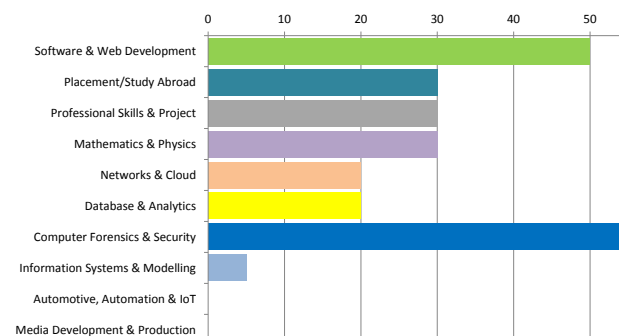
The BSc (Hons) in Computer Forensics & Security is a 4-year ab-initio Level 8 programme.

The aim of the BSc (Honours) in Computer Forensics & Security programme is

to produce graduates with the necessary knowledge, skills and expertise to pursue a career in computer security and computer forensics. Graduates should be able to build, use and adapt software and hardware solutions to conduct investigations or to secure networks and systems. The course will also confer on the graduates a set of personal and professional attributes that will allow them greater flexibility in the development of their own career options. Specifically the course aims to produce graduates who can

- Reason and problem-solve to a high level in the area.
- Design specific security solutions.
- Provide security support to systems development teams.
- Participate constructively in the deployment of new security technologies.
- Participate in the development of forensic solutions in response to a security solution.
- Undertake research-based projects where required.
- Manage technology-based projects that require the handling of innovation and change in dynamic environments.
- Present and communicate clearly.
- Work with others in a group environment.

The breakdown of course credits across the four years on each specialism is illustrated by the following charts.





TAC Zero Trust Case Management Platform

#34 / TL2.51

Academic Title

Design & Implementation of a Zero Trust Identity Centric Secure Case Management Platform

Project Areas

- Computer Networks
- Computer Security
- Database and Analytics
- Information Systems and Modelling
- Open Source
- Software Development: (Web)

Project Supervisor
Jerry Horgan

by Jabez Dickson

This project presents the design and implementation of a Zero Trust identity centric case and subject registry for TAC Industries. The system demonstrates secure handling of investigative data using network segmentation, federated identity, role based access control, and audit logging via SIEM. The infrastructure includes VLAN isolated zones, Active Directory authentication, ADFS federation, and Virtual Machine technologies. It is a web based case management platform that validates the architecture and shows identity based security replacing traditional perimeter security.



Technologies: Active Directory, ADFS, VLAN Segmentation, Proxmox, pfSense, SIEM, MinIO, Next.js, RBAC, KASM, SQL

<https://github.com/JacobDicksonOfficial/TAC-Industries-Infra>



AnalysIT Attachment Scanner

#35 / TL2.25

Academic Title

Developing an Outlook Extension for Malware Analysis

Project Areas

- Computer Forensics
- Personal Independent Project
- Software Development: (Back End / Front End)

Project Supervisor

Michael McMahon

by Alexandra Dinea

AnalysIT is an attachment scanner extension built for Outlook, made to conduct a static analysis of files within the email, without ever downloading the file locally. The resource utilizes OSINT to enrich the output, and allows the user to download a CSV file of the IOCs to send to a SOC/Security admin for incident response, and provides the user with remediation steps. Outlook was deemed the best option to develop an extension for its widespread enterprise adoption and seamless integration capabilities within organizational security workflows.

AnalysIT
An attachment scanner for Outlook

Alexandra Dinea - BSc
Hons Computer Forensics
Supervisor: Michael McMahon

Abstract
AnalysIT is an attachment scanner extension built for Outlook, made to conduct a static analysis of files within the email, without ever downloading the file locally. The resource utilizes OSINT to enrich the output, and allows the user to download a CSV file of the IOC's to send to a SOC/Security admin for incident response, and provides the user with remediation steps. Outlook was deemed the best option to develop an extension.

Tools and Technologies
TS, VirusTotal, ipinfo.io, AbuseIPDB, urlscan.io, webpack, FastAPI, Figma

Methodology
Agile-Scrum
Agile Scrum is an iterative framework for developing products through short, time-boxed iterations called sprints (usually 1-4 weeks)
Tasks and sprints were visualised and broken down using burndown charts, enabling structured tracking of progress, workload distribution, and sprint completion against planned times.

Objectives

- Build an add-in for Outlook, using React and Typescript
- Allow the add-in to run python malware analysis scripts externally through a backend server, uploading the file to a container.
- Detect what file, and outline the file structure through analysis.
- Enrich the results with Open Source Intelligence.
- Allow the user to export IOCs to a CSV file.
- Provide user-friendly remediation steps to help users mitigate detected security risks.

App Flow & UI Review

Export Report



Technologies: OSINT tools, NodeJS, Typescript, React, Outlook, Webpack, Yeoman, FastAPI, Python, Docker, Figma

<https://github.com/alexalexiiii/final-year-project>



Academic Title

System for Deploying Security and Forensic Classroom Labs

Project Areas

- Cloud Computing
- Computer Security

Project Supervisor

Jimmy McGibney

LearnSec

#36 / TL2.50

by Jorja Holland

LearnSec is a cloud-based system designed to simplify cybersecurity lab deployment for students. A web application built using Python (Flask) provides the user interface, while Boto3 is used to communicate with AWS services start and stop the lab environments in AWS Academy. A separate AWS account hosts AWS Cognito for user management and S3 buckets for storing lab content and launch templates, which are accessed by AWS Academy users. Apache Guacamole provides a browser-based desktop interface. Labs are created on demand, making the system cost-effective, scalable, and secure.



Technologies: AWS, AWS Academy, Python, Python Flask, Boto3, Pycharm, Apache Guacamole

<https://jholland-22.github.io/websiteFYP/>

LearnSec
SYSTEM FOR DEPLOYING SECURITY AND FORENSIC CLASSROOM LABS

Introduction
This project is aimed at addressing the need for quick and reliable availability of virtual machines for students to perform labs for cyber security modules. Cloud automation simplifies the distribution of VMs providing scalability, consistency and availability.

Methodology
An Iterative development approach was taken. It was broken into 5 two-week sprints. Each sprint consisted of the following:

- Pick specific features to build
- Implement them using AWS CDK
- Test them to make sure they worked
- Fix any issues
- Repeat process

Tools and Technologies
AWS, AWS Academy, Python, Flask, Boto3, Pycharm, Apache Guacamole

AWS Architecture
The architecture diagram shows the flow from Users (Students/Educators) through AWS Cognito to the AWS Cloud. The AWS Cloud includes an AWS Academy Account (Project) and a Personal AWS Account. The Personal AWS Account contains an Amazon S3 bucket for Lab Content and Launch Templates, and an Amazon EC2 instance for the Lab Environment. The AWS Academy Account contains an Amazon S3 bucket for Lab Content and Launch Templates, and an Amazon EC2 instance for the Lab Environment. The AWS Academy Account also contains an Amazon IAM role for the Lab Environment.

Key Features
User-Friendly
• Web-based interface, no installation needed
• Deploy labs with one click
Scalable & Reliable
• Auto-scales for multiple users
• 24/7 uptime
Consistent
• Standardised lab environments
• Repeatable deployments
Secure
• Role-based access control
• Authenticated sessions
Cost Effective
• Fully compatible with AWS Academy Accounts
• Labs run on demand



Academic Title

System for Automating a Simulated Computer Network for Cybersecurity Training

Project Areas

- CI/CD & Testing
- Computer Forensics
- Computer Networks
- Computer Security
- DevOps
- Open Source

Project Supervisor

Komal Komal

This project is a small command line tool that aims to leverage multiple technologies, mainly Vagrant, in order to deploy local cybersecurity labs. This is done by preconfigured Vagrantfiles that describe scenarios, where there are multiple machines with various roles, such as attacker, victim, etc. These machines are configured with their own OS, network settings, etc., and post deployment provisioning is handled through the use of Bash and Ansible scripts. The goal of this project is to deliver environments that can be readily deployed and tore down using free software.



Technologies: Vagrant, VirtualBox, Bash, Shell, Ansible, GitHub

<https://github.com/cienfleur/fyp-project-2026>

GuppyLab

#37 / TL2.25

by Sebastian Jazmin

GuppyLab
System for Automating a Simulated Computer Network for Cybersecurity Training
A Reproducible Environment Framework Using Vagrant

Introduction
Cybersecurity labs that are delivered by educational institute or company present a significant barrier to entry through price and admission, as well as lacking in configuration. The aim of this project is to present an automated and free solution to deploying and making cybersecurity labs using Vagrant, as an alternative to those that may not have the means to access other options.

Key Benefits:

- Rapid deployment and teardown
- Free and open source technologies used
- Transparent lab configurations
- Consistent deployment of environments
- Isolated and safe testing environment

System Architecture

User (Administrator/Student) → Scenario (Configuration Management) → Vagrant (Orchestration Layer) → Virtual Machines (VM Instances & Provisioning) → Virtual Network (Network Topology) → Cybersecurity Lab Environment (Ready for Testing)

Development Methodology: Agile-Scrum
This project used Agile-Scrum methodology throughout its development process, which revolves around an iterative development cycle involving regular sprints, standups and regular deliverables.

Iterative Development Process
Plan → Develop → Test → Review → Iterate

Key Technologies

- Vagrant**: Open source provisioning tool
- VirtualBox**: Hypervisor software for VMs
- Ansible**: Automates provisioning along with bash
- Bash/Shell**: Automates provisioning of commands
- Git**: Version control system for the project

Results

- A command-line tool that allows for the easy deployment of cybersecurity labs
- Different machines are assigned different roles in the environment
- Machines are provisioned according to their requirements using Bash and Ansible
- Environments can be tore down and spun back up as needed

Author: Sebastian Jazmin, Student ID: 20102083
Institution: South East Technological University
Contact: 20102083@setu.ie, github.com/cienfleur



Academic Title

Adversarial Multi-Agent LLM Simulation with Three-Tier RAG for Adaptive Attack and Defence

Project Areas

- AI/ML Development
- Computer Forensics
- Computer Security
- Database and Analytics

Project Supervisor

Jimmy McGibney

#38 / TL2.28

by Seán Murphy

This project presents a domain-agnostic adversarial AI framework where three autonomous agents - Red Team (attack), Blue Team (defence), and Judge (evaluation) - compete in iterative battle rounds. Each agent draws on a three-tier knowledge architecture: private strategic memory, shared battle history, and a public knowledge base, implemented via ChromaDB and local LLMs through Ollama on AWS EC2. A metacognition loop enables agents to self-assess and retain strategic insights between rounds. Demonstrated through web security scenarios.

Fraud Attack & Defence Simulator with AI

An adversarial multi-agent red-team/blue-team framework with 3-tier RAG & adaptive learning

Motivation & Research Gap

- Three autonomous agents battle iteratively - **Red Team** attacks, **Blue Team** defends, **Judge** scores - with a 3-tier RAG architecture driving adaptation each round.
- Domain-agnostic design - demonstrated with web security, extensible to other fraud detection for **Sun Life Financial**.
- Existing tools like MITRE CALDERA and CyberBattSim use static rule sets with **no persistent cross-engagement memory**.
- No open-source framework models the **co-evolution** of attacker and defender strategies using local LLMs on commodity hardware.
- Agents run entirely on **local hardware** via Ollama - no cloud dependency, no data leaves the machine.

Methodology

- **Agile** - monthly sprints covering RAG setup, agent prompt engineering, and MCP integration, with regular supervisor and industry mentor reviews.
- **Adversarial cycle** - each round is a controlled experiment tracking attack novelty, defence effectiveness, and strategy diversity across agents. Judge scores are persisted to ChromaDB after every round.
- **Theorise-before-build** - all major architectural decisions were validated before implementation.

Key Technologies

Python

Flask

AWS

AWS EC2

ChromaDB

Ollama

MCP

HuggingFace

Linux

Vector Embeddings

Text Chunk • `MiniLM-L6-v2` • [0.23, -0.14, ...] • ChromaDB

- Locally cached - no API calls
- Chosen over Ollama embeddings for efficiency and display
- Cosine similarity search returns top-k chunks as agent context per round
- 384-dimensional vectors stored across three scoped ChromaDB collections - private, shared, and public knowledge.

System Architecture

Flask Web Interface

Battle dashboard • Config • Logs

↓

MCP Tool-Calling Layer

execute_attack • apply_defence • query_rag

↓

Red Team

Llama 3.2

Judge

Mistral

Blue Team

Phi-3 Mini

↓

Private RAG

Agent learnings

Shared RAG

Battle history

Public RAG

OWASP - CVEs

↓

ChromaDB + all-MiniLM-L6-v2

Semantic vector search - 3-tier collections

Agent Roles

Red Team Agent

Generates diverse attack strategies with mandatory type rotation. Queries private RAG for novel patterns and adapts tactics based on Judge novelty scoring to maximise strategic coverage.

Blue Team Agent

Constructs defences using RAG-retrieved context from shared battle history and its own private collection, building a compounding library of successful mitigations each round.

Judge Agent

Scores rounds on novelty, effectiveness, and escalation. Writes outcomes to shared ChromaDB, penalises repeated attack types, and triggers metacognition prompts before memory is written.

System Configuration

- **Model selection** - swap any agent's LLM at runtime to change reasoning style and creativity
- **Temperature** - higher increases attack novelty; lower produces more consistent defences
- **RAG top-k** - controls ChromaDB results per query; higher gives broader context at the cost of inference time
- **Attack domain** - switching the knowledge base shifts threat context from web security to fraud detection with no code changes

3-Tier RAG Architecture

- **Tier 1 - Private Agent Collections** - Per-agent strategic learnings - not shared. Forms each agent's evolving "brain" across rounds.
- **Tier 2 - Shared Battle History** - Full round outcomes visible to all agents. Enables cross-agent pattern recognition over time.
- **Tier 3 - Public Knowledge Base** - OWASP guidelines, CVEs, fraud patterns. Static reference corpus seeded at initialisation.

Seán Murphy - 20101936
BSc (Hons) Computer Forensics & Security
Dept of Computing & Maths
South East Technological University (SETU)
Academic Year 2025/2026

Project Team
Supervisor: Jimmy McGibney, SETU
Business Mentor: Wayne Finn, Sun Life
Technical Mentor: Zohaib Khan, Sun Life

Technologies: Python, Flask, Ollama, ChromaDB, AWS EC2, LLaMA, Phi-3, Mistral, RAG, sentence-transformers



https://seanmurphy1479.github.io/fyp_site/





Academic Title

Lightweight File Integrity Verification Using Secure Hashing for Educational and Forensic Contexts

Project Areas

- Computer Forensics
- Computer Security
- Personal Independent Project
- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

Opeyemi Bamigbade

VeriLite is a lightweight file integrity monitoring tool developed in Python to support digital forensics and system security. The system uses cryptographic hashing algorithms such as SHA-256 to generate baseline signatures of files and detect unauthorised modifications. Designed with simplicity and accessibility in mind, it provides forensic functionality without the complexity of enterprise solutions like Tripwire or AIDE. The tool supports baseline creation, verification, and change detection, while maintaining reproducible logs to support evidence integrity and chain-of-custody principles.



Technologies: Python, hashlib, JSON, CLI, Streamlit, SHA-256, Git, OS modules

<https://github.com/theopakieser/FinalYearProject2026>

VeriLite – Lightweight File Integrity

#39 / TL2.50

by Theo Pakieser

Verilite

File Integrity Checker

<p>OVERVIEW</p> <p>Lightweight forensic monitor SHA-256-based detection Instant tamper identification Supports TXT, JSON, and log files</p> <p>PROBLEM</p> <p>Complex enterprise tools are:</p> <ul style="list-style-type: none"> • Difficult to configure • Resource-intensive • Not suited for education <p>RESULTS</p> <ul style="list-style-type: none"> • Detects single-character changes • Reliable hash-based verification • Fast execution 	<p>SOLUTION</p> <ul style="list-style-type: none"> • Python-based • Simple + fast • Transparent + lightweight • Maintains forensic accuracy <p>FEATURES</p> <ul style="list-style-type: none"> • Scan files • Create baseline • Detect changes <p>TECHNOLOGIES</p> <p>Python – Core system SHA-256 – Hashing JSON – Storage Streamlit – Interface Git – Version control</p>
---	---

Folder → Scan → Hash → Compare → Detect → Log

Scan for Source Code



Academic Title

Gamified CTF

Project Areas

- Computer Security
- Game Development

Project Supervisor

Komal Komal

CipherQuest

#40 / TL2.52

by Brianna Power

CipherQuest is a single-player web-based gamified CTF. The aim of this application is to educate beginner technology users in fundamental cybersecurity concepts while still making it enjoyable by adding character selection, CTF pop-up challenges that range from easy to difficult and non-playable character interactions placing the user in different scenarios to help the player understand real-world situations. Lives and score system is in place for players to compete with each other. Hints system is used to aid players in their challenges.

Gamified CTF

"CipherQuest"

System Diagram

```

graph TD
    HP[Home Page] --> S[Sign Up]
    HP --> L[Log In]
    HP --> G[Guest]
    S --> SV[Detail verification / Account Setup]
    L --> I[Input details/ Verify account]
    G --> CS[Character Selection]
    SV --> NGS1[New Game Full health Score = 0]
    I --> LSGP[Loads saved game progress]
    CS --> NGS2[New Game Full health Score = 0]
    NGS1 --> MG[Main Gameplay]
    LSGP --> MG
    NGS2 --> MG
    MG --> CI[Character Interaction]
    MG --> CTF[CTF challenges with hint system]
                    
```

Technologies

- Defold
- Supabase
- LUA
- PostgreSQL
- Github
- Piskel

Description

CipherQuest is a single-player web based gamified CTF. The aim of this application is to educate beginner technology users in cybersecurity basic fundamentals while still making it enjoyable by adding character selection, CTF pop-up challenges that range from easy to difficult. Lives and score system in place for users to compete with each other. Hints system used to aid users in their challenges

Methodology

```

graph TD
    R[Research] --> FED[Front End Development (Game UI skeleton)]
    FED --> BED[BackEnd Development (Connecting UI to Functionality)]
    BED --> GA[Game Additions]
    GA --> TA[Test and Amend]
    TA --> D[Deployment]
                    
```

Technologies: Defold, LUA, PostgreSQL, Supabase, Piskel, Github

<https://briannap33.github.io/Cipher-Quest-FYP-/>

<https://briannap33.github.io/Cipher-Quest-FYP-/>

South East Technological University
BSc (Hons) Computer Forensics and Security

Technologies: Defold, LUA, PostgreSQL, Supabase, Piskel, Github

<https://briannap33.github.io/Cipher-Quest-FYP-/>

Page 43



Academic Title

Remote Monitoring Platform

Project Areas

- CI/CD & Testing
- Computer Networks
- Computer Security
- Database and Analytics
- DevOps
- Information Systems and Modelling
- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

Richard Lacey

Távlink is a multi-purpose SaaS monitoring platform to remotely oversee a wide range of devices and services across both IT and OT environments. You configure what and how you want to collect, enabling near real-time monitoring, alerting, and automated follow-up actions. Create and modify configuration templates and apply them at scale. Create organisations, add members, manage access control or even integrate into your system via the Távlink API. For sensitive and isolated environments, bridging software is available to connect even critical infrastructure safely to Távlink.



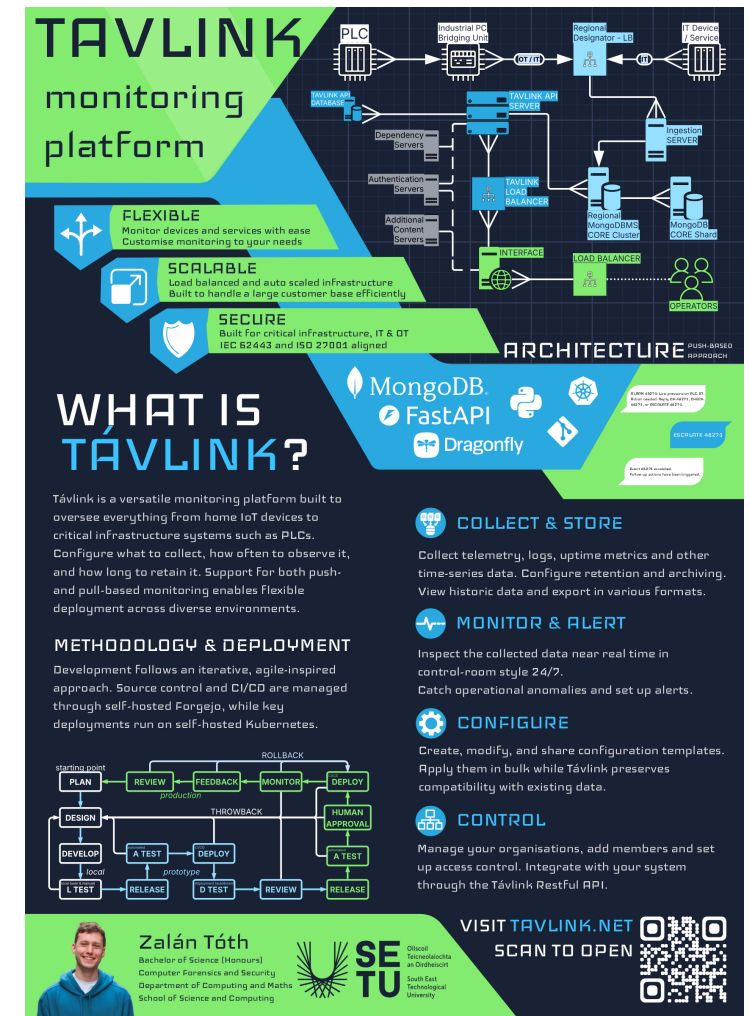
Technologies: FastAPI, MongoDB, Dragonfly, Python, Forgejo/Git, Kubernetes

<https://tavlink.net>

Távlink

#41 / TL2.35

by Zalán Tóth



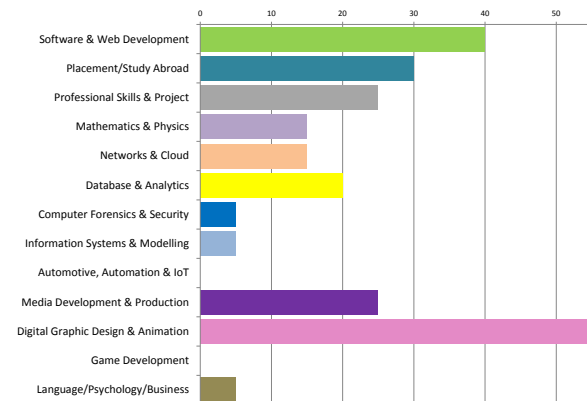
BSc (Hons) in Creative Computing

The **BSc (Hons) in Creative Computing** is a four-year Level 8 programme. Many students transfer to the final year of the programme having completed the Level 7 **BSc in Multimedia Applications Development**.

The aim of the BSc (Hons) in Creative Computing is

To provide students with the knowledge and practical experience of industry standard innovative tools and technologies, within the domains of technology and creative media. This enables graduates to pursue a career in both the computing and creative media industry. Ireland's globally recognised digital and creative economy has experienced significant growth in recent years. Enterprise Ireland aims to expand even further the export footprint of this growing sector, and skilled workers are required to do this. Creative Computing graduates will be qualified to fulfil the needs of this sector and many others.

The breakdown of course credits across the four years on these programmes is illustrated by the following chart.





LAYR

#42 / TL2.28

Academic Title

Interdisciplinary Digital/Physical Product Ecosystem

Project Areas

- Animation
- Digital Graphic Design
- Internet of Things
- Software Development: (Front End / Web)

Project Supervisor

Jacqui Woods O'Brien

This project creates a full brand identity for a niche retro-modern startup hardware company. The primary objective of this project is to adhere to current niche market needs and fully implement this design through digital and physical touchpoints. The project details the creation of designs across physical and digital mediums, culmination of multimedia skills, and how they can be utilised to solve business needs. Leveraging current and more dated techniques, the project showcases that a single creative problem solver can elevate the design and appeal of products.



Technologies: Blender, FreeCad, Adobe Illustrator, Osci-Render, Figma, FDM Printing

<https://djcanning.github.io/>

by Daniel Canning

Daniel Canning
BSc (Hons) in Creative Computing
South East Technological University

Project Description

This project creates a full brand identity for a niche retro-modern startup hardware company.

The primary objective of this project is to adhere to current niche market trends and fully implement this design through digital and physical touchpoints. The project details the creation of designs across physical and digital mediums, a plethora of multimedia skills, and how they can be utilised to solve creative needs.

Leveraging a variety of techniques, the project showcases that a single creative problem solver can elevate the design and appeal of an end product.

“Bringing Digital and Physical Together”

Methodology

Design Thinking is selected as the primary methodology as it aligns with the creative and iterative nature of this project. Design Thinking prioritises empathy and ideation, enabling exploration of multiple design directions before committing to final outputs. It ensures flexibility while maintaining a user-centric perspective, essential for creating designs that meet real user needs and expectations.

To complement Design Thinking, Agile principles are incorporated to introduce structure and maintain momentum throughout development. While Design Thinking provides creative depth and flexibility, Agile ensures that progress remains measurable and organised.

This hybrid approach combines the adaptability of Design Thinking with the efficiency of Agile, making it particularly suited to solo development by balancing autonomy with a clear framework for tracking milestones.

Key Technologies

- Blender
- FreeCad
- Adobe Illustrator
- Osci-Render
- Figma
- FDM Printing

Scan to visit my project or visit [DJCanning.github.io](https://djcanning.github.io)



Academic Title

Promotional Tool-Kit for a Musician with Included User Manual

Project Areas

- Animation
- Digital Graphic Design
- Media Development and Production
- Personal Independent Project
- Open Source

Project Supervisor

Brenda O'Neill

This project entails the creation of a number of promotional materials for a musician to use to promote his/her musical projects. It includes: • Album box art (front, back and sides) • A digital cover for streaming services • An artist logo and banner (for use on social media and streaming sites) • A CD design • A promotional poster • A track list poster • Merchandise designs (t-shirts, hoodies and stickers are what will be made for this project). The goal for this project is for it to provide an example and aid for those wishing to start in digital creation.



Technologies: Adobe Suite, Affinity, GIMP, Inkscape, Maya, Blender, Magix Vegas, Kdenlive, Friction

<https://jake-dunphy-fyp-site.carrd.co/>

Promotional Tool-kit for a Musician

#43 / TL2.52

by Jake Dunphy O'Leary

PROMOTIONAL TOOL-KIT FOR A MUSICIAN

(Included User Manual)

PROJECT ABSTRACT

This project entails the creation of a number of promotional materials for a musician to use to promote his/her musical projects. This includes: Digital Album art, artist logo, poster, 3d album box, promotional video and visualiser video.

The goal for this project is for it to provide an example and aid for those wishing to start in digital creation.

Both Open-Source and Proprietary software is used to show a wide budget range.

METHODOLOGY

This project uses multiple methodologies, one for each major type of media created as examples:

Step 1: Research and Inspiration

Gather assets, compare, select, create a mood board.

Step 2: Conceptualization and Sketching

Develop an idea to create a visual concept.

Step 3: Design Development and Refinement

Bring sketches to life with digital tools and refinement.

Step 4: Finalization and Delivery

Make final adjustments and export the final design to delivery.

Step 5: Understanding the Brief

Ask all relevant client brief questions, address and message.

Step 6: Client Presentation and Feedback

Showcase your design to gather feedback and iterate.

SYSTEM DIAGRAM

Graphic Design

PLANNING	PRODUCTION	PRODUCTION	FINAL PRODUCTION
METHODS: BRUSH, VECTOR, TYPE, COLOR, BLEND, MASK	TOOLS: ILLUSTRATOR, PHOTOSHOP, AFFINITY, CANVA, SKETCH, FIGMA	FORMATS: PDF, PNG, JPEG, SVG, EPS, AI	DELIVERY: PRINT, DIGITAL, SOCIAL MEDIA, WEBSITE

Video Production

3D Modeling and Rendering

KEY TECHNOLOGIES

Adobe After Effects

Affinity

GIMP

Inkscape

MAGIX Vegas

Friction Graphics

Kdenlive

MAYA

Blender

Jake Dunphy O'Leary | Creative Computing | Department of Computing and Maths | SETU Waterford



Academic Title

Creating a Retro Arcade Aesthetic: Exploring Retro Aesthetics

Project Areas

- Game Development

Project Supervisor

Patrick McInerney

Neon Sprint is a retro-inspired arcade racing game being developed as a final year project for desktop PC using Unity and C#. The project focuses on creating a fast, accessible, and replayable racing experience built around responsive controls, drifting, boost mechanics, and competitive AI opponents. Players race across stylised tracks in short, high-intensity events that reward both speed and driving skill. The project combines gameplay design, 3D asset creation, interface design, and iterative development using an Agile approach.



Technologies: Unity, C#, Blender, Trello, GitHub, PC/Desktop

<https://afitz17.github.io/fyp-neonsprint/>

Neon Sprint

#44 / TL2.52

by Alan Fitzgerald

ARCADE RACING GAME DEVELOPMENT

NEON SPRINT

A retro-inspired arcade racing game focused on speed, drifting, boost, and short replayable races.

Abstract

Neon Sprint is a single-player arcade racing game developed for desktop PC. The project focuses on fast, pick-up-and-play racing inspired by late 1990s and early 2000s arcade racers. Players compete against five AI opponents in short, high-intensity races built around drifting, boost usage and style-based scoring. The game prioritises speed, flow, accessibility, and replayability over realistic simulation, while using a retro visual style and readable track design to create a distinct arcade racing experience.

Key Features

- Single-player arcade racing against 5 AI opponents
- Short races across 3-5 laps
- Arcade-style driving and drifting
- Boost system linked to player performance
- Style-based scoring for drifts and clean overtakes
- Multiple cars with distinct handling characteristics
- Readable track layouts designed for fast gameplay
- Results screen with finishing position, race time, and score

System Overview

```

graph TD
    PI[Player Input] --> CC[Car Controller]
    CC --> RM[Race Manager]
    RM --> AI[AI]
    RM --> T[Track]
    RM --> S[Scoring]
    AI --> HUD[HUD / UI]
    T --> HUD
    S --> HUD
    HUD --> R[Results]
          
```

Methodology

This project follows an Agile approach, with work completed in small stages and improved through regular testing and review. Development is managed in Trello using a Kanban board.

Technologies Used

Alan Fitzgerald 20088422
BSc (Hons) Creative Computing
Department of Computing & Mathematics

Official Representative on Oribesort
South East Technological University

<https://afitz17.github.io/fyp-neonsprint/>

Page 48



Academic Title

FindIT: Campus Lost & Found App

#45 / TL2.25

Development & Design of a Mobile Lost and Found Platform with React Native, Node.js and MongoDB

by Jack Kiely

Project Areas

- Computer Security
- Database and Analytics
- Software Development: (Back End / Front End / Mobile Hybrid / Web)

Project Supervisor

Dr Rosanne Birney

Losing personal belongings on campus is a frequent issue experienced by students and staff, with current recovery methods relying heavily on informal communication such as posters, emails, and reception desks. This project presents mobile platform called FindIT that allows users to report lost or found items, browse listings, and improve recovery outcomes through the application. The system is developed using React Native for cross-platform mobile delivery, supported by a Node.js and Express web API with cloud data storage provided by MongoDB Atlas.

FINDIT
A React Native app that helps users report, find, and recover lost items.

SUMMARY
Losing personal belongings on campus is a common issue faced by students and staff. Current lost-and-found systems rely on informal communication methods such as posters, emails, and reception desks. FindIT is a mobile lost-and-found application developed using React Native (Expo) and a Node.js / Express web API, with MongoDB Atlas cloud database storage. It enables users to report, browse, and recover lost items through a centralised digital platform that improves visibility and communication across campus.

KEY FEATURES

1. User registration and login
2. Report lost and found items with images
3. Browse and search listings
4. Filter items by category
5. Contact finder/owner securely
6. Manage personal item posts

METHODOLOGY
The project follows an Agile development approach using weekly sprints. Tasks are planned using Trello, implemented incrementally, tested regularly, and reviewed with the supervisor. This iterative workflow supports flexibility, continuous improvement, and realistic progress throughout the semester.

SYSTEM OVERVIEW

- 1. User interacts with the Mobile App (Frontend)**
Users (standard users or admin) use the React Native mobile app to browse items, report lost items, search listings, or manage content (admin).
- 2. App sends requests to the Backend Server**
The app communicates with a Node.js / Express API, which handles authentication (login/register), processes user actions, and applies admin controls where needed.
- 3. Backend stores and retrieves data from the Database**
The server connects to MongoDB, where all system data is stored – including user accounts, item reports, categories, and images.

TECHNOLOGIES USED
React Native, Node.js, Express, MongoDB

JACK KIELY 20068129
SUPERVISOR: ROSANNE BIRNEY
BSc (Hons) in Creative Computing
Department of Computing & Mathematics



Technologies: React Native, Expo, Node.js, Express, MongoDB Atlas, Vercel, Render & GitHub

<https://github.com/JackKiely1/lost-and-found-webapp>



Focus-Learning to See Again

#46 / TL2.49

Academic Title

Focus: A Short Film About Loss and Healing, Developed Using DaVinci Resolve

Project Areas

- Media Development and Production

Project Supervisor

Jacqui Woods O'Brien

by Shannon Tobin

A short film about loss and healing, developed using DaVinci Resolve and the Adobe Suite. "FOCUS" - Learning to See Again, is an 8 -10 minute short film that explores grief, creativity, and emotional recovery through visual storytelling. The film follows Ella, a young photographer struggling after the loss of her close friend and mentor, Liam. As her world becomes muted and her passion fades, she discovers an old memory card containing photographs taken by Liam - revealing how he once saw her and the world around them.

"FOCUS" - Learning To See Again
A short film about loss and healing, developed using DaVinci Resolve and the Adobe Suite.

Abstract
"Healing isn't about forgetting someone - it's learning to see the world they loved through your own eyes."
"FOCUS" - Learning to See Again, is an 8 -10 minute short film that explores grief, creativity, and emotional recovery through visual storytelling. The film follows Ella, a young photographer struggling after the loss of her close friend and mentor, Liam. As her world becomes muted and her passion fades, she discovers an old memory card containing photographs taken by Liam - revealing how he once saw her and the world around them.
Through revisiting shared locations and memories, Ella begins to reconnect with her creativity and sense of purpose. The film uses colour, light, and minimal dialogue to represent her emotional journey from loss to healing. "FOCUS" is a poetic and reflective piece aimed at students and young creatives, encouraging them to rediscover inspiration and perspective through art and memory.

Technologies
F PTR
StoryTribe Ae

Methodology
Combining traditional film production stages with a reverse - engineering approach
5 Stages of Film Production
Using a Hybrid approach allows me to go back to the previous stage and make any necessary changes needed.

Thumbnails

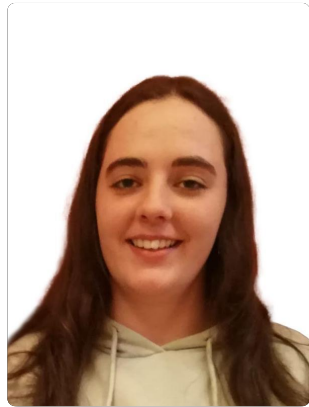
Shannon Tobin
BSc (Hons) Creative Computing
Department of Computing and Maths
SETU | Waterford



Technologies: DaVinci Resolve, Adobe After Effects, StoryTribe, Autodesk Flow Production Tracking

<https://shabbibz.github.io/ShannonT-FYP.github.io/>

#47 / TL2.52



Stellara

Academic Title

The Gamified Personal Development App

Project Areas

- CI/CD & Testing
- Digital Graphic Design
- Open Source
- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

Dr Rosanne Birney

by Sarah Walsh

Stellara is a full-stack web application that enables users to build and maintain positive habits and achieve personal goals through the utilisation of gamification techniques. Core features include achievements, an experience points (XP) system, and unlockable rewards to encourage productivity and continued use of the platform. By focusing on a fun and engaging progression system, this application adds a creative flair to managing every day, mundane tasks while combining skills in Software Engineering, UX Design and Technical Knowledge.



Technologies: React, Node.js, Express.js, PostgreSQL, JWT, GitHub, Vercel, Render, Supabase, Adobe Suite

<https://fyp-gamified-personal-development-a.vercel.app/>

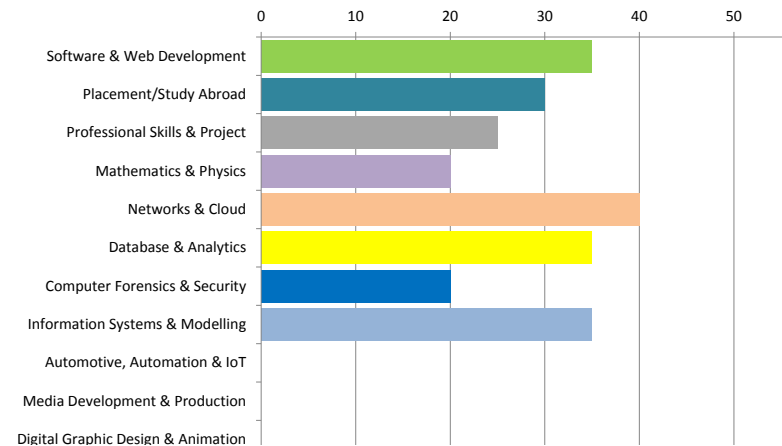
BSc (Hons) in Information Technology Management

The **BSc (Hons) in Information Technology Management** is a one-year add-on to the **BSc in Information Technology**. Across the four years of the programmes there is an emphasis on developing strong networking and cloud computing skills allied to a core of database and information systems knowledge.

The aim of the BSc (Hons) in Information Technology Management is

to provide graduates with a focus on the integration of heterogeneous computer systems and the management of various ICT services to support organisations to use diverse types of technology effectively and efficiently. It also aims to provide graduates with the knowledge and skills to handle and transmit data in a secure and safe manner across different types of networks.

The breakdown of course credits across the four years on these programmes is illustrated by the following chart.



A distinctive feature of this programme is that the final year project is worth 10 credits. There is also an emphasis on data-related and research-led projects as distinct from development-type projects.

#48 / TL2.35



Academic Title

Bloom View

Web-Based Financial Portfolio Manager and Visualisation System

Project Areas

- Database and Analytics
- Information Systems and Modelling
- Personal Independent Project
- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

Kavindu Sellaheewa

Bloom View is a full stack solution created to simplify portfolio tracking for new to intermediate investors. The system focuses on clear monitoring, using a KPI driven dashboard and interactive visualisations to transform raw financial data into actionable insights with a focus on educational framework to empower users to learn and make more informed decisions. Beyond just tracking numbers, it is built on an educational framework designed to empower you. The goal is to give you the context you need to learn as you go, helping you make much more informed decisions without the usual stress.



Technologies: React, Node.js, MongoDB Atlas, D3.js, Chakra UI, Yahoo Finance API, JavaScript, Hetzner

<https://github.com/AlexKav47/Financial-Portfolio-Tracker/tree/main>

by Alex Kavanagh

Web-Based Financial Portfolio Manager and Visualisation System
BLOOM VIEW

ABSTRACT
Bloom View is a full stack solution created to simplify portfolio tracking for new to intermediate investors. The system focuses on clear monitoring, using a KPI driven dashboard and interactive visualisations to transform raw financial data into actionable insights with a focus on educational framework to empower users to learn and make more informed decisions.

TECHNOLOGIES
JS, MongoDB Atlas, Node.js, Chakra, Yahoo Finance

MOTIVATION
Bloom View was motivated by the growing number of young Irish adults investing in stocks and cryptocurrency across multiple platforms, making it difficult to track their full portfolio in one place. Many users lose sight of overall performance, allocation, and returns when switching between apps. This project addresses that issue by providing a centralised portfolio tracker that also promotes learning through clear visualisations and educational content, helping users better understand their investments and make more informed decisions.

KEY FEATURES

- **Comprehensive Portfolio Management:** Features an interactive dashboard to manage both stock and cryptocurrency holdings in one place.
- **Income & Performance Tracking:** Monitors real-time portfolio performance alongside dividend and staking income.
- **Data Visualization:** Uses charts, tables, and summary cards to present live and historical data, making complex investment information easier to digest.
- **Asset Allocation Insights:** Provides visual tools to help users understand how their capital is distributed across different assets.
- **Educational Design:** Employs clear layouts and interactive features specifically designed to build financial literacy while users manage their wealth.

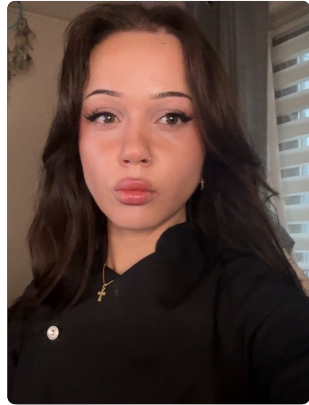
SYSTEM DIAGRAM

UI VIEWS



Alex Kavanagh - 20098349
BSc (Hons) IT Management
Department of Computing and Mathematics
Supervisor: Kavindu Sellaheewa





Rethinking Cybersecurity Through UX

#49 / TL2.28

Academic Title

Influencing User Security Behaviour Through UX and Behavioural Design

Project Areas

- Computer Security
- Digital Graphic Design
- Information Systems and Modelling
- Software Development: (Front End / Web)

Project Supervisor

Kavindu Sellaheva

by Catherine (Katya) Puhhova

This project investigates how user experience (UX) design influences cybersecurity behaviour, with a focus on password security. Users often ignore warnings, reuse weak passwords, and prioritise convenience due to security fatigue and poorly designed interfaces. A system compares a baseline interface with a UX-optimised version that provides clear feedback and real-time time-to-crack indicators. The aim is to evaluate whether improved design can influence user decision-making, increase engagement with security features, and encourage the creation of stronger, more secure passwords.

The poster is titled "Influencing User Security Behaviour Through UX and Behavioural Design" with the subtitle "Rethinking Cybersecurity: Designing for Human Behaviour". It features an abstract, a comparison of "Before UX" and "After UX" password prompts, a "Security Fatigue" section, a "System Flow" diagram, and an "Expected Outcome" section. A QR code is present in the bottom left corner of the poster.

ABSTRACT
 This project investigates how user experience (UX) design influences cybersecurity behaviour. Users often ignore warnings, reuse weak passwords, prioritise convenience due to security fatigue and poorly designed interfaces. A system is developed to compare a traditional technical interface with a UX optimised version using clear language, visual cues and real-time feedback. The aim is to determine whether improved design can guide users towards safe decisions.

Weak Password!
 Your password contains predictable patterns like name or number sequences. These patterns are often targeted in automated attacks. Would you like to improve your password security?
 Improve password
 Use password anyway

Before UX
 Basic Feedback: "Password is Weak" (*****). User ignores warnings.

After UX
 Smart Feedback: "Add symbols & length to increase security" (*****). User improves password.

SECURITY FATIGUE
 HABITUATION, COGNITIVE OVERLOAD, WORKFLOW DISRUPTION, ALERT FATIGUE

SYSTEM FLOW
 INTERFACE DESIGN → DEVELOP → TEST → ANALYSE → COLLECT DATA →

EXPECTED OUTCOME
 The UX optimised is expected to improve user security behaviour and reduce cognitive load compared to traditional baseline design. It is designed for users to create stronger passwords, spend more time engaging with feedback and make more informed decisions when provided with clear guidance and visual cues. The inclusion of features such as real-time password strength feedback and "Estimated Crack Time" indicators is expected to increase user awareness of security risks.

By: Catherine (Katya) Puhhova | BSc (Hons) Information Technology Management | Department of Computing & Mathematics | South East Technological University | puhhova@hotmail.com
 Supervisor: Kavindu Sellaheva



Technologies: HTML, CSS, JavaScript, Canva, Figma, Google Forms

<https://github.com/Katyaovva/UX-Password-SignUpVersB.git>



Redesigning Service Flows with AI Agents

#50 / TL2.49

Academic Title

Agentic AI in Enterprise Information Systems: Redesigning Service Flows for Efficiency

Project Areas

- CI/CD & Testing
- Cloud Computing
- Information Systems and Modelling

Project Supervisor
Richie Lyng

by Elizabeth Solomon

My project explores how autonomous AI agents can improve enterprise information systems by automating repetitive internal service tasks, reducing manual workload, and making workflows faster, clearer, and more scalable. Using Microsoft Azure AI Agent Service, I am building a prototype agent-based workflow, likely for onboarding or IT support, to evaluate its impact on efficiency, communication, and user experience, while also examining the challenges of integrating agentic AI into business environments.

Autonomous Agents in Enterprise Information Systems
Redesigning Service Flows for Efficiency and Scale

Elizabeth Solomon · BSc (Hons) Information Technology Management
Supervisor: richie.lyng@setu.ie

Applied Research

BACKGROUND: The Automation Plateau
Current Enterprise Information Systems (EIS) have hit a functional ceiling. Traditional workflows rely on static, "if-then" logic and manual human intervention to bridge data silos. This creates a reactive bottleneck where internal services such as IT support and HR onboarding cannot scale without a linear increase in labour.

The Solution: Shifting from Generative AI (talking) to Agentic AI (doing). By leveraging Microsoft Azure AI Agent Service, this project prototypes an "Agent-First" workflow. These autonomous agents reason through complex tasks, transforming humans from manual processors into strategic overseers.

Technologies Used
AZURE FOUNDRY, ENTRA ID, AZURE AI SEARCH, Microsoft Learning, Google Workspace

Research Questions

- Architectural Design:** "How can autonomous agents be seamlessly integrated into legacy EIS to minimize human dependency?"
- Technical Implementation:** "Can Microsoft Azure AI Agent Service sustain an enterprise-grade service workflow?"
- Integration & Scalability:** "What are the primary technical barriers when deploying autonomous agents across departmental silos?"

Architecture

Traditional Workflow: Email chains, ticket queues, manual routing, delayed updates, fragmented visibility.

Agent-First Workflow: Agent intake, intent analysis, knowledge retrieval, automated actions, tracked escalation.

Flow: User Request → Agent Intake → Knowledge Retrieval → Action or Escalation → Audit & Update

Evaluation & Expected Impact

Efficiency: Less repetitive manual handling

Service Flow: Faster & clearer updates

Decision Clarity: Better escalation and next-step visibility

Scalability: Flexible design across departments

Assessment Criteria:

- Task completion speed
- Manual intervention frequency
- Escalation quality and traceability
- Perceived usefulness and trust
- Suitability for future scaling

Expected Enterprise Value:

- Lower routine workload for support staff
- Improved information visibility across teams
- More consistent service delivery decisions

Methodology

Literature Review: Goal: Identify why traditional Enterprise Info Systems fail to scale. Focus: Compare traditional Enterprise systems to Modern systems utilising automation and Agentic AI.

Workflow Analysis: Goal: Map Traditional vs Agentic AI Workflows. Action: Identify high-redundancy triggers (e.g. ticket creation, new hire alerts) and deconstruct them into sequences for the agent.

Prototype: Environment: Built using Azure AI Foundry using Semantic Kernel. Test: Metrics: Performance measured by Task Completion Rate and Latency reduction.

Challenges: Most legacy systems weren't built for AI. Creating "Agent-Friendly"

Conclusion: This project proves we are moving from "Chatbots that talk" to "Agents that do." By offloading redundant service tasks to Azure AI Agents, SMEs can finally scale their operations without a linear increase in human labor. Professionals to shift from manual task execution to high-value strategic oversight.

Project QR CODE: <https://linktr.ee/20103319>

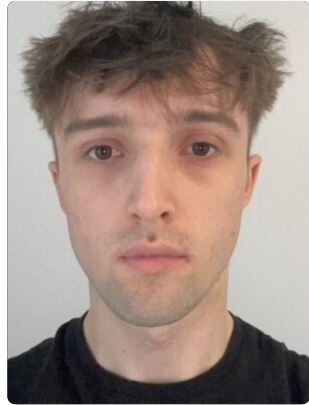
Key Readings: Microsoft Learn – Foundry Agent Service, Microsoft Learn – Semantic Kernel Agent Framework, Azure – Foundry Agent Service, Wu et al. (2023) Enterprise Information Systems Digitalization of HR

SE TU | SETU Computing Expo 2026



Technologies: Azure Foundry, Entra Id, Azure Search, Microsoft Learning, Canva, Microsoft Learning, Google Work

<https://linktr.ee/20103319>



Investigating Role-Based Access Control

#51 / TL2.51

Academic Title

Investigating Role-Based Access Control: Challenges & Best Practices for it Professionals

Project Areas

- Computer Security
- Information Systems and Modelling

Project Supervisor

Michael McMahon

by Cathal Stafford

Role-Based Access Control (RBAC) is widely adopted but difficult to maintain in practice. Organisations frequently over-provision access during onboarding and fail to remove permissions after role changes, leading to privilege creep. A survey of 40 IT professionals found 66% experienced these issues firsthand, with 53% reporting unnecessary access retention after role changes. This study uses a mixed-methods approach combining survey data with qualitative interviews to evaluate whether RBAC remains a suitable standalone solution for modern IT environments.

The poster features the SE TU logo and the student's name, Cathal Stafford. It includes an abstract, hypothesis, objectives, methodology, results and findings, and respondent organizations. The methodology section highlights a 'MIXED METHOD APPROACH' involving literature review, survey design, qualitative interviews, data analysis, and findings & conclusion. The results section contains two pie charts: one showing the frequency of previous access rights retention (Never: 36.9%, Sometimes: 31.6%, Often: 10.5%, Very often: 16.8%) and another showing challenges with privilege creep (Yes: 34.2%, No: 65.8%). Respondent organizations include B+L, Scurri, dubarry, G, TAOGLAS, and Rewley's.



Technologies: Google Forms, Microsoft Excel

<https://github.com/cathalst/FYP-Progress-20102414/blob/main/progress-log.md>





CompliWin: Peace of Mind

#52 / TL2.49

Academic Title

Windows System Compliance Checker

Project Areas

- Computer Security
- Software Development: (Core)

Project Supervisor

Malik Faizan

As cybersecurity threats against small businesses and individual users intensify maintaining proper security in a Windows environment continues to increase in complexity and understanding especially for non-expert computer users. The Windows Security Assessment Tool built using Python is intended to solve this issue. It employs a client-server structure utilizing MariaDB along with system monitoring libraries including psutil and winreg, offering users an simple, automated method to automatically detect open ports, problematic registry configurations and obsolete software programs.



Technologies: Python, Windows, MariaDB

<https://github.com/Darius20103104/FinalYearProject>

by **Darius Vanagevicius**

Windows System Compliance Checker

Darius Vanagevicius (20103104)

Supervisor: Malik Faizan

South East Technological University-Waterford, Ireland



Abstract

Windows System Compliance Checker is a desktop tool that audits a Windows computer against a predefined set configuration targets. It is aimed at small organizations and security-conscious individuals who need a fast, visual overview of a system's security. Use cases include hardening checks, routine application audits and misconfigured registry settings or unexpected open network ports.

Research

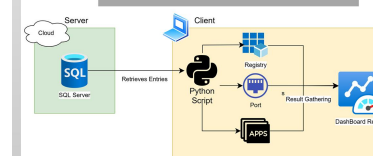
- 43% of all cyberattacks in 2019 targeted small businesses.
(<https://www.worpar.com/business/resources/articles/small-business-cyber-security-and-data-breach/>)
- 52% of the surveyed professionals consider their cybersecurity budgets inadequate.
(<https://securitybrief.co.uk/story/back-of-handing-staff-worries-range-0-cybersecurity-teams/>)

Methodology

The used method is the Waterfall-model. This is a sequential approach, where each step must be complete in order before the next.



Architecture Diagram



Technologies Used

- Python
- PyQt6
- MariaDB
- Windows Registry



Outcome

The result is a lightweight standalone Windows compliance tool that requires no enterprise infrastructure, domain membership or specialist security knowledge to operate. It delivers real-time registry, port and software auditing with a clear visual dashboard and provides one-click fixes for non-compliant settings.

Email: 20103104@setu.ie | BSc (Hons) in Information Technology Management | South East Technological University

BSc (Hons) in Software Systems Development

This four-year programme empowers students with a comprehensive understanding of software development, web development, mobile app development, and data science alongside artificial intelligence and security fundamentals. Through specialized coursework, students delve into advanced programming languages and techniques essential for software engineering.

They master web development frameworks, crafting dynamic and interactive web applications. Dedicated modules in mobile app development equip students with the skills to create innovative solutions for iOS and Android platforms. Moreover, the curriculum delves into data science methodologies, enabling students to extract insights from complex datasets. Graduates emerge with a versatile skill set, ready to meet the evolving demands of the tech industry.

Subject Groups	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8	
Software & Web Development	Programming Fundamentals 1	Programming Fundamentals 2	Software Development Tools	Data Structures & Algorithms 1	Flexible Semester Placement / Study Abroad / Voluntary Organisation Project	Mobile App Development 1	DevOps Practice	Mobile App Development 2	
	Website Development 1	Website Development 2	User Experience	Web App Development 1		Web App Development 2	Cloud App Development		
Database, IS & Modelling	Systems Analysis Design	Intro to Software Engineering	Database Fundamentals	Database Systems		NoSQL Databases			
		Business Information Systems	Enterprise Applications			Digital Transformation and IS	Enterprise Systems Architecture		
Data Science	Mathematics Fundamentals	Statistical Analysis				Further Statistics	Data Science in Practice	Data Science Essentials	
								Artificial Intelligence	
Computer Systems & Security	Computer Systems 1	Computer Systems 2	Computer Networks	Intro to Computer Security			Automated Cloud Services		Application Security
Professional Studies	Communication Skills			Professional Practice				Project 1	Project 2 (10 credit)
French			French B1.3	French B1.4		Intercultural Bus Context	French B2.1	French B2.2	
German			German B1.3	German B1.4		Intercultural Bus Context	German B2.1	German B2.2	
Psychology			Introduction to Psychology	Development Psychology		Introduction to Social Psychology	Intro to Cognition & Perception	Management Psychology	
Sports Science			Introduction to Sport and Exercise	Sports and Exercise Biomechanics 1		IOT Standards and Protocols	Sports and Exercise Biomechanics 2	Applied Biomechanics	
Technology Commercialisation			Creative Problem Solving	Integrated Marketing		Technology Entrepreneurship	Project Management	Technology Commercialisation	

Pick any 3 modules in semester 8



VitaGym, Your Smart Fitness Companion

#53 / TL2.25

Academic Title

Android Application for Smart Gym Management and Exercise Form Correction via Pose Estimation

Project Areas

- AI/ML Development
- Cloud Computing
- Software Development: (Back End / Front End / Mobile Native / Mobile Hybrid)

Project Supervisor

Kavindu Sellahewa

VitaGym is an Android application designed to enhance gym engagement through intelligent automation. It features QR code check-in, user registration, personalised workout sessions, class scheduling, and real-time location tracking via the Google Maps API. A key innovation is pose estimation using Google ML Kit and MediaPipe, enabling real-time exercise form correction and injury prevention via the smartphone camera. By detecting body landmarks and joint angles, VitaGym delivers instant corrective feedback, simplifying fitness management and promoting regular gym attendance.

The poster provides a comprehensive overview of the VitaGym project. It includes an abstract describing the application's goals and features, a list of key features such as QR code check-in, location tracking, and AI pose estimation, a system architecture diagram showing the flow from frontend to backend, a methodology section on agile development, a list of key technologies used, and a references section. It also features screenshots of the app's dashboard and pose estimation interface, along with a QR code for scanning.



Technologies: Android Studio, Kotlin, Firebase, Google Maps API, Google ML Kit, MediaPipe, ZXing

<https://github.com/diegowit/VitaGym.git>





Academic Title

End-to-End Analytics for a Large Local Manufacturing Site for Increased Data Visibility

Project Areas

- Database and Analytics
- Information Systems and Modelling
- Work Based Project

Project Supervisor
Sonya Hogan

SiteSight

#54 / TL2.25

by Pedro Augusto Canteli

END-TO-END ANALYTICS FOR A LARGE LOCAL MANUFACTURING SITE FOR INCREASED DATA VISIBILITY | SiteSight

PEDRO AUGUSTO CANTELI | SUPERVISED BY SONYA HOGAN | IN PARTNERSHIP WITH BAUSCH + LOMB

INTRODUCTION

- Technological advancements have impacted the manufacturing sector and enabled operational data to be collected and stored in unprecedented volumes.
- Making use of such data in an effective manner remains a challenge for the entire industry: "data rich and information poor".

PROBLEM STATEMENT

- Manufacturing processes at Bausch + Lomb's Waterford site generate large volumes of production data; however, data visibility varies significantly across process types and physical areas within the site.
- This has resulted in a fragmented, siloed data landscape that limits end-to-end operational visibility.
- There is a clear need for a consistent, unified, reliable, centralised yet flexible data analytics solution that provides end-to-end visibility across process types and areas and delivers meaningful insights to relevant stakeholders.

OBJECTIVE

Design and implement a centralised data analytics solution that provides end-to-end visibility across the entire manufacturing process, focusing on the most relevant operations and covering all areas and product types.

METHODOLOGY

PHASE 1: WATERFALL

- Prototyping and Identification of Data Sources
- Data Modelling
- Data Automation

PHASE 2: ITERATIVE

- Feedback & Definition of New Questions
- Dashboard Development
- Validation
- Presentation

KEY TECHNOLOGIES

DATA PIPELINE

EXISTING FLOW

Manufacturing operations completed → Raw operational data is processed by the OLTP manufacturing system → DLT Manufacturing System DB → 15-20 MINUTES → DLT Manufacturing System REPLICA DB

NEW DATA FLOW

DLT Manufacturing System REPLICA DB → EXTRACT - Raw operational data → TRANSFORM - Aggregation - Dimension tables - Join Identifiers - Fact table - Lot traceability enabled → LOAD - Structured analytical tables → DATA WAREHOUSE → POWER BI

ETL (SQL Stored Procedures) BATCH PROCESS (DAILY ETL)

PEDRO AUGUSTO CANTELI | BSC (HONS) IN SOFTWARE SYSTEMS DEVELOPMENT
DEPARTMENT OF COMPUTING & MATHEMATICS | SETU

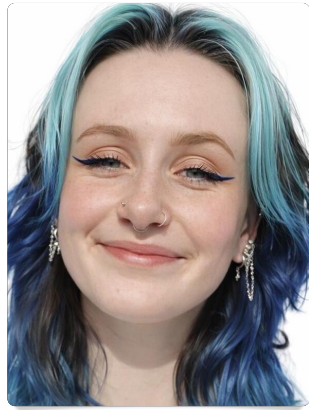
Technological advancements have enabled operational data to be collected and stored at unprecedented volumes. However, effectively leveraging this data remains a challenge across the manufacturing industry. At Bausch + Lomb's Waterford site, data exists across multiple platforms with varying levels of maturity, structure, and reporting practices, resulting in a fragmented data landscape. This project addresses these challenges by unifying these capabilities through a centralised analytics solution, enabling consistent, end-to-end visibility across the manufacturing process.



Technologies: Power BI, Microsoft SQL Server, Azure DevOps, Git

<https://site-sight.netlify.app>





Smart Closet Organiser

#55 / TL2.28

Academic Title

AI-Powered Smart Closet Organiser for Outfit Planning and Wardrobe Management

Project Areas

- AI/ML Development
- Database and Analytics
- Software Development: (Back End / Front End / Mobile Native)

Project Supervisor

David Drohan

by Amy Comyns Haugh

Smart Closet Organiser is a mobile application designed to simplify wardrobe management and reduce outfit decision fatigue. Users can digitise clothing items and easily create, mix, and save outfit combinations. The app uses Gemini AI to generate personalised outfit recommendations based on individual style preferences and real-time weather conditions. A smart donation feature tracks unworn items to encourage sustainable fashion habits, addressing the fact that most people wear only 20% of their wardrobe 80% of the time.

DESCRIPTION

Smart Closet Organiser is a mobile application designed to simplify wardrobe management and reduce outfit decision fatigue. Users can digitise their clothing items and easily create, mix, and save outfit combinations.

The app uses AI to generate personalised outfit recommendations based on individual style preferences and real-time weather conditions. A smart donation feature also tracks unworn items to encourage more sustainable fashion habits - because most people wear only 20% of their wardrobe 80% of the time - Smart Closet Organiser was built to change that.

KEY FEATURES

- 01 AI Outfit Recommendations
Get daily outfit suggestions based on your style & weather
- 02 Wardrobe Management
Categorise & search your wardrobe
- 03 Outfit Creation & Preview
Mix, match and save combinations visually
- 04 Calendar Integration
Plan outfits around occasions & events
- 05 Smart Donation Tracker
Flags unworn items to encourage donation
- 06 Weather Aware Suggestions
Real time weather info with OpenWeatherMap

ARCHITECTURE PATTERN - MVVM

- Presentation Layer: Jetpack Compose UI
- ViewModel Layer: Business Logic State
- Data Layer: Firebase + Local Cache

TECHNOLOGY STACK

Kotlin, Android Studio, Jetpack Compose, Firebase, OpenWeather API, Google Analytics

Amy Comyns Haugh
BSc (Hons) Software Systems Development



Technologies: Kotlin, Android Studio, Jetpack Compose, Firebase, OpenWeather API, Google Analytics

<https://amycomynshaugh03.github.io/Smart-Closet-Organiser/>



Academic Title

AI Driven Financial Analytics Platform

Project Areas

- AI/ML Development
- Database and Analytics
- Open Source
- Software Development: (Back End / Web)

Project Supervisor

Michael McMahon

Open Analytics

#56 / TL2.35

by Paul Dolan

FYP Finance: AI Driven Financial Transaction Analysis Platform Open-Analytics

Abstract	Objectives
<p>This project is an AI-powered financial analytics system that combines zero-shot machine learning with rule-based logic to classify transactions accurately and efficiently. Leveraging label testing and manual overrides, the system addresses ambiguous or rare transactions. Anomaly detection flags unusual or high-value transactions, supporting risk monitoring and financial awareness. An open-source project, built entirely with open-source technology, this financial analytics platform provides a robust, accessible, and practical system for all users.</p>	<ul style="list-style-type: none"> • Enable CSV file upload to import bank transactions • Automatically and accurately categorise financial transactions • Provide clear insights through a dashboard • Ensure robustness and usability • Develop an open-source solution, built with open-source technology, for accessibility and transparency
Agile Development	Technologies
<p>Initial Planning – Gantt Timeline</p> <p>↓</p> <p>Sprint Planning</p> <p>↓</p> <p>Development</p> <p>↓</p> <p>Testing, Validation & Debugging</p> <p>↓</p> <p>Review & Evaluate Progress</p> <p>↓</p> <p>Iteration Refinement & Improvement</p>	<p>python</p> <p>pandas</p> <p>FastAPI</p> <p>Streamlit</p> <p>PostgreSQL</p> <p>HUGGING FACE</p>
Results & Discussion	<p>System Performance & Practicality</p> <ul style="list-style-type: none"> • Runs locally - no internet required • Lightweight, responsive, and secure. • Open-source design makes financial analytics accessible to all, locally and securely. <p>Model Performance</p> <ul style="list-style-type: none"> • Hybrid approach: Achieved 95% accuracy on test data. • Rule-based logic: Handles most common transactions quickly. • BART-large-mnli zero-shot: Successfully classifies unseen/new merchant descriptions. • Label testing/training: Accuracy improves, especially on ambiguous or rare transactions. • Why hybrid? Combines strengths of both methods to overcome rule-based rigidity and zero-shot misclassifications. <p>Limitations & Mitigations</p> <ul style="list-style-type: none"> • Zero-shot ML can misclassify ambiguous transactions → mitigated by combining with rule-based logic. • Hybrid system has ~5% failure/error rate → mitigated with manual over-ride of transaction categorisation. <p>Conclusion</p> <p>Overall, combining rule-based logic with zero-shot machine learning provides a practical, and effective solution for financial transaction analysis.</p>
System Diagram	
<p>CSV upload – user uploads financial transaction data</p> <p>↓</p> <p>Data Parsing, validation and cleaning</p> <p>↓</p> <p>Transaction categorisation</p> <p>↓</p> <p>Zero Shot ML Classification (Model: facebook/bart-large-mnli)</p> <p>Transaction Description: TESCO STORES 1234</p> <p>Candidate Categories: GROCERIES, TRANSPORT, UTILITIES, ENTERTAINMENT</p> <p>Output: GROCERIES (0.92), TRANSPORT (0.92), UTILITIES (0.05), ENTERTAINMENT (0.02)</p> <p>↓</p> <p>Dashboard visualisation and transaction table</p> <p>↓</p> <p>Database storage</p> <p>↓</p> <p>Anomaly detection – outlier risk scoring</p>	

Paul Dolan - BSc Software Systems Development - Department of Computing & Mathematics - South East Technological University, Waterford.

This project presents a locally deployed financial analytics platform for personal and business data. The system processes real bank CSV files, automatically categorises transactions using a hybrid approach combining rule based logic and machine learning, and identifies unusual spending patterns. Designed with a privacy first approach, all processing occurs locally without external data sharing, providing a simple and accessible way for users to better understand and manage their finances, while maintaining full control over their data.



Technologies: Python, FastAPI, PostgreSQL, Streamlit, Hugging Face Transformers, pandas

<https://github.com/PaulsGitH/fyp-open-source-finance-analytics>



Obsidian Routes

#57 / TL2.52

Academic Title

An Integrated Real-Time Safety and Navigation Framework for Motorcyclists

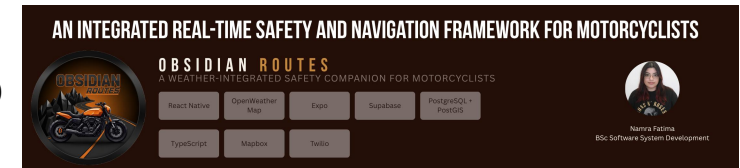
Project Areas

- CI/CD & Testing
- Cloud Computing
- Software Development: (Back End / Core / Front End / Mobile Native / Mobile Hybrid)

Project Supervisor

Opeyemi Bamigbade

by Namra Fatima



Abstract

Obsidian Routes is a mobile safety application for motorcyclists that unifies weather-aware route planning, live GPS ride recording, and one-tap emergency SOS into a single interface. Built as an Android-first React Native application with a Supabase backend, the system implements per-segment weather-hazard analysis and background GPS telemetry, with crash recovery. Twilio-powered emergency alerts deliver real-time GPS coordinates and battery status to prioritised contacts via SMS. By integrating all these features in a simple-to-use interface, the app solves the problem of fragmented navigation, eliminating rider distraction and enhances situational awareness on the Road.

Problem Statement

Motorcyclists face significantly higher risks than other road users, often exacerbated by unexpected weather changes and fragmented mobile tools. Current solutions require riders to manually switch between navigation, weather forecasting, and emergency messaging applications while in motion. This fragmentation increases cognitive load, creates physical distraction, and delays critical response times during mechanical failures or accidents. There is a clear need for a unified system that automates environmental hazard detection and streamlines emergency communication into a single, rider-centric interface.

Core Technical Achievements

- **Consolidated Navigation:** Reduces rider distraction by unifying mapping, route planning, and environmental monitoring within a single, high-contrast interface.
- ▲ **Dynamic Hazard Analysis:** Provides real-time safety monitoring by segmenting route geometry and identifying dangerous weather thresholds (e.g., windspeeds > 40 km/h) along the path.
- **Resilient Ride Telemetry:** Ensures data integrity through background GPS tracking and automated crash recovery, persisting speed and distance metrics even during application backgrounding.
- **Asset Lifecycle Management:** Enables systematic tracking of motorcycle specifications and maintenance logs.

System Architecture & Technical Design

The system implements a robust, hybrid cloud-to-mobile architecture designed for high availability and real-time responsiveness. It leverages a layered service pattern to isolate complex business logic—such as weather hazard analysis and emergency triggers—from standard data operations.

Methodology

Agile Scrum
The development lifecycle followed 2-week iterative sprints. Instead of traditional horizontal layering, the project employed a vertical-slice approach, where each feature is built end-to-end, as a complete, functional cross-section of the entire technical stack. This ensured that each sprint delivered functional, testable components.

Tech Stack

- React Native Cross-platform UI
- Supabase Backend host
- TypeScript Type-safe full stack
- Deno Runtime Edge Functions
- OpenWeather MapWeather data
- Expo / EAS Build + cloud deploy
- PostgreSQL Primary DB + PostGIS
- Mapbox SDK Maps + routing
- Twilio API Emergency SMS
- Zustand + TanStack State management

Bsc (Hons) Computing
Department of Computing & Mathematics

Obsidian Routes is an Android-first motorcycle safety companion app designed for Irish and European riders. The application combines route planning, real-time weather forecasting along planned routes, live GPS ride tracking, and emergency SOS functionality. Built with **React Native** in TypeScript, **PostgreSQL** backend in *Supabase*. The app integrates Mapbox, OpenWeather Map and Twilio APIs for mapping, segmented weather updates and emergency SMS respectively. By integrating all these features in a simple-to-use interface, the app solves the problem of fragmented navigation for riders.



Technologies: React Native, TypeScript, Supabase (PostgreSQL), Mapbox, OpenWeatherMap API

<https://github.com/NamraFatima16/bikerApp>





Academic Title

Baseball Team Management Application with Data Analytics

Project Areas

- Database and Analytics
- DevOps
- Software Development: (Back End / Front End / Web)

Project Supervisor

Kurt Pumares

BaseballPro Manager

#58 / TL2.50

by Jorge Gasco

BaseballPro Manager is a data-driven web application designed for baseball team management. The platform provides two distinct user roles: Managers access comprehensive team statistics, analyse player performance metrics, generate optimal batting lineups, and send coaching feedback. Players view personalised dashboards tracking their batting averages, home runs, RBIs, and other key metrics over time. The system integrates real-time data from the Sportradar MLB API, delivering current player statistics, game scores, and league standings.

BaseballPro Manager
Baseball Team Management Application with MLB Data Analytics

Abstract
BaseballPro Manager is a data-driven web application for baseball team management. The platform enables managers to organise rosters, track player statistics, and analyse performance trends through interactive dashboards. Players access personalised statistics and coaching feedback. The system integrates real-time data from the Sportradar MLB API for up to date stats, scores, and standings. Inspired by Moneyball's analytics approach, the application brings advanced data driven tools directly to MLB coaches and players.

Methodology
BaseballPro Manager follows Feature-Driven Development, an Agile-inspired methodology that delivers small, functional features prioritised by user value. Each feature becomes a milestone tracked via Trello boards with sprints and Git/GitHub version control.

- Data Modelling:** MongoDB schema design with 6 entities — User, Team, PlayerStats, GameStats, GameFeedback
- API Integration:** Sportradar MLB API connected via Axios for real-time player stats, scores, and standings.
- Authentication:** Firebase Authentication with JWT tokens for role-based access (Manager / Player)
- Analytics:** Interactive dashboards with performance trends, batting comparisons, and automated lineup generation.
- Deployment:** Docker containers for consistent development and cloud deployment (AWS/Azure)
- Evaluation:** Metrics include API response time, data accuracy, user satisfaction, and system scalability.

Technologies
React.js, Node.js, Express.js, MongoDB, Firebase, Sportradar API, Material-UI, Docker, Mongoose, Git/GitHub, JWT, bcrypt

Platform Architecture
Manager / Player roles using React.js + Material-UI. Backend uses Express.js REST API. Authentication via Firebase Auth (JWT / User Mgmt). Data storage via MongoDB Atlas (MongoDB Live Data). External data from Sportradar API (MLB Live Data).

Key Features

- Role-Based Access:** Separate Manager and Player dashboards with Firebase Authentication and JWT token management.
- Manager Dashboard:** Comprehensive team overview with data, win/loss records, and performance summaries.
- Live MLB Data Feed:** Real-time Sportradar API integration for current player stats, scores, and standings.
- Performance Analytics:** Interactive charts tracking batting averages, RBIs, and other key metrics over time.
- Manager Feedback:** Coaches send targeted coaching notes and equipment orders to players via in-app reports.
- Roster Management:** Create, edit, and manage full team rosters with detailed player profiles and positions.
- Player Filtering:** Sort and filter players by position, performance trends, and key statistical metrics.



Technologies: React.js, Node.js, Express.js, MongoDB, Firebase Authentication, Sportradar MLB API, Material-UI, Do

<https://jordigasco.github.io/FYPwebsite/>



Stock Market Learning-Trading Simulator

#59 / TL2.51

Academic Title

A Stock Market Learning and Trading Simulation Platform

Project Areas

- Database and Analytics
- Software Development: (Back End / Front End / Web)

Project Supervisor

Deirdre O’Halloran

by Karina Gassanova

Learn Trade Grow is a full-stack web application designed to teach users the fundamentals of investing through structured lessons and quizzes that assess their understanding. The platform provides a safe, risk-free environment where users can practise real trading using a virtual simulator powered by live market data. Eight lessons guide users from stock market basics through to advanced trading strategies, each gated by a 70% quiz pass mark. Users then apply their knowledge by buying and selling real stocks using virtual funds via the Alpaca Markets API.

OVERVIEW

An interactive web platform designed to help users develop practical investment knowledge through eight structured lessons covering stock market fundamentals, chart analysis, risk management and trading strategies. Each lesson concludes with a quiz requiring 70% to progress. Users then apply their knowledge in a live trading simulator using €10,000 of virtual funds.

SYSTEM ARCHITECTURE

User → Web Browser → React Web Application (Lessons, Quizzes, Trading Simulator, Portfolio, Profile)

Authenticate → Firebase Auth (Email / Password, Google Sign-in) → Read / Write data → Firebase Firestore (User data & portfolio) → Fetch live prices → Alpaca Markets (Live prices & 90-day history) → Store & retrieve all user data → Firebase Firestore Database (Lesson Progress, Quiz Results, Portfolio, Holdings, Transactions, Profile)

TECHNOLOGY STACK

- React: Front-end Framework
- JavaScript: Core Language
- Firebase: Auth & Database
- VS Code: Development IDE
- GitHub: Version Control
- Alpaca: Live Stock Market Data API

METHODOLOGY

Developed using an Agile approach across four time-boxed sprints, each involving planning, development, testing and review.

Plan (Quiz) → Build (Develop) → Review (Test) → Repeat (Test)

1. Authentication & Database (Jan-Feb)
2. Lessons & Quiz Engine (Feb-Mar)
3. Trading Simulator (Mar)
4. Testing & Finalisation (Mar-Apr)

KEY FEATURES

- Structured Learning Path:** Eight lessons from stock market basics to advanced strategies, unlocked step by step.
- Gated Quiz System:** A 70% pass mark is required after each lesson before the next stage is unlocked.
- Trading Simulator:** Trade real stocks using €10,000 of virtual funds with live Alpaca market data.
- Live Price Charts:** 90-day interactive chart showing price trends and daily volume bars.
- Portfolio Tracker:** View holdings, total invested, portfolio value and P&L, updated in real time.
- User Profiles:** Custom photo, avatar colour and display name synced across every page.

APPLICATION INTERFACE

Trading Simulator | Lessons Page

Scan to view project landing page

Karina Gassanova • Student No. 20102374 | BSc (Hons) in Software Systems Development | Department of Computing and Mathematics • SETU 2026



Technologies: React, JavaScript, Firebase, Firestore, Alpaca Markets API, Recharts, CSS, HTML

<https://karinagassanova.github.io/stock-learning-app>



Capi

#60 / TL2.49

Academic Title

ai-powered Adaptive Learning Companion

Project Areas

- AI/ML Development
- Software Development: (Back End / Mobile Native)

Project Supervisor

Diarmuid O'Connor

by Yong Hsiang Hsieh

Capi is an AI-powered, mobile-first iOS learning companion that helps students retain what they learn. Most of what students learn is gone within a day, not for lack of effort but because nothing brings them back. Capi does. It schedules spaced review, runs short active-recall sessions when concepts are due, and pulls related concepts with each one. Students only have to show up. Capi captures the lecture, the slides, and imports from their other tools. A memory of each student builds over time, so each session is better than the last.



Technologies: FastAPI, PostgreSQL, Pinecone, Groq, ElevenLabs, Swift, SwiftUI, Python, Render, LangFuse, DeepEval

<https://www.capi.lol/>

Capi - AI-Powered Adaptive Learning Companion

You forget what you learn – not because you're lazy, but because nothing ever brings you back.

WHAT IS CAPI

Capi captures what you're learning, automatically turns it into personalised notes and tutorials, and decides exactly when you need to review it. Your only job is to show up for two minutes when Capi asks – it remembers everything, learns your gaps, and grows with you every session.

SYSTEM ARCHITECTURE

```

    graph TD
      iOS[iOS app] --> Backend
      MCP[MCP clients (e.g. Claude)] --> Backend
      subgraph Backend [Capi backend · FastAPI on Render]
        direction TB
        subgraph Engines [Seven engines, one process]
            Capture
            Synthesis
            Review
            Tutoring
        end
        subgraph Tools
            SongMaker
            Librarian
            Memory
        end
      end
      Backend --> Groq[Groq Whisper · LLM · Vision]
      Backend --> ElevenLabs[ElevenLabs Music]
      Backend --> PostgreSQL[PostgreSQL source of truth]
      Backend --> Pinecone[Pinecone vector store]
    
```

TECH STACK

Yong Hsiang Hsieh
Software Systems Development
wilsonhsieh1216@gmail.com



Academic Title

Comparative & Historical Price Analysis Platform for Supermarket Products Using Web Technologies

Project Areas

- Database and Analytics
- Personal Independent Project
- Software Development: (Back End / Core / Web)

Project Supervisor

Dr Rahul Mhapsekar

PricePulse

#61 / TL2.50

by Dion Kennedy



Project Overview

PricePulse is a web-based price comparison platform designed to address the lack of price transparency in the Irish grocery market. With inflation and "price creep" quietly eroding household budgets, the platform gives consumers the ability to compare current supermarket prices across multiple retailers and review interactive historical price charts to understand how costs have changed over time.

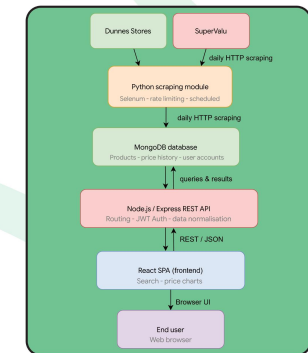
Built using a Python scraping backend, a MongoDB database, and a Node.js/React frontend, the system collects and stores daily product pricing data in a scalable, GDPR-compliant manner. Registered users can also maintain a personalised wishlist, allowing them to monitor long-term pricing trends for the products most relevant to their shopping habits.

Methodology



The platform is developed iteratively using the Agile SCRUM methodology, ensuring a stable and scalable codebase that can be extended to accommodate additional retailers and product categories in the future.

System Architecture



Key Features

- ✓ Cross-retailer price comparison across multiple supermarkets
- ✓ Historical price tracking with interactive daily charts
- ✓ Product search with sorting and filtering
- ✓ User account system with secure registration and login
- ✓ Responsive web interface accessible on desktop and mobile

Technologies used



Dion Kennedy (20101554)
BSc (Hons) Software Systems Development
Dept. of Computing & Mathematics
SETU Waterford



This project tackles the issue of **price creep**: the subtle, compounding rise in everyday grocery costs that most shoppers will never notice. I built a full-stack web platform that automatically scrapes supermarket prices daily from Irish retailers and displays them historically using charts, letting users track how prices evolve over time. The platform features interactive charts, cross-retailer comparisons, and a personalised wishlist. It turns raw retail data into clear, easy-to-understand information for budget-conscious consumers.



Technologies: Python, MongoDB, Node.js, and React

<https://tiredwork.github.io/final-year-project/>





Academic Title

Immersive First-Person Survival Game

Project Areas

- Game Development

Project Supervisor

Jacqui Woods O'Brien

NOMO

#62 / TL2.51

by Vitalii Kovalenko

NOMO is a single-player first-person survival game developed in Unity and set in a remote northern Soviet environment. The player takes on the role of a fisherman stranded on an isolated island after a violent storm. To survive, the player must explore the world, manage hunger, hydration, energy and temperature, collect resources, and interact with the environment. The long-term objective is to repair a damaged boat and escape the island, while uncovering the atmosphere and mystery of the setting.

Immersive First-Person Video Game

NOMO

Developed by: Vitalii Kovalenko
Course: Bc(H) Software Systems Development
Supervised by: Jacqui Woods O'Brien

Project Overview

NOMO is a single-player first-person survival game made in Unity. The game takes place in a remote northern Soviet setting. The player controls a fisherman trapped on an unknown island after a storm. The goal is to explore, survive, and repair a boat to escape. The project also aims to build a solid base for a larger survival game.

Features:

- Resource management
- Advanced health system
- Interactive world
- Day & Night cycle
- Combat system
- Various AI creatures
- Storyline
- Data persistence

System Diagram

This diagram shows the relationship between the core gameplay systems in NOMO. The player interacts with world objects, manages inventory and survival conditions, and follows objectives that drive progression. Together, these systems lead the player toward the final goal of repairing the boat and escaping the island.

```

    graph TD
      Env[Environment/Hazards] --> Stats[Survival Stats]
      Inv[Inventory] <--> Player[PLAYER]
      IO[Interactive Objects] --> Stats
      IO --> Obj[Objective System]
      Stats --> Player
      Obj --> Player
      Player --> Game[Game Ending]
      
```

Methodology

PLAN → PROTOTYPE → IMPLEMENT → REFINE → TEST → FINALIZE

The project was developed using an iterative solo workflow. Core gameplay systems were planned, implemented, tested, and refined in small stages. This approach made it possible to improve mechanics gradually and adapt the project scope during development.

Tech Stack



Technologies: Unity, C#, Blender, Visual Studio, Audacity, Miro, Github

<https://anyakasia.itch.io/nomo>



Evergreen Mobile

#63 / TL2.52

Academic Title

A Mobile Reproductive Health Application

Project Areas

- Software Development: (Front End / Mobile Native / Mobile Hybrid)

Project Supervisor

Sonya Hogan

by Sylvia Martin

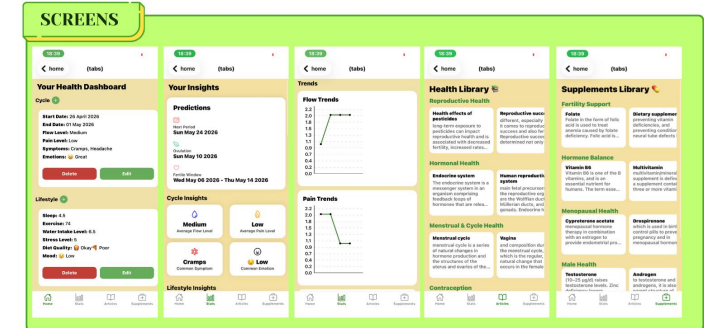
A mobile application for sexual and reproductive health that caters to menstruating women, women who are undergoing or have undergone menopause, and men. It serves as a digital platform on which users can log key reproductive health data, view personalised statistics and insights, access built-in educational resources, and receive daily reminders to log their health data. The application’s aim is to encourage users to take a more proactive, informed, and organised approach to managing their reproductive health.



DESCRIPTION

A mobile application for sexual and reproductive health that serves as a digital platform on which users can log key reproductive health data, view personalised statistics and insights, access built-in educational resources, and receive a daily reminder to log their health data. The application’s aim is to encourage users to take a more proactive, informed, and organised approach to managing their reproductive health.

TECHNOLOGIES



METHODOLOGY

Agile Development Methodology

This project followed an Agile development methodology, allowing for flexible and iterative development. Features were implemented in weekly sprints based on a prioritised backlog and regular reviews and feedback was used to improve the system throughout development.

- Weekly sprint-based development
- Iterative design and continuous improvement
- Regular reviews with supervisor

FUTURE WORK

- Wearable device integration
- AI powered personalised insights
- AI chatbot for user support
- Bar code scanning for hormone disruptors
- Community forum and discussion groups
- Quizzes for educational content

Sylvia Martin | BSc (Hons) in Software Systems Development
 Department of Science and Computing | South East Technological University, Waterford
<https://sylviamartin1.github.io/fyp-project-site/>



Technologies: React Native, Express, Node.js, MongoDB, Wikipedia Api

<https://sylviamartin1.github.io/fyp-project-site/>



#64 / TL2.52



LanLearn

Academic Title

Smart SRS Language Learning App

Project Areas

- Cloud Computing
- Software Development: (Back End / Front End / Mobile Hybrid)

Project Supervisor

Deirdre O’Halloran

This project is a React Native language learning app to help beginners learn German. It uses spaced repetition flashcards to review vocabulary, AI generated sentences for practical usage of learned vocabulary, and text to speech for passive listening. Users progress is saved to accounts secured with Firebase and MongoDB. The app aims to provide an engaging and personalized learning experience, while also offering an alternative to traditional language learning apps rigid structure and also making use of AI features to help supplement what they have learned.

LanLearn

Smart SRS Language Learning App

by Tomás McGrath

Project Description

LanLearn is an app to help beginners learn German words with spaced recall. The app introduces vocabulary for a range of topics and reinforces learning through a spaced repetition system(SRS), Words reappear over time for optimal review and you see if you remember them. Utilizes OpenAI to generate example sentences using known vocabulary, which helps learners understand usage. Text-to-speech allows users to improve listening skills with passive listening. The app addresses the problem of lack of active vocabulary found in many traditional language learning apps, while also making use of AI features to enhance learning.

Methodology

App Developed in Sprint cycles with branches to solve issues and deliver core features

Technologies

System Diagram

Key Features

- User authentication - register,login
- Topic categories with different words
- Personalized SRS word reviews.
- Sentence Generation with user words
- Passive listening to sentences with TTS

Tomás McGrath
 • 20103551@setu.ie
 • Bsc(Hons) in Software Systems Development
 • Department of Computing and Maths - SETU Waterford

Ollscoil Technological in Dubhainnis
 South East Technological University



Technologies: Firebase, React Native, Node, Express, OpenAI, Google Gemini, MongoDB, AWS, GitHub, VS Code

<https://tomasmcg.github.io/FYP-Website/>



FixMyPhone Phone Troubleshooting Guide

#65 / TL2.49

Academic Title

Design and Development of a Mobile Troubleshooting Assistant and Signal Diagnostic Tool

Project Areas

- Computer Networks
- Database and Analytics
- Software Development: (Back End / Front End / Web)

Project Supervisor

Dr Rahul Mhapsekar

by Mubarak Alabi

FixMyPhone is a web-based mobile troubleshooting assistant that guides users through a structured, step-by-step diagnosis flow for common smartphone problems. Users select an issue category and answer a series of guided questions. A rule-based scoring engine analyses their responses to identify the most likely cause and generate a personalised fix plan. The system covers general device issues such as performance, battery, and app crashes, as well as mobile connectivity problems including weak signal and no service. Inspired by call-centre support workflows.

The screenshot shows a presentation slide for 'FixMyPhone'. It includes an abstract, system architecture diagram, problem statement, novel contributions, target users, methodology, and technologies used. A small portrait of the author is also visible in the bottom right corner of the slide.



Technologies: React, Node.js, Express.js, MongoDB, Mongoose, Vite, React Router, Vercel, Render

<https://mubarak09.github.io/FixMyPhone-Phone-Troubleshooting-Guide/>

#66 / TL2.25



Tri-Hard

Academic Title

Tri-Hard: Triathlon Training Plan Generator

Project Areas

- Database and Analytics
- Software Development: (Back End / Front End / Web)

Project Supervisor

Brenda O’Neill

Tri-Hard is a web-based application that generates personalised triathlon training plans using user inputs such as event type, race date, weekly availability, and ability across swimming, cycling, and running. The system produces structured and balanced schedules based on progressive training principles to support safe and effective improvement. Designed with simplicity and accessibility in mind, Tri-Hard provides an affordable and user-friendly alternative to complex or subscription-based coaching platforms.

by Robert O'Donnell

TRI-HARD: TRIATHLON TRAINING PLAN GENERATOR

ABSTRACT

Tri-Hard is a web-based application that generates personalised triathlon training plans based on user input such as race type, event date, and fitness levels across swimming, cycling, and running.

SYSTEM DESIGN

- User Input
- Algorithm
- Plan
- Calendar UI
- Feedback

METHODOLOGY

Agile development with iterative sprints, testing, and feedback loops.

TRI-HARD

TECHNOLOGIES

- React
- Node.js
- Express
- MongoDB
- Tailwind CSS
- JWT/OAUTH

OBJECTIVE

Generate personalised plans, balance disciplines, adapt to user weaknesses, and provide structured progression.

TARGET USERS

Amateur triathletes, fitness enthusiasts, and users seeking structured training.

Robert O'Donnell | 20089483 | Department of Computing & Mathematics | SETU



Technologies: React, Node.js, Express, MongoDB, Mongoose, JWT Authentication, REST API

<https://github.com/robertodonnell100/tri-hard.git>





PassKey Auth

#67 / TL2.35

Academic Title

Implementing Passwordless Authentication Using FIDO2 and WebAuthn

Project Areas

- CI/CD & Testing
- Computer Security
- Database and Analytics
- Software Development: (Back End / Front End / Web)

Project Supervisor

Komal Shoukat

This project implements a passwordless authentication system using FIDO2 and WebAuthn standards, eliminating phishing, credential theft, and brute-force attacks. Users authenticate via biometrics (Touch ID, Face ID) or hardware security keys. Features include usernameless login, multi-authenticator support, SHA-256 hashed recovery codes, and FIDO MDS3 attestation verification. The frontend uses React, TypeScript, and Vite. The backend runs Flask with python-fido2. PostgreSQL stores credentials, Redis manages session state, and Docker Compose orchestrates all services.

Implementing Passwordless Authentication Using FIDO2 and WebAuthn

PassKey Auth

Stephen Power | BSc (Hons) Software Systems Development | Supervisor: Komal Shoukat

Project Description

This project implements a passwordless authentication system using FIDO2 and WebAuthn standards, eliminating traditional password vulnerabilities such as phishing, credential theft, and brute-force attacks. Users authenticate using biometrics (Touch ID, Face ID) or hardware security keys. The system features usernameless login, multiple authenticator support, SHA-256 hashed recovery codes, and attestation verification using the FIDO Alliance Metadata Service

System architecture

Methodology

Iterative & Feature-Driven Development

- "Implement, test, debug, commit" cycle
- GitHub feature-branch workflow
- Conventional commits (feat, fix, refactor)
- Manual testing via browser DevTools

Key Features

- Passkey registration and login (WebAuthn)
- Usernameless authentication
- Recovery codes (SHA-256 hashed)
- Attestation verification (FIDO MDS3)
- Multi-authenticator support
- Admin dashboard with credential revocation

Key Technologies

Stephen Power

BSc (Hons) Software Systems Development
Department of Computing and Mathematics | South East Technological University | 2026



Technologies: React, TypeScript, Flask, Python, PostgreSQL, Redis, Docker, WebAuthn, FIDO2, python-fido2

<https://www.passwordlessauth.net/>





Fantasy Football Waterford

#68 / TL2.28

Academic Title

A Mobile Fantasy Football Management System

Project Areas

- Computer Security
- Database and Analytics
- Software Development: (Back End / Front End / Mobile Native / Mobile Hybrid)

Project Supervisor

Jacqui Woods O'Brien

by Jonathon Ryan

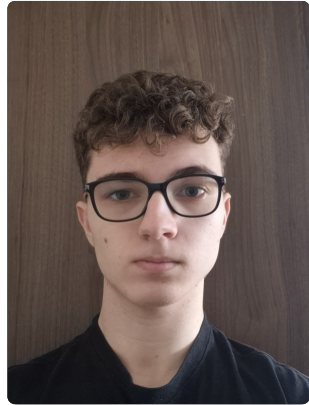
A mobile fantasy football application where users can select and manage a squad of players, select their Starting XI and compete on a live leaderboard. The system combines an interactive Android interface with a backend service to calculate points based on real-world performance. Users can sign up to the application, name their team, and may “Transfer” players in and out each week based on their preferences. Points will be updated by the admin for each player, depending on their performance (Goals, Assists etc), each week as games are played in the local Waterford Junior Football League.

The poster features a blue background with a white header. It includes a small portrait of the student, the project title, and logos for the Waterford Junior Football League and MongoDB. The poster is divided into three columns: Overview, Technologies, and Methodology. Below these is a System Architecture diagram showing the flow from a Mobile App (Kotlin) to a REST API (Node.js) to MongoDB. At the bottom, there are three screenshots of the application interface: Transfers, Pick Team, and Leaderboard. The footer of the poster reads 'Jonathon Ryan – Software Systems Development – Computing – SETU Waterford'.



Technologies: Mongo DB, Android Studio, Node js

<https://github.com/jonoryan42/fantasy-football-app>



NutritionMax

#69 / TL2.49

Academic Title

AI-Powered Nutrition Tracking

Project Areas

- AI/ML Development
- Cloud Computing
- Software Development: (Front End / Mobile Hybrid)

Project Supervisor

Kavindu Sellahewa

by Rael Santers

NutritionMax is a mobile application that allows users to log their food intake, track daily calories and monitor their macronutrients and micronutrients. The System uses AI to retrieve nutritional food data from trusted sources and generate personalised food recommendations based on user deficiencies while taking into account their dietary preferences. This application provides users with deep insights into their dietary lifestyle, to help them make the best choices to reach their fitness goals.

Abstract
NutritionMax is a mobile application that allows users to log food intake, track daily calories and monitor their macro and micronutrients. The System uses AI to retrieve nutrition data from trusted sources and generate personalised recommendations based on user deficiencies.

Methodology
Application was developed using Agile methodology with weekly development sprints focusing on implementing core features

Technologies
React Native, Firebase, Firestore, Gemini API

Key Features

- AI Nutrition Search
- Food Logging and calorie tracking
- Macro/Micro Nutrient monitoring
- Personalised calorie targets
- Weekly food Recommendations
- Dietary preference

System Overview

```

    graph TD
      A[User Authentication via Firebase] --> B[User Dashboard Layout]
      B --> C[Food Logging]
      B --> D[Weekly Recommendations]
      C --> E[Track Log entered in Firebase]
      D --> F[Retrieve Nutrition Data from Firebase]
      E --> G[Retrieve Weekly Summary from Firebase]
      F --> G
      G --> H[Summary + User Performance sent to Server API]
      H --> I[AI Generate Recommendations based on user deficiencies]
      I --> J[User Dashboard & Weekly Summary sent to Mobile App]
      J --> K[User Dashboard & Weekly Summary sent to Mobile App]
    
```

User Interface

NutritionMax
1687 Remaining
148g Protein / 233g, 108g Carbs / 311g, 36g Fat / 104g

Log food
Portion size (grams): 300 g
Chicken breast raw

Select meal
Breakfast, Lunch



Technologies: React Native, Firebase, Firestore, Gemini API, Cloud functions

<https://raels24.github.io/nutritionmax-showcase/>

Rael Santers
20103026

BSc (Hons) in Software Systems Development
Department of Computing & Mathematics,
South East Technological University

Supervisor:
Kavindu Sellahewa





Academic Title

All Football: Real-Time Platform

Design and Implementation of a Real-Time Football Data Platform

Project Areas

- Cloud Computing
- Software Development: (Back End / Front End / Web)

Project Supervisor

Malik Faizan

This project presents the design and implementation of a full-stack real-time football data platform. It integrates live match updates, team and player statistics, and news into a single web application. The backend is built with Spring Boot, using scheduled polling and delta detection to process live data from external API sources. Redis is used for caching, while MySQL provides persistent storage. A React-based frontend delivers an interactive user interface, with real-time updates enabled through WebSocket communication.



Technologies: React, Spring Boot, MySQL, Redis, Docker, AWS, WebSocket

<https://github.com/musicheng520/All-Football-Backend>

#70 / TL2.50

by Sicheng Mu

The poster features a blue header with a soccer ball icon, the title 'ALL FOOTBALL REAL TIME FOOTBALL DATA PLATFORM', the author's name 'Sicheng Mu', ID '20109735', and affiliation 'Software Systems Development'. It includes a QR code and the SE TU logo.

Introduction: This project presents a full-stack real-time football data platform designed to deliver live match updates, team and player statistics, and the latest football news through an interactive web interface. The system integrates external football APIs with a scalable backend architecture, enabling continuous data synchronization and efficient data processing. By leveraging caching mechanisms and real-time communication technologies, the platform ensures low-latency data delivery and a responsive user experience. The goal of this project is to demonstrate the design and implementation of a modern web-based system that combines real-time data tracking, efficient backend processing, and intuitive frontend interaction.

System Architecture: A diagram showing a Full-Stack Architecture (Cloud, Frontend (Vue + MUI), Spring Boot Backend) with components like Docker, AWS EC2, MySQL, Redis, and External API.

User Interface: Screenshots of the application showing real-time match updates, team & player statistics, latest football news, and various pages like Team Page, Admin Page, Live Match Tracking, and News Page.

System Workflow: A flowchart illustrating the process from user request to data delivery, involving Frontend, Backend (Spring Boot), External API, MySQL, Redis, and Websocket.

Conclusion: This project demonstrates the design and implementation of a scalable full-stack system for real-time football data processing. By integrating external APIs, efficient backend architecture, and caching mechanisms, the platform achieves reliable data synchronization and low-latency performance. The system highlights how modern web technologies can be combined to deliver real-time, data-driven, and responsive user experiences, providing a practical solution for handling dynamic and continuously updating information.

Technologies: React, Spring Boot, MySQL, Redis, Docker, AWS, WebSocket.

South East Technological University
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#71 / TL2.35

Sun Life Metaverse



Academic Title

An Immersive 3D Platform for Sun Life Waterford, Connecting VR and Web Experiences

Project Areas

- Digital Graphic Design
- Game Development
- Media Development and Production
- Work Based Project
- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

Sonya Hogan

by Malgorzata Victor

Sun Life Metaverse is an immersive project that creates a virtual 3D representation of the Waterford office, accessible via web and VR. It addresses challenges in navigation, onboarding, and hybrid work by providing an interactive map, AI-driven pathfinding, and real-time insights. The solution improves employee experience, supports new hires, connects remote and onsite staff, and demonstrates innovative use of *VR*, *3D mapping*, and *digital twin technology* in a modern corporate environment.

Sun Life Metaverse
An Immersive 3D Platform for Sun Life Waterford, Connecting VR and Web Experiences

3D VIRTUALISATION

PROJECT DESCRIPTION
Sun Life Metaverse is a virtual 3D representation of the Waterford office, accessible via web and VR. It enhances navigation, onboarding, and hybrid work by providing interactive maps, AI-driven pathfinding, and real-time zone insights.

SYSTEM DIAGRAM

FEATURES
AI-integrated pathfinding for easy navigation
Web and VR platform accessibility
Built-in sensory zones with real-time notifications
Support for new hires, interns, and remote workers

METHODOLOGY
Agile Methodology
1. Plan, 2. Design, 3. Develop, 4. Test, 5. Deploy, 6. Review

TECHNOLOGY
Unity, Autodesk Maya, React, Cloudbees, JavaScript, C#, Babylon.js, Meta Quest Developer Hub

MALGORZATA VICTOR
BSC HONS IN SOFTWARE SYSTEMS DEVELOPMENT

DEPARTMENT OF COMPUTING & MATHEMATICS
Sun Life



Technologies: Unity, Autodesk Maya, React, Cloudbees, JavaScript, C#, Babylon.js, Meta Quest Developer Hub

<https://malgorzataavictor.github.io/>



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South East
Technological
University

SETU WATERFORD

COMPUTING EXPO '26

Section 2

HIGHER DIPLOMA IN SCIENCE

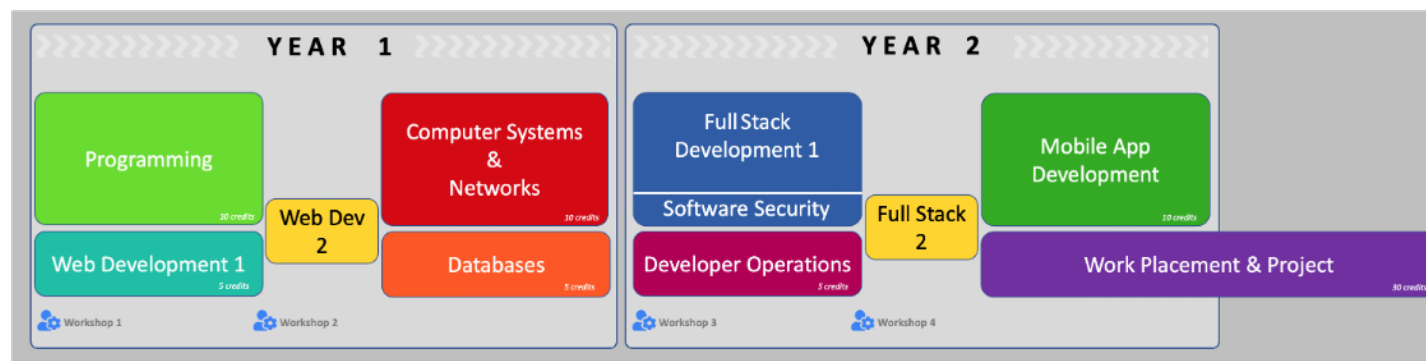
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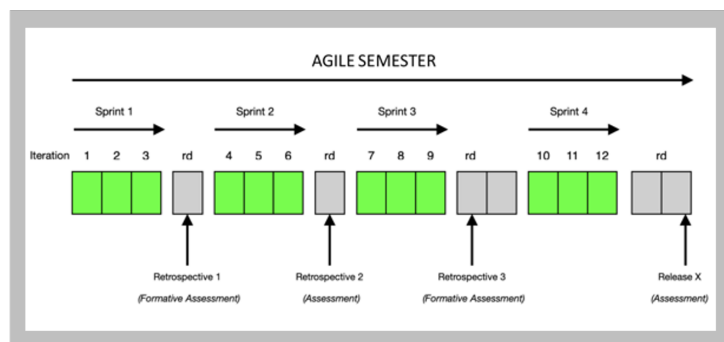
KARGO

Higher Diploma in Science in Computer Science (Online)

The ONLINE **Higher Diploma in Science in Computer Science** is an accelerated 24-month ICT Conversion Course focused on full stack oriented development. It is designed to allow honours graduates from non-computing disciplines to acquire the industry-relevant ICT and software development skills, expertise and practical experience required to become suitable candidates for employment in the ICT domain in general and in software development in particular.



As an accelerated course, there is an average time commitment of 16 hours per week required. Students with less ICT experience may need to factor in more time. The course is delivered using our award-winning online delivery platform—TutorStack. Pioneered on this programme with industry, we follow an “Agile Semester” approach, typically consisting of 4, three-week sprints followed by 1-week breaks for retrospective, after each sprint.



In addition there is a six lesson on-demand module each summer. Online delivery over the two years is supplemented by four onsite workshops to further enhance and deepen the learning experience, and learning community. Although not mandatory, these should be deemed essential. While all taught modules are delivered within two years, Work Project & Placement runs into the following year so as not to over burden students.

For a more in depth preview of the course content and structure, please watch this [video](#).

Try out a sample of the course [here](#).

Find out more [here](#).



Academic Title

Evaluating LLM & RAG Based TTRPG Rule Assistants with a Focus on D&D 5e

Project Areas

- AI/ML Development
- Open Source

Project Supervisor

Peter Windle

RAW: Rules as Written

#72 / TL2.38

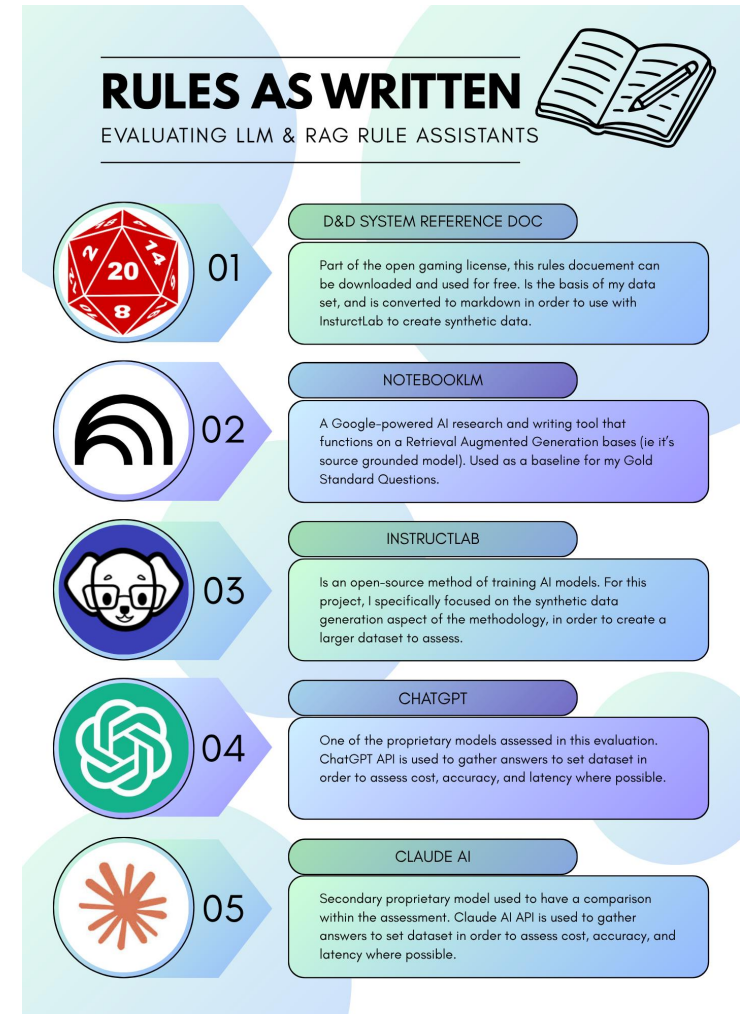
by Leanne Ahern

The goal of this project was to investigate the use of Large Language Models and Retrieval-Augmented Generation frameworks as a rule-assistance tool for Tabletop Role-Playing Games (TTRPGs) with a specific focus on Dungeons and Dragons 5th Edition. The initial aim was to assess the accuracy, cost, and latency of different models when providing information from a dedicated ruleset. However, it evolved to include a general configuration that others could use to trial and test the accuracy of AI models using my work as a guide.



Technologies: Python, NotebookLM, Markdown, InstructLab, Hugging Face Transformers, LLMs (Claude, GPT)

<http://bit.ly/4lZ4LZt>





ScanIQ

#73 / TL2.38

Academic Title

ScanIQ: A Mobile Application for Ingredient Analysis Using Barcode Scanning and Food Data APIs

by **Ludmila Bulat**

Project Areas

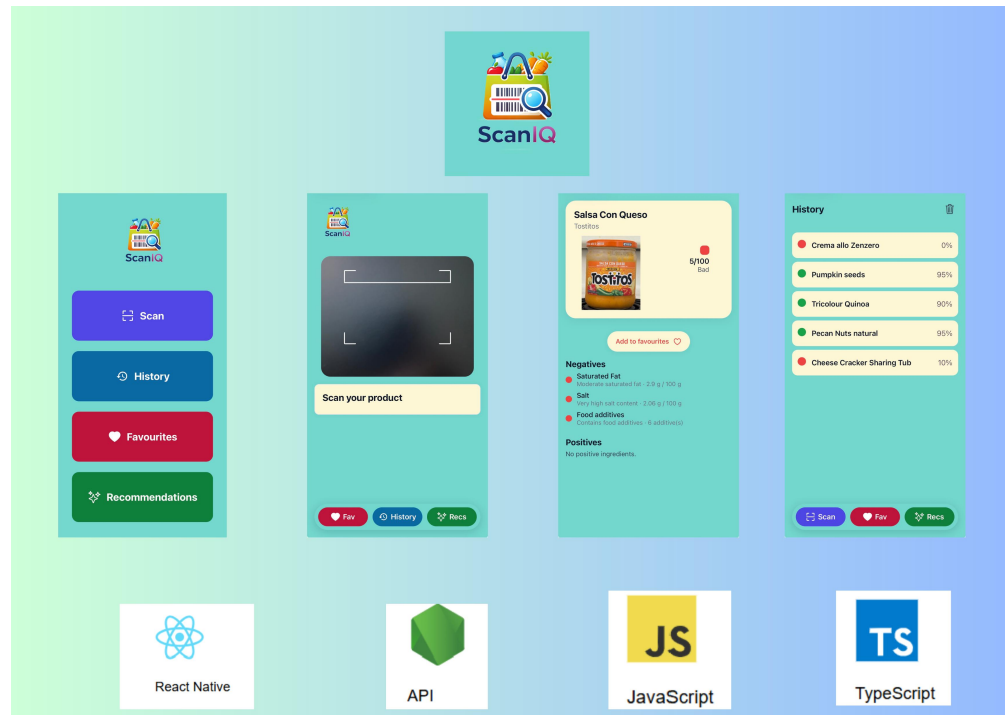
- AI/ML Development
- Personal Independent Project
- Software Development: (Core / Front End / Mobile Hybrid)

Project Supervisor

Dave Drohan

ScanIQ is a mobile application that helps users better understand food products by scanning barcodes and analysing ingredient data. The app integrates the OpenFoodFacts API to retrieve product information and applies a custom scoring system based on nutritional values such as sugar, salt, additives, and fibre. Users receive a simple colour-coded score and clear explanations, along with healthier product recommendations. The application also includes features such as scan history and favourites, focusing on usability, transparency, and informed decision-making.

Technologies: React Native, Expo, TypeScript, OpenFoodFacts API, AsyncStorage, Expo Camera



<https://scaniq-final-project.vercel.app/>



NeuraLumaDMX

#74 / TL2.38

Academic Title

AI Driven Translation of Natural Language into DMX Lighting Control

Project Areas

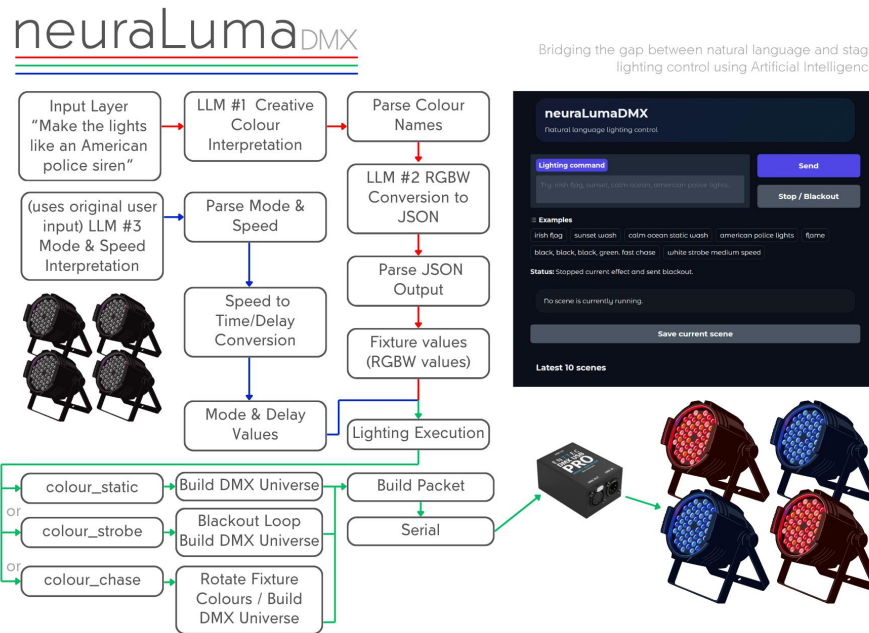
- AI/ML Development
- Internet of Things
- Personal Independent Project
- Software Development: (Core)

Project Supervisor

Peter Windle

by Nigel Byrne

neuraLumaDMX explores how natural language can be translated into stage lighting control using AI. The project focuses on bridging the gap between human intent and the technical requirements of DMX512 lighting systems. By using locally hosted large language models, an untrained user can input a command such as “make the lights calm”, which is transformed into structured DMX channel data and transmitted over a USB DMX interface to control physical lighting hardware in real time. A validation and sanitisation layer ensures that only safe and valid DMX data is transmitted.



Technologies: Python, PySerial, llama.cpp, GGUF LLMs, DMX512, USB-DMX (Enttec Pro), JSON, Gradio

<https://bit.ly/neuralumadm>



APAVS

#75 / Not Presenting

Academic Title

Automated Pipeline and Visualisation System for Tool Load Port Data

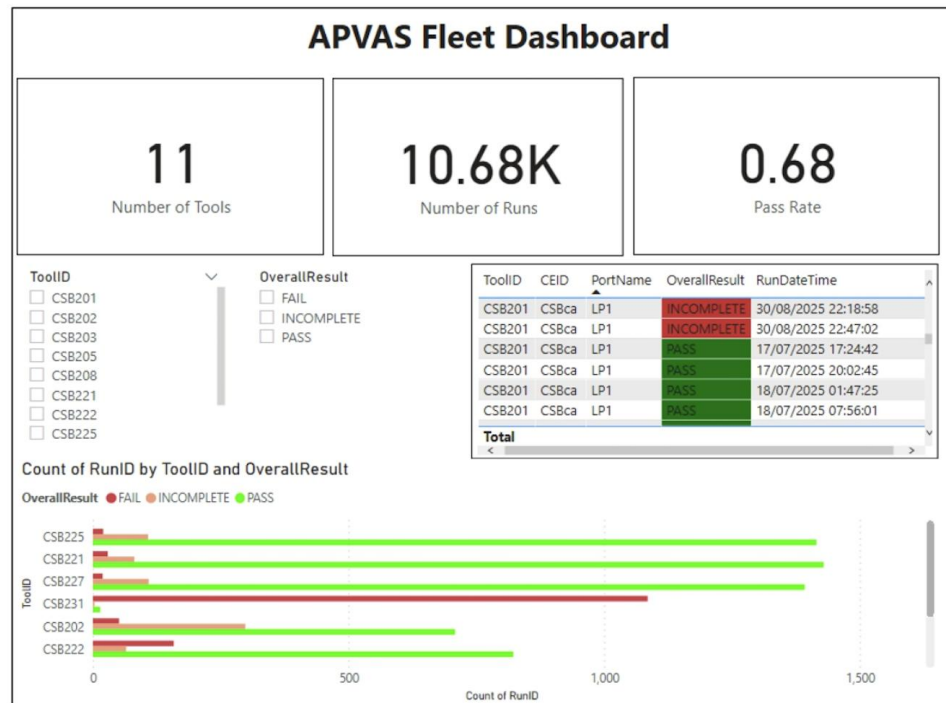
Project Areas

- Automotive and Automation
- Database and Analytics
- Work Based Project

Project Supervisor
Sonya Hogan

by Vincent Byrne

APAVS automates the monitoring of load port qualification data across a fleet of semiconductor manufacturing tools. Currently, technicians manually export log files, run Excel macros, and visually inspect qualification plots for individual tools with no fleet-wide visibility. APAVS replaces this workflow with a PowerShell extraction pipeline that retrieves data directly from tool hard drives, parses raw sensor logs, and calculates slot-level offsets against taught reference positions. Results are stored in a SQL Server database and visualised through a Power BI.



Technologies: PowerShell, SQL Server, Power BI



<https://bit.ly/4rJabZx>

#76 / TL2.38

CareModel Hub



Academic Title

Developing the CareModel Hub Web Application for Implementing the Kidney Failure Risk Equation

Project Areas

- DevOps
- Information Systems and Modelling
- Work Based Project
- Open Source
- Software Development: (Back End / Front End / Web)

Project Supervisor

Dr Anita Kealy

by Peter Chuk

Higher Diploma in Computer Science, SETU

Developing the CareModel Hub Web Application for Implementing the Kidney Failure Risk Equation

Presenter: Peter Chuk

- Chronic Kidney Disease (CKD), also referred to as Chronic Renal Disease (CRD), affects approximately 12% of the Irish population. Current detection rates remain around 40%, and while only ~3% of CRD patients progress to End Stage Renal Disease (ESRD), the absolute number of patients requiring secondary care services, including in-centre dialysis, continues to rise.
- The majority of CRD patients can be effectively managed within primary care settings, provided that high-risk individuals are identified early.
- The Kidney Failure Risk Equation (KFRE) predicts 5-year progression to ESRD using age, sex, eGFR, and ACR. Recommended by NICE NG203, KFRE enhances risk stratification, supports timely intervention, improves resource allocation, and reduces unnecessary secondary referrals.

KERE: HIGH NEGATIVE PREDICTIVE VALUE

~85-90% of CKD Stage 3 Patients → KFRE <9% (5-year risk) = Safe for Continued GP Monitoring

Key Takeaway: KFRE accurately identifies who do NOT need immediate specialist care

*High negative predictive value (NPV) reduces unnecessary nephrology referrals
Green: Low Risk → GP Monitoring

Regulatory & Governance

- ISO 13485 (QMS) - Defines requirements for a structured Quality Management System for medical device software.
- ISO 14971 (RA) - Establishes a formal framework for identifying, analysing, and mitigating clinical and technical risks.
- ISO 27001 (InfoSec) - Specifies controls for managing information security and protecting sensitive data.
- MDR / IVDR - EU regulations governing the safety, performance, and clinical validation of medical and in-vitro diagnostic devices.
- GDPR & NIS2 - European regulations ensuring lawful data protection and strengthened cybersecurity resilience.

2. System Architecture Overview

Layered microservice architecture:

- React Frontend (UI Layer)
- Node.js (Next.js + TypeScript) Backend
- FastAPI/Python Microservice (KFRE Engine)
- MongoDB Atlas Persistence

Design principles: modularity, security, fault isolation, scalability.

A Scalable Design for Clinical Calculations: Future Integrating Manual Data Entry with Hospital Records

Phase 1: with manual data entry application

Phase 2 & 3: HL7 connection to LIS

Planned container orchestration platform

Scan QR code: <https://pccork.github.io/caremodelhub/>

New KFRE Calculation

MRN: 541210 Specimen No: BC0012

Age: 60 Sex: M eGFR: 45 ACR: 120

5 Year Progression Risk: 8.5%

5 Year Progression Risk: 10%

5 Year Progression Risk: 15%

5 Year Progression Risk: 20%

5 Year Progression Risk: 25%

5 Year Progression Risk: 30%

5 Year Progression Risk: 35%

5 Year Progression Risk: 40%

5 Year Progression Risk: 45%

5 Year Progression Risk: 50%

5 Year Progression Risk: 55%

5 Year Progression Risk: 60%

5 Year Progression Risk: 65%

5 Year Progression Risk: 70%

5 Year Progression Risk: 75%

5 Year Progression Risk: 80%

5 Year Progression Risk: 85%

5 Year Progression Risk: 90%

5 Year Progression Risk: 95%

5 Year Progression Risk: 100%

Contact Information for Presenter:

- peter.chuk@setu.ie
- <https://github.com/pccork>
- <https://pccork.github.io/caremodelhub/>

ACKNOWLEDGMENT

- Dr Aidan Ryan, Consultant Chemical Pathologist, CUH
- Dr. Sinead Coakley, Consultant Clinical Biochemist, CUH
- Biochemistry Laboratory Management Team, CUH
- Learning Team, Department of Computer Science, SETU
- Dr Anita Kealy, project supervisor, SETU

The CareModel Hub (CMH) is a modular clinical decision support platform designed to bridge the gap between validated medical algorithms and their practical use in healthcare. The platform uses a microservice architecture where a Node.js backend manages authentication and user roles while isolated Python services perform clinical calculations such as the Kidney Failure Risk Equation (KFRE). The system follows EU NIS2 cybersecurity principles and supports HL7 FHIR interoperability standards for integration with modern healthcare systems.



Technologies: Node.js, Python, FastAPI, React, MongoDB, Microservices, HL7 FHIR

<https://pccork.github.io/caremodelhub-showcase/>





Academic Title

GateMate

#77 / Not Presenting

Project Areas

- Internet of Things

Project Supervisor

Mary Fitzgerald

by Aidan Clancy

GateMate is a privacy-first vehicle presence detection system for gates and access points. It uses distance-based sensing and time-threshold logic to generate a stable presence state without relying on cameras or cloud processing. A modular architecture separates sensing, transport, and processing via MQTT. Support for BLE and LoRa (Long Range Radio) enables deployment across domestic, rural, and temporary environments, providing a low-power, long-range, extensible solution for real-world applications.

GATEMATE PRESENCE DETECTION SYSTEM

Detect vehicles without cameras or cloud infrastructure

- Privacy First**
 - No cameras
 - No personal data
- Works Anywhere**
 - BLE, Wi-Fi & LoRa
 - Off-grid capable
- Modular System**
 - MQTT Based
 - Extensible Architecture

BLE Distance Sensor → BLE / LoRa → MQTT → Home Assistant → Alerts



Technologies: Bluetooth, LoRa, MQTT, Home Assistant, IOT

<https://bit.ly/GateMateLab>



WSL Plus

#78 / Not Presenting

Academic Title

Management Tool for the Windows Subsystem for Linux

Project Areas

- Personal Independent Project
- Open Source
- Software Development: (Back End / Front End)

Project Supervisor

Mary Fitzgerald

The Windows Subsystem for Linux (WSL) is a Windows feature that enables developers to run lightweight instances of Linux distributions on Windows. The native CLI for managing WSL has limitations, including a lack of support for bulk actions and multi-step workflows for common tasks. Some actions require users to manipulate the Windows registry, which can break the user's system if mishandled. WSL Plus provides a Go-based CLI and Flutter-based GUI for managing WSL. The tool makes it easier to monitor the status of multiple instances and manage them in bulk, improving developer productivity.



Technologies: go, cobra, flutter, wsl, windows, linux

<https://wslp-home.netlify.app/>

by Shane Crowley

WSL Plus

Graphical

Terminal

WSL management

- Multi-instance status
- Bulk actions
- Better ergonomics



EnferVision

#79 / Not Presenting

Academic Title

LIMS Bulk PRF Data Extraction Process Implemented as Local Web App Using AI Process

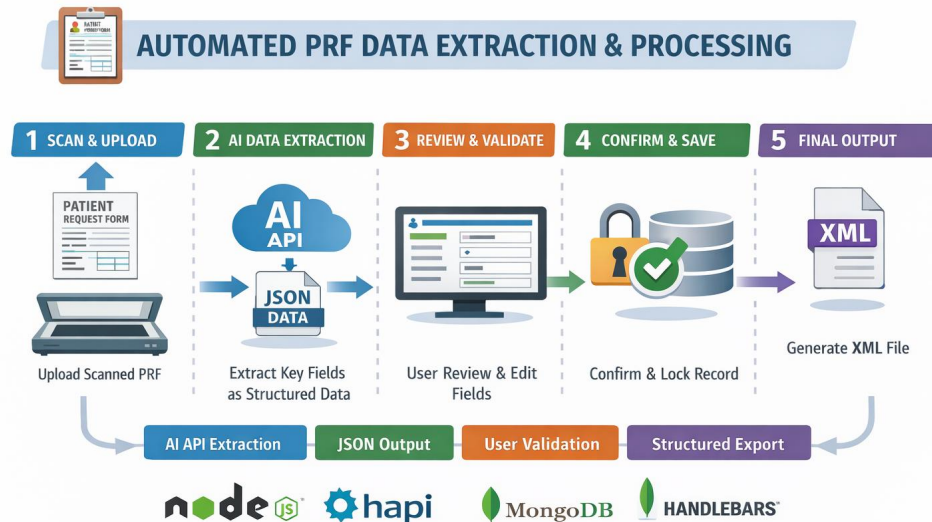
Project Areas

- Work Based Project

Project Supervisor

Richard Lacey

by Daniel Cullen



enferVision is a full-stack browser-based app designed to streamline data extraction and processing of patient request forms. The system uses AI to extract structured data from scanned documents and allows users to review and validate the extracted patient information through a user-friendly interface. It supports the full workflow from document ingestion to final XML generation, with features including role-based authentication, data validation, user observations, and audit logging. The platform reduces manual data entry and enhances traceability within clinical data handling processes.

Technologies: Node.js, Hapi.js, Handlebars, MongoDB, Mongoose, OpenAI API, Joi, JWT, bcrypt, Bulma CSS, Nodemon



<https://enfervisionprojectshowcase.onrender.com>





Academic Title

A Simple Workout Tracker

Project Areas

- Software Development: (Web)

Project Supervisor

Dr Sinead O'Neill

Compound

#80 / Not Presenting

by **Eoin Geoghegan**

Compound is a full-stack web application built with JavaScript, Svelte, Node.js, and Hapi. Users can create custom workouts, view pre-defined templates, and track completed custom sessions with timestamps. Workouts and exercises can be added, edited, or deleted. The app includes session-based authentication, an admin dashboard, and stores data using MongoDB with Mongoose and lowdb. It demonstrates full-stack development, CRUD operations, RESTful API integration, and user-focused functionality for managing and tracking workouts.

Technologies: JavaScript, Svelte, Node.js, Hapi, MongoDB, Mongoose, Handlebars

Technologies

- Language: JavaScript
- Frontend Framework: Svelte
- Runtime: Node.js
- Backend Framework: Hapi
- Database: MongoDB
- Database Tool: Mongoose
- Templating Engine: Handlebars

Development Tools

- Nodemon
- ESLint
- Prettier
- dotenv



<https://eoingeoghegan.github.io/CompoundFinalProject/>



There's No Place Like Home

#81 / TL2.38

Academic Title

Design and Implementation of a Segmented, Privacy-Centric Homelab Using Open-Source Platforms

Project Areas

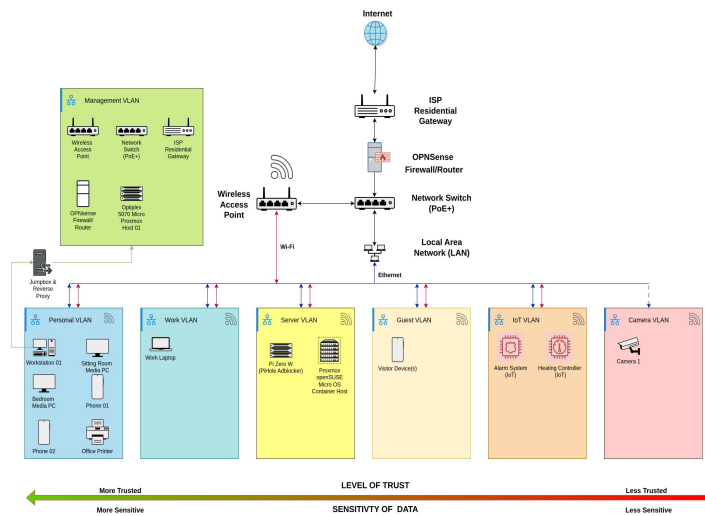
- Computer Networks
- DevOps
- Information Systems and Modelling
- Personal Independent Project
- Open Source

Project Supervisor

Mary Fitzgerald

by Wolfgang Helnwein

Final Network Diagram /Project End 2026



Tech Stack



'There's No Place Like Home' shows how a typical home network can become a secure, scalable, privacy-focused homelab using open-source tools. It employs VLAN-based segmentation, a custom OPNsense router, a managed switch, and Proxmox for self-hosting to enable network isolation and flexible service deployment. Focused on hands-on learning, the project develops systems administration and architecture skills through iterative, experiential practice. Favouring locally hosted services and recycled hardware, it also demonstrates how individuals can cut cloud dependence and reduce electronic waste.

Technologies: FreeBSD, OPNsense, Linux, Proxmox VE, Containers, Podman, Networking, Firewalls, VLANs



<https://urlr.me!/homelab>





Academic Title

Web App Designed to Help Users Learn and Practice Conversational Irish Using AI and Meta-prompting

Project Areas

- Personal Independent Project
- Software Development: (Back End / Front End / Web)

Project Supervisor

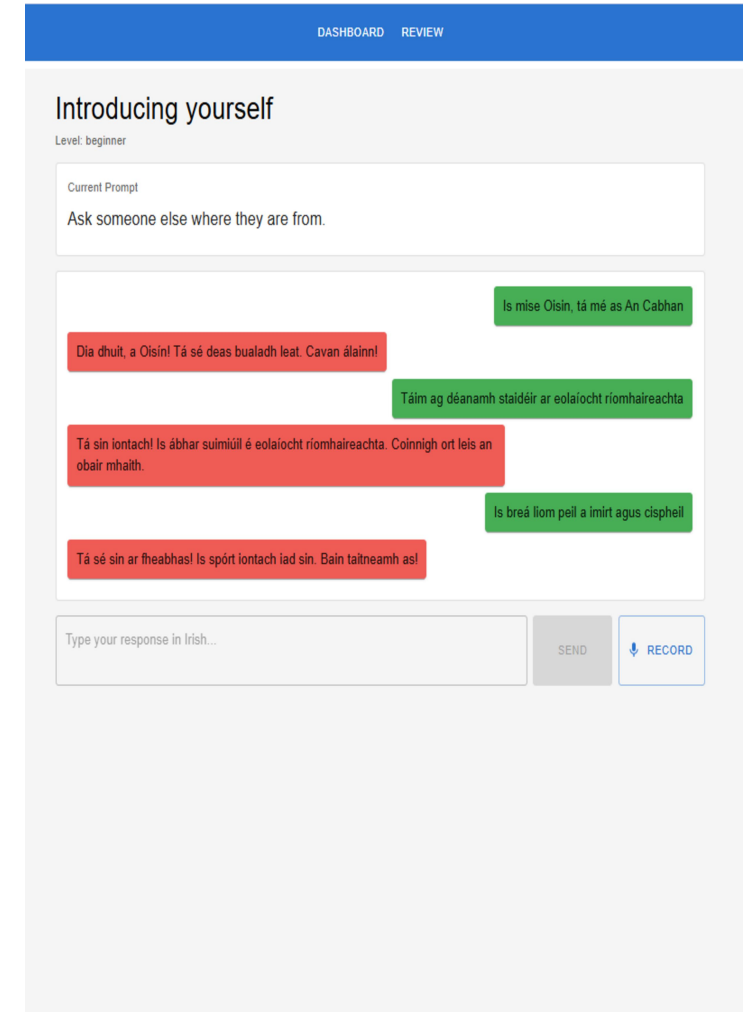
Michael McMahon

CoRaw

#82 / Not Presenting

by Oisín Larkin

CoRaw is a webapp designed to help users learn and practice conversational Irish using AI and meta-prompting. The webapp will take the user through immersive realistic conversations that will translate to improving real world conversational skills in Irish. The idea is that CoRaw will give people who are learning the Irish language a chance to engage in realistic everyday conversations at their own pace with an AI model. Users will be presented with some questions when they first login to determine their level and topics they are interested in.

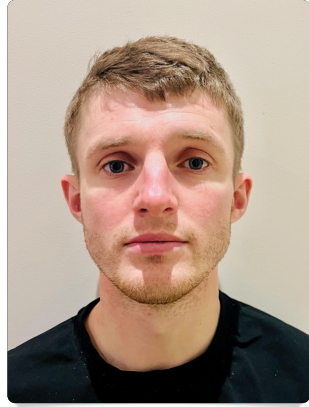


Technologies: React, Hapi, Joi, JWT, Typescript

<https://bit.ly/47h7xDa>

CB42

#83 / TL2.38



Academic Title

IoT Model of Rally Car Sensor and Telemetry System Displayed on Screen and in the Cloud

Project Areas

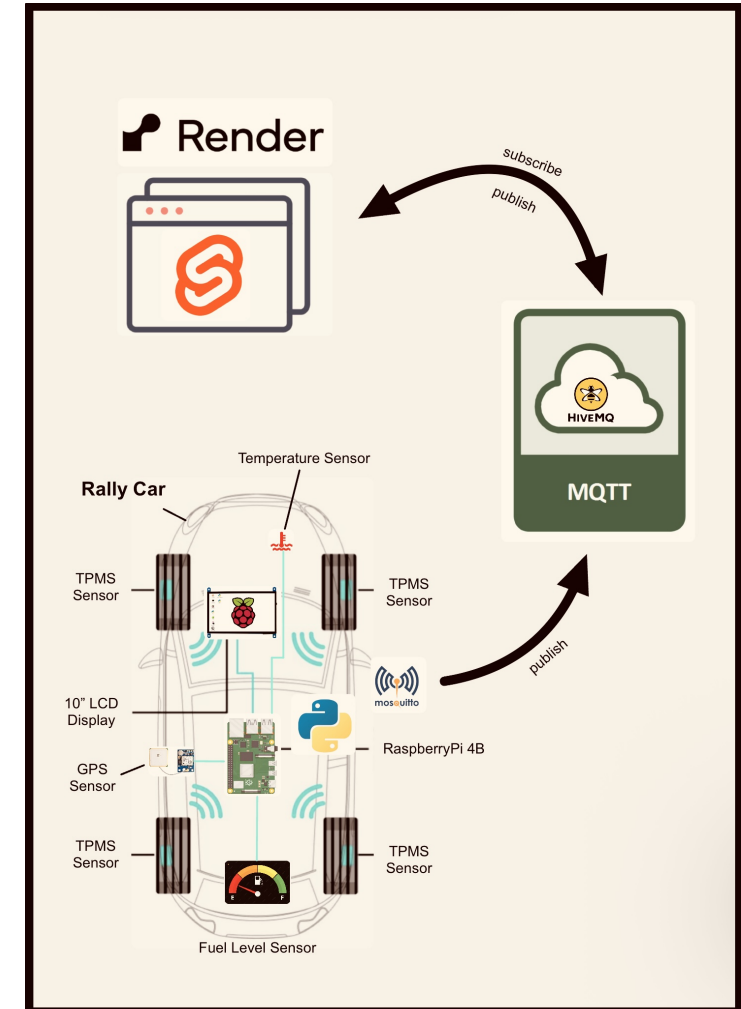
- Automotive and Automation
- Cloud Computing
- Internet of Things
- Personal Independent Project

Project Supervisor

Dr Mujahid Tabassum

by Garret Lenihan

A telemetry system that collects and displays real-time data from a historic rally car. A Raspberry Pi acts as the central controller, interfacing with several sensors, including a GPS module, a DS18B20 temperature sensor, a fuel level sender measured through an ADS1115 and BLE TPMS (tyre pressure monitoring system) sensors. Data is processed and published to an MQTT broker locally and remotely. An in-car display and a Svelte web app visualise live data and vehicle location, enabling the co-driver, service team, and spectators to monitor the car's status and improve safety.



Technologies: Python, MQTT, Svelte, Mosquitto, HiveMQ, PahoMQTT

<https://bit.ly/GarrettsHDipProject>



Academic Title

Poc Investigating Use of Wearables and Sensors in Preventing Falls in Elderly Healthcare

Project Areas

- Cloud Computing
- Database and Analytics
- Internet of Things
- Personal Independent Project
- Software Development: (Back End / Front End / Web)

Project Supervisor

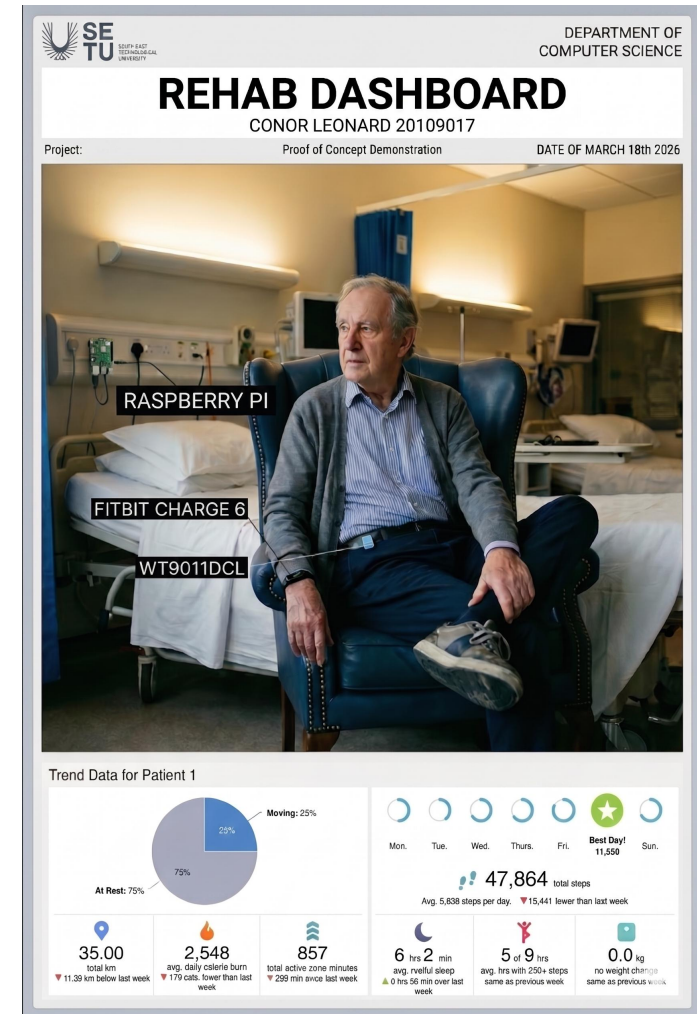
Richard Lacey

Rehab Dashboard

#84 / TL2.38

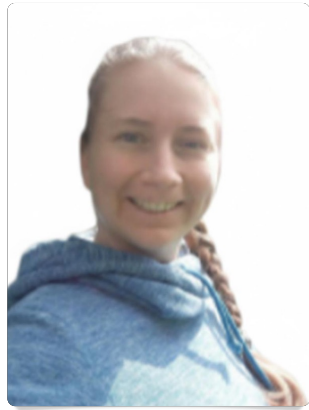
by **Conor Leonard**

Movement is key in rehabilitation of older persons. Wearables like FitBits provide excellent data, but it is impractical for clinicians to log into multiple individual accounts. They are also insensitive to smaller movements like sitting to standing. Bluetooth movement sensors can detect any fine movement. This project explores combining the wearable data obtained via an API with the sensor data collected via a Raspberry Pi via a HAPI backend to a REACT multi-patient dashboard that can be easily reviewed by clinicians, integrating IoT BLYNK movement alerts that may prevent falls.



Technologies: Bluetooth sensors, Rasberry Pi, Fitbit with API calls, HAPI, React, Python, IoT Blynk

<https://bit.ly/48hGGaE>



Done!

#85 / Not Presenting

Academic Title

A Gamified Tracker of All Things Done Available on a Web App

Project Areas

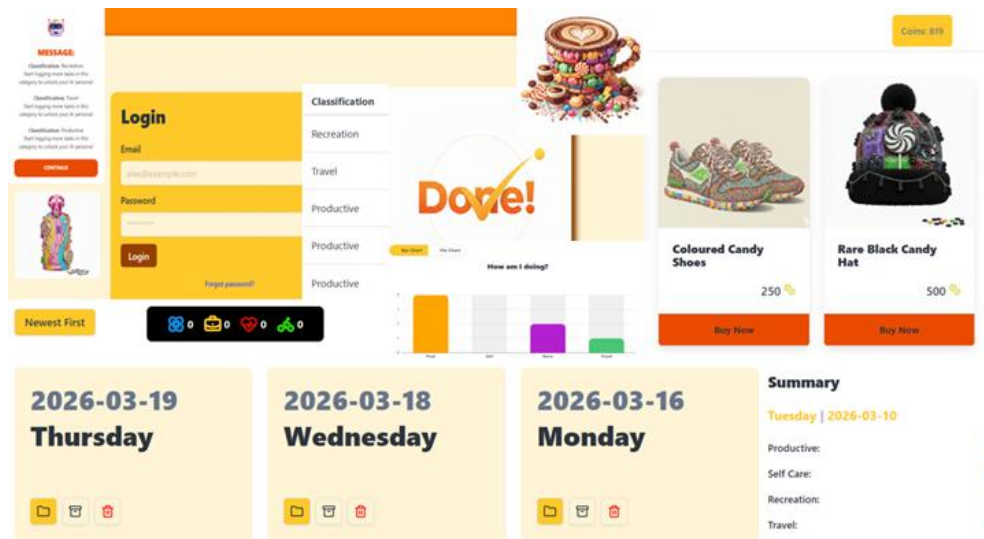
- Personal Independent Project
- Software Development: (Back End / Front End)

Project Supervisor

Richard Lacey

by Noemi Lovei

A gamified tracker of all things done available on a webapp, supplemented with in-game currency and in-app statistics and charts for visualising user engagement. Built with a nodejs backend exposing the backend APIs, storing data through a MYSQL database and a react frontend all the while connected to a custom python mini AI server making recommendations based on user activity and delivering through web API. Built with robust front-end design, keeping data security and good database practices in mind.



Technologies: React, Nodejs, Python, Javascript, Typescript



<https://nilanoemi25.github.io/project-/>



Warble

#86 / Not Presenting

Academic Title

A System for Multi-Model LLM Evaluation & Optimization

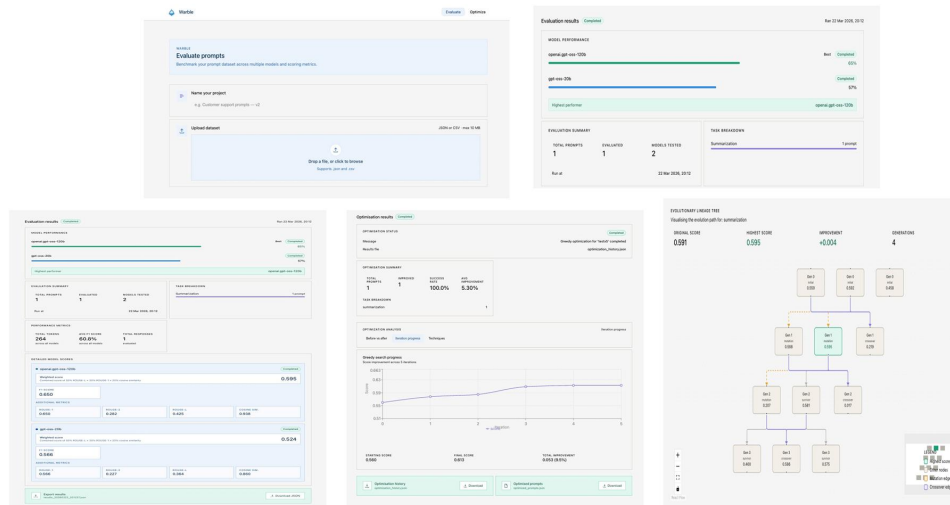
Project Areas

- AI/ML Development
- Cloud Computing
- Work Based Project
- Software Development: (Back End / Front End)

Project Supervisor

Mary Fitzgerald

by **Rhiannah Maher**



Warble automates prompt evaluation and optimisation across multiple Large Language Models (LLMs). Built with a React front end and Python FastAPI back end, users can submit prompts and evaluate responses using F1-Score, ROUGE, and cosine similarity. Prompts are optimised through greedy and evolutionary search algorithms. The system integrates AWS Bedrock for LLM inference and is deployed on AWS for scalability. *Warble* provides visual feedback on prompt performance, offering a structured alternative to manual prompt engineering across different LLM architectures.

Technologies: React, JavaScript, Python, FastAPI, Node.js, Hugging Face, NLTK, Amazon Web Services



<https://bit.ly/Warble>





ECADS

#87 / Not Presenting

Academic Title

Emergency Services Contact & Dispatch System for Offline Incident Management

Project Areas

- Personal Independent Project
- Software Development: (Core)

Project Supervisor

Dr Sinead O'Neill

by Fergal McLoughlan

An offline stand-alone contact and dispatch system designed for the emergency services, Gardaí in particular, to allow data capture of call information and incident management in a “system/network down” scenario. ECADS has been developed from a simple interactive Bash and PowerShell script version into a graphical Windows Forms application which records data at a local level on individual clients. This makes it a lightweight solution which is easily deployable on control room clients or local servers, depending on the size of the control room.

The screenshot displays the ECADS application interface. At the top, there are navigation tabs: Home, Contact Records, Incidents (selected), and Reports. The main window title is "Today's Incidents - Offline". On the left side, there is a form for entering incident details, including fields for First Name, Surname, Phone Number, Date of Birth, Address, and Closure Code. Below these fields is a text area labeled "What Has Happened" and a "Create Incident" button. In the center, there is a large empty rectangular area, likely for displaying incident records. At the bottom, there are sections for "Add Comment" (with a text area and "Add Comment" button), "Incident to add comment to:" (with a dropdown menu and "View" button), and "Incident to Close" (with a dropdown menu and "Close" button). On the right side, there are fields for "Unit for Dispatch" and "Dispatch Incident" with a "Dispatch" button.

Technologies: Bash, PowerShell, C#, Windows Forms



<https://feargalmcloughlin.github.io/ECADS/>





Academic Title

Wynsum Point of Sale

#88 / Not Presenting

A High-Performance Edge-Native Point of Sale Terminal with Zero Trust Security

Project Areas

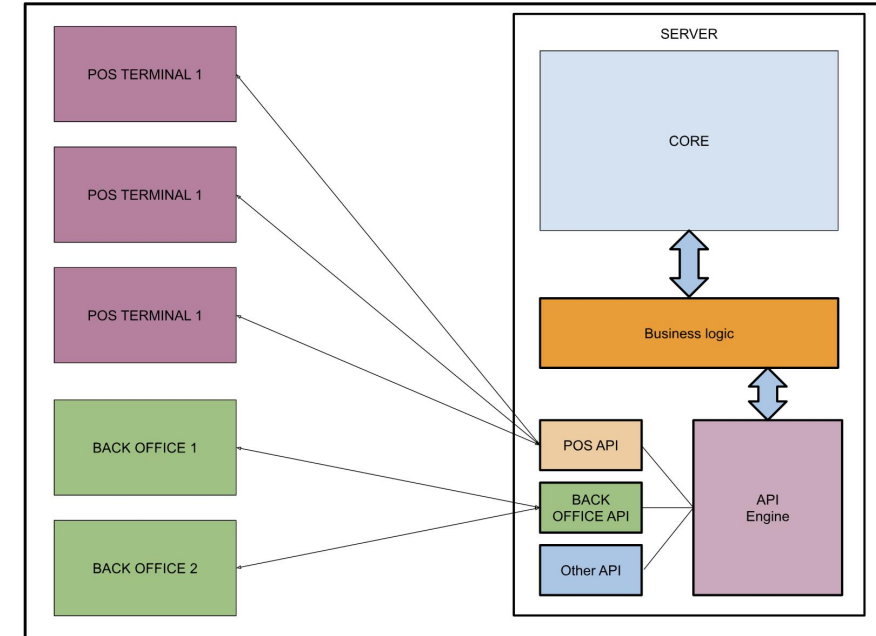
- Personal Independent Project
- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

Michael McMahon

by Vadym Melnychenko

This project delivered Wynsum POS, a high-performance PWA within an Edge-Native RMS. It bridges the gap between complex marketing needs and legacy infrastructure. Redefining performance for retail, the system eschews traditional caching to ensure 100% data consistency. Using a WebSocket-based JSON-RPC protocol and row virtualization, it manages 10,000+ items at 60 FPS. Adhering to “Zero Trust,” all financial logic is server-side and secured via ECDSA hardware keys. An Asynchronous Checkout Pipeline ensures sub-5ms response times during complex multi-step retail transactions.



Wynsum RMS Design



Technologies: Python, Django, Django Channels, Daphne/Uvicorn, Redis, PostgreSQL, React, Vite, TypeScript

<https://project.wynsum.ie/>



EVOTE

#89 / Not Presenting

Academic Title

An Electronic Voting System Implemented as a Full Stack Application Addressing UI for Disabilities

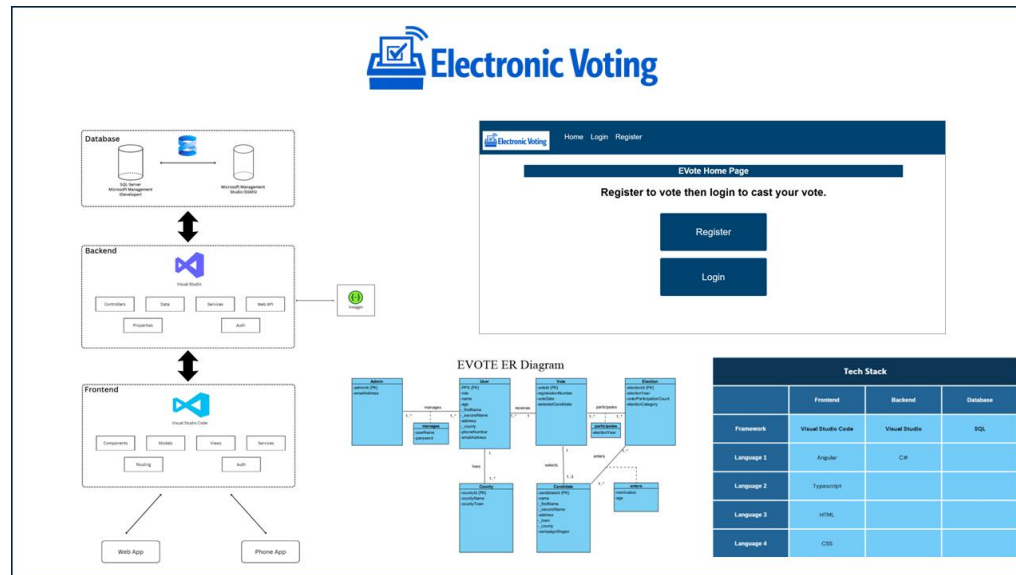
by Jake Nagle

Project Areas

- Software Development: (Back End / Core / Front End / Web)

Project Supervisor

Catherine Fitzpatrick



This project is a full-stack web application simulating a secure and accessible electronic voting system. Users can register, log in, and cast a vote. The frontend is built on Visual Studio Code with Angular, the backend with Visual Studio using C#, and SQL Server Management 22 is used for database. An admin panel allows management of users, candidates, elections, and viewing vote analytics. Security is implemented using JWT tokens and hashing of user passwords. The system implements accessibility features to support users with reading and sight disabilities.

Technologies: Visual Studio Code, Visual Studio, SQL Server Management 22



<https://jake-nagle123.github.io/EVoting/project.html>



GuestEase

#90 / Not Presenting

Academic Title

A Full-stack Web App for Small Hospitality Businesses

Project Areas

- Personal Independent Project
- Software Development: (Back End / Front End / Web)

Project Supervisor

Catherine Fitzpatrick

by **Andrea Nardinocchi**

GuestEase is a full-stack web app designed for small hospitality businesses such as B&B, guesthouses, and small boutique hotels. This booking system enables users to create and manage their bookings, profiles, write reviews, while also processing Stripe payments. It features an admin dashboard through which the administrator can create, and manage bookings, user accounts, manage rooms availability, and read users' reviews. It triggers email notifications, which can be cron-automated. Its goal is to provide a user-friendly tool to streamline the user experience on both ends: guests and admin.

Technologies: React, Vite, TypeScript, Material UI, Node.js & Express, Supabase, Cron-job, Stripe, Resend



<https://guestease-landing.vercel.app/>

#91 / TL2.38

Compliance Questionnaire Assistant



Academic Title

AI-Powered Web App Enabling Quick Completion of Security Questionnaires with RAG

Project Areas

- AI/ML Development
- Cloud Computing
- Work Based Project
- Software Development: (Back End / Front End / Web)

Project Supervisor

Richard Lacey

by David O'Connor

The CQA is a web app designed to streamline vendor onboarding at ServisBOT. When clients send us security questionnaires, the security team spends significant time searching through policies to respond. The CQA addresses this by allowing users to upload documentation and generate AI-powered answers referencing this documentation, saving the team time and effort.

The application consists of a React frontend hosted on AWS S3, and a Lambda backend using AWS managed services, including Bedrock Knowledge Base, DynamoDB, Aurora, and S3 to power questionnaire completion.

Technologies: React, Material UI, TypeScript, AWS CDK/SDK, JavaScript, Express, Bedrock, serverless AWS resources

The collage includes screenshots of the CQA Admin Panel, Questionnaires list, and Policy Configuration. It also features logos for various technologies used in the project: Amazon S3, Amazon CloudFront, React, MUI, TypeScript (TS), TanStack, AWS CDK, Node.js, Express.js, and Amazon Bedrock. On the right, an 'Overall Architecture/Chat/Prompts' diagram shows the flow from a User through CloudFront and API Gateway to a Central Lambda function, which interacts with S3, Bedrock Knowledge Base, and Conversation/Message Tables.



<https://bit.ly/cqa-setu>



Terms Long; Didn't Read (tl;dr)

#92 / TL2.38

Academic Title

A Comparison of Container Image Vulnerability Scanners in a CI/CD Pipeline

Project Areas

- CI/CD & Testing
- Personal Independent Project
- Open Source

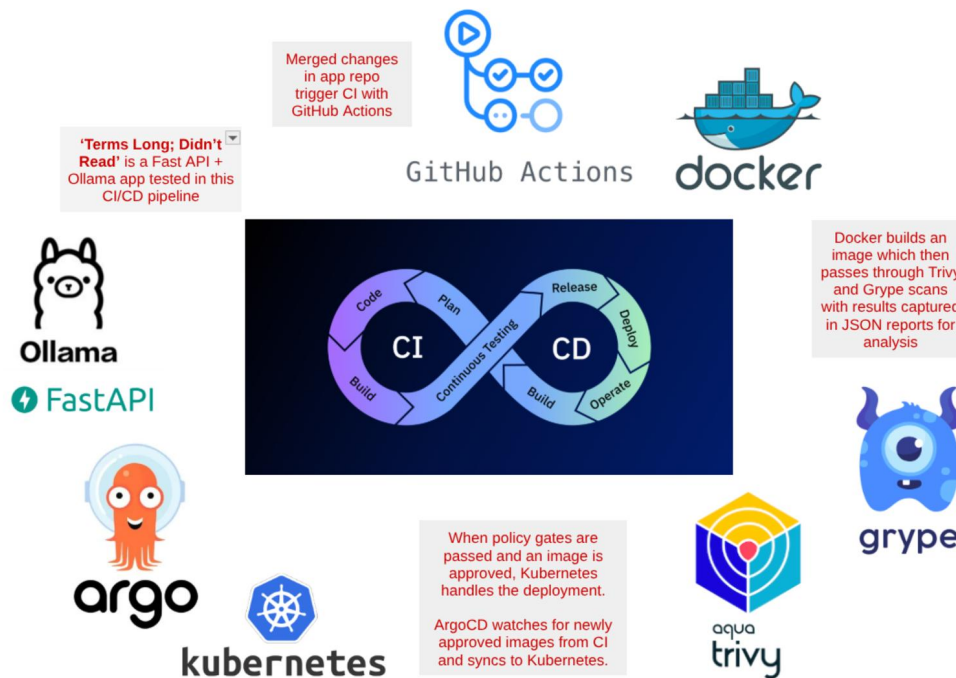
Project Supervisor

Peter Windle

by Grainne O'Connor

Terms Long; Didn't Read is a web app that extracts key obligations and data sharing risks from long online agreements, helping users quickly understand what they are signing up for. The app is containerized and integrated into a CI/CD pipeline that evaluates two container image vulnerability scanners; Trivy and Grype. Application images and selected images from Docker Hub, are scanned as they pass through the pipeline. Scan reports are stored as workflow artifacts in GitHub Actions and analysed to compare scanner performance in terms of vulnerability detection and developer workflows.

Technologies: Python, Ollama, Docker, Github Actions, Kubernetes, ArgoCD



<https://bit.ly/tldr-project>



Academic Title

An Autonomous Cloud Infrastructure Management System

Project Areas

- DevOps
- Personal Independent Project
- Software Development: (Web)

Project Supervisor

David Drohan

An autonomous cloud infrastructure system monitors EC2 instances on Amazon Web Services, analyzing and responding to operational events to ensure reliability, scalability, and resilience across multiple cloud instances. It continuously tracks key metrics such as CPU usage, memory consumption, network bandwidth, uptime, and database storage. An AI agent from OpenAI analyzes recent datasets to summarize overall system health, identify potential risks, and recommend corrective actions. All metrics, event logs, and AI insights are presented on a dashboard for monitoring and decision-making.



Technologies: AWS, Python, Node.js, Javascript, Handlebars, MongoDB, OpenAI

<https://modrisco89.github.io/Odin/>

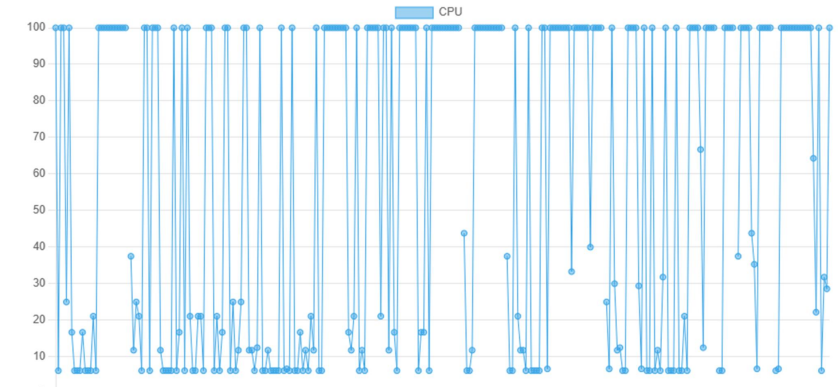
Odin

#93 / TL2.38

by Michael O'Driscoll



Dashboard About Settings Logout



Uptime 5 minutes OK Used Memory 24.89%

Event Log

Email	Name	Last Name	Event	Date
	Michael Martin	O'Driscoll	Logout	27-01-2026 17:06:34
	Michael Martin	O'Driscoll	Login	27-01-2026 17:06:37
	Michael Martin	O'Driscoll	Login	27-01-2026 18:59:07
	Odin	Borson	Reboot	27-01-2026 19:47:23
	Odin	Borson	Reboot	27-01-2026 19:56:08

Clear Event Log

ANDROIDS

#94 / Not Presenting



Academic Title

Air Navigation Data for Radio Officer Information Display System

Project Areas

- Work Based Project
- Software Development: (Web)

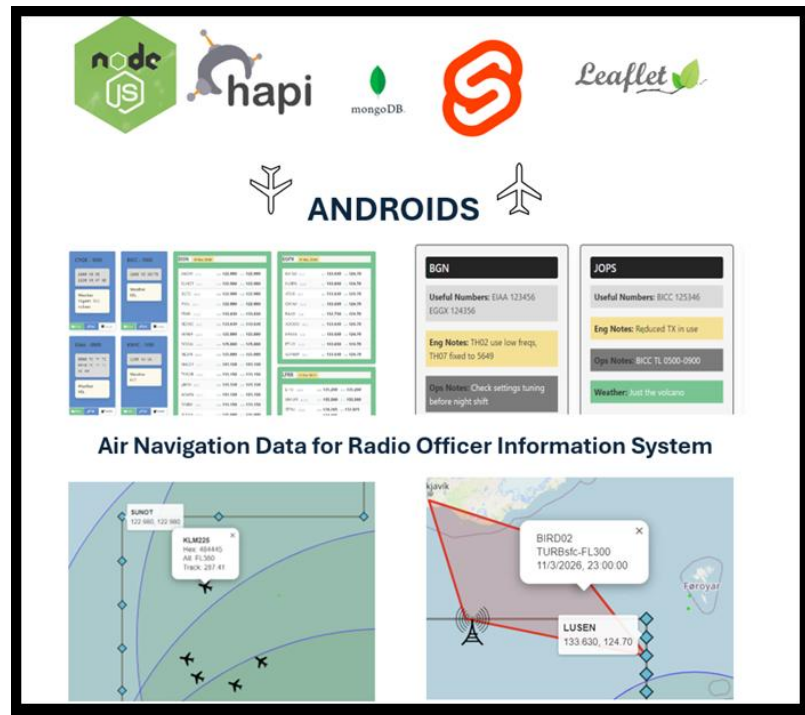
Project Supervisor

David Drohan

by Joe Power

An information display system for Radio Officers, providing HF and VHF radio frequencies, Weather data, NOTAMs for North Atlantic operations, with supplementary operational and engineering notes. The system is complemented by a Map view display system using leaflet and API data derived from the HAPI backend, Aviation ADSB feeds and NASA Space Weather. Phase I establishes a secure, validated, fully functional backend. Phase II builds a modern, interactive, map-driven interface powered by Svelte and Leaflet.

Technologies: Nodejs, hapi, mongoDB, Svelte, Leaflet



<https://powerj24.github.io/hdip24-project/>



ERR!

#95 / TL2.38

Academic Title

Full Stack Web App Expense Mgt. System with ROS API Integration for Enhanced Reporting Requirements

by Elaine Rice

Project Areas

- Work Based Project
- Software Development: (Web)

Project Supervisor

Sonya Hogan

Expense Management System
Manage and submit ERR Expenses efficiently with our secure web application.

Log in

Fast entry
Add expenses in seconds with clean forms.

Totals & summaries
See category totals and recent activity.

Secure access
Authentication required for all data views.

ROS API integration
Built to establish a secure communication with ROS.

Submission History
Filter by Pay Date
From: dd/mm/yyyy To: dd/mm/yyyy [Reset]

TOTAL SUBMISSIONS	ACKNOWLEDGED	REJECTED	TOTAL VALUE SUBMITTED (€)
1	1	0	16.00

SUBMISSION ID	PAY DATE	TAX YEAR	LINE ITEMS	TOTAL (€)	STATUS	ACKNOWLEDGEMENT ID	CREATED
ERR-202601-012676-ERR1	12/1/2026	2026	1	16.00	ACKNOWLEDGED	0B7026A4-8F11-4039-B091-699853214F	17/3/2026

ROS Response
Submission ID: ER14-202603-0f2a1d4a-ER1
Status: Submitted
ACK Status: ACKNOWLEDGED
ACK ID: 033ced94-4db9-4bcf-81aa-877590337beb

ERR!: Full Stack Expenses Web App is an expense management system designed to model Ireland's Enhanced Reporting Requirements (ERR) workflow. Built with SvelteKit, Node.js, MongoDB, and a dedicated.NET signing microservice, the application generates compliant ERR JSON submissions and securely communicates with Revenue's ROS PIT3 REST API using RSA-SHA512 digital signatures. The system includes RBAC, and a persistent submission audit trail. It demonstrates secure API integration, cryptographic request signing, and enterprise-style reporting architecture in a real-world compliance context.

Technologies: SvelteKit, TypeScript, Bulma, Node / Express, JavaScript, MongoDB,.NET, C#, Revenue PIT3 REST API



https://bit.ly/ERR_Expense_Mgt_System





Academic Title

3 Approaches to Designing EU Compliant Labels (Scripting, Coding and AI Prompting)

Project Areas

- Automotive and Automation
- Digital Graphic Design

Project Supervisor

Dr Mujahid Tabassum

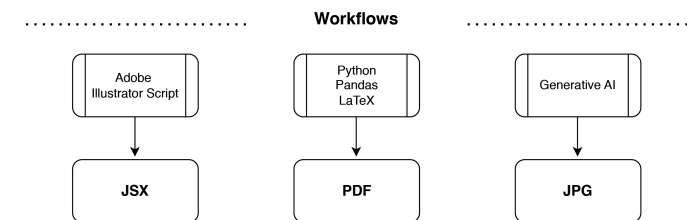
#96 / Not Presenting

by Pedro Royo

This project explores different ways to automate label design, particularly the initial steps of the design process. These steps include checking for compliance with European regulations and gathering each item of information that needs to appear on the label. Both tasks can be very time consuming and prone to error when done manually.

The approaches researched include Adobe Illustrator scripting, Generative AI, and Python with Pandas library for data manipulation along typesetting with LaTeX. Suitable approaches may be effectively adopted into the design workflow.

Label Design & Compliance Workflows



Technologies: Javascript, Python, Pandas, LaTeX, AI

<https://bit.ly/LabelAutomator>





Galaxy Morphology Classification Model

#97 / Not Presenting

Academic Title

Pytorch Galaxy Classification Model

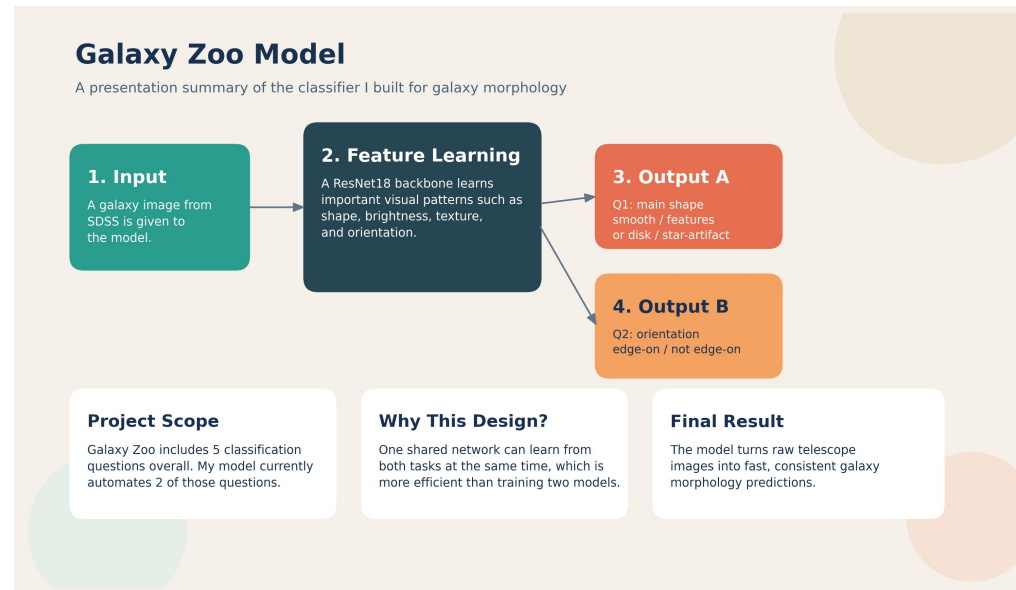
Project Areas

- Information Systems and Modelling
- Personal Independent Project

Project Supervisor

Dr Mujahid Tabassum

by Giovanni Serra



This project uses PyTorch to classify galaxy images from the Galaxy Zoo dataset. It focuses on two of the five Galaxy Zoo questions: identifying the main galaxy shape and detecting whether the galaxy is edge-on. The workflow includes preparing labels, downloading images, training a model with a ResNet18 backbone, and making predictions. The project shows how deep learning can support astronomy by producing fast and consistent galaxy classifications from telescope images, helping demonstrate how computer vision can be applied to real scientific data.

Technologies: Python, PyTorch, Torchvision, Pandas, PIL, Matplotlib



<https://galaxyclassifier.netlify.app/>



Academic Title

BankBroker

#98 / Not Presenting

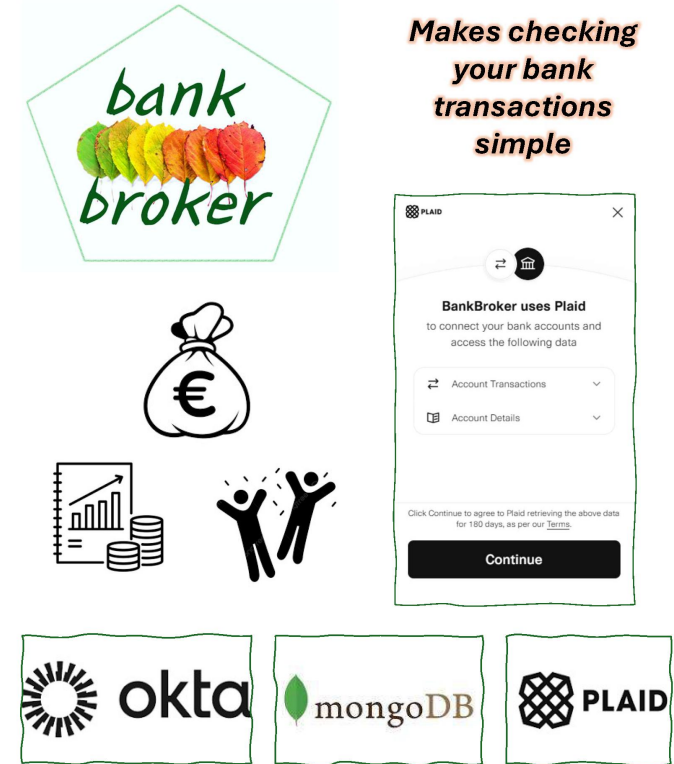
Project Areas

- Database and Analytics
- Personal Independent Project
- Software Development: (Back End / Front End / Web)

Project Supervisor
Sonya Hogan

by Marian Sheehy

Bank Broker is a proof-of-concept web Application for bank reporting capabilities. Current banking applications are dated in their user friendliness. They are limited in their reporting selection and tend to have very restricted access to historic data. This application will be a user hub with links to the main Irish banks. Users can access all the data in one place, perform data analysis and create more meaningful financial reporting. Data will be retrieved using Plaid software, which uses official bank APIs and OAuth, allowing connection through the bank's portal, using a secure access token



Technologies: Plaid, MongoDB, API, Vite, Typescript

<https://mariansheehy.github.io/bankBroker/>



Academic Title

A Borehole Management Application for Diamond Drilling in the Mining Industry

Project Areas

- Database and Analytics
- Personal Independent Project
- Open Source
- Software Development: (Back End / Front End / Web)

Project Supervisor

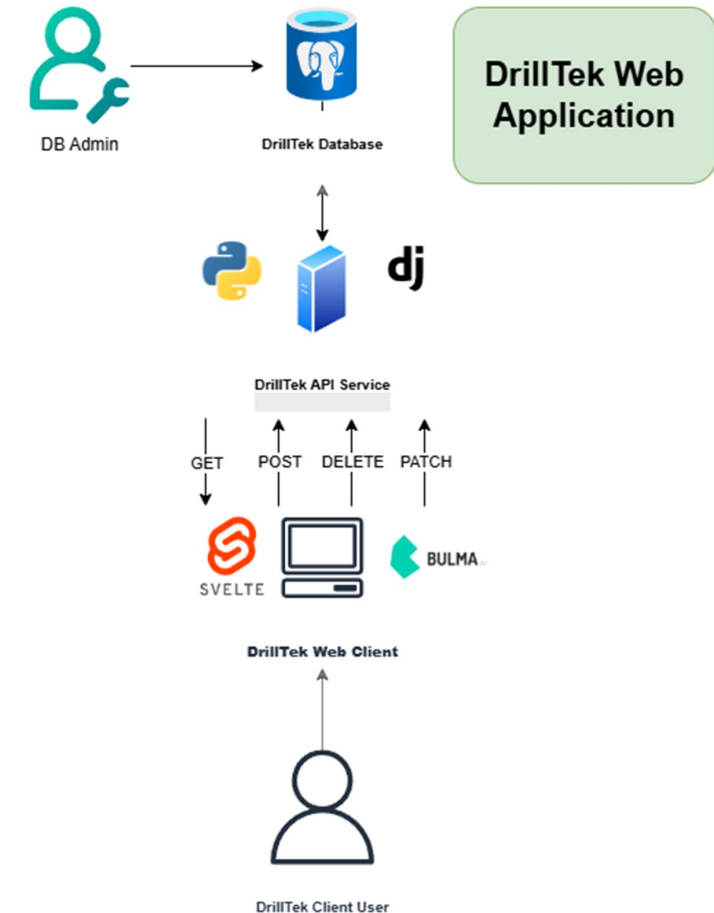
David Drohan

DrillTek

#99 / TL2.38

by Joshua Smiles

DrillTek is an open-source, web-based solution for managing and logging boreholes in extractive industry. It is designed to be used inside mining operations and exploration companies. The application is three-tier, comprising a Svelte-based client, an API service built using Django Rest Framework, and a PostgreSQL database. Users can create borehole programs comprised of individual boreholes and upload geological logging information associated with them. This information is then available for access via 3D orebody modeling software.



Technologies: Svelte, Sveltekit, Bulma CSS, Python, Django, Django Rest Framework, PostgreSQL

<https://joshuasmlies0.github.io/DrillTek/>



PlayPal

#100 / Not Presenting

Academic Title

A Social Platform for Game Tracking and Discovery

Project Areas

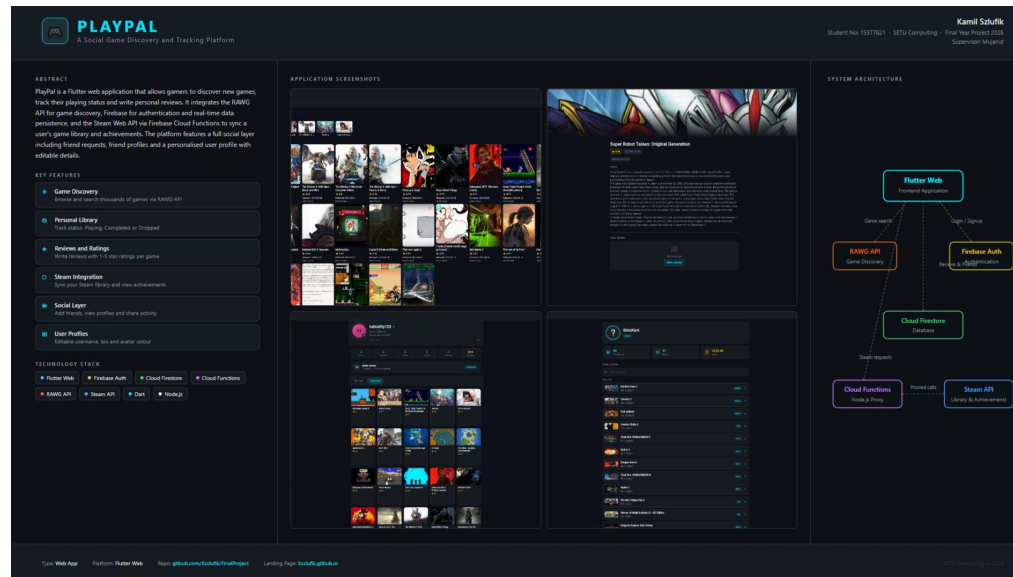
- Cloud Computing
- Software Development: (Back End / Front End / Web)

Project Supervisor

Dr Mujahid Tabassum

by Kamil Szlufik

PlayPal is a Flutter web application that allows gamers to discover new games, track their playing status and write personal reviews. It integrates the RAWG API for game discovery, Firebase for authentication and real-time data persistence, and the Steam Web API via Firebase Cloud Functions to sync a user's game library and achievements. The platform features a full social layer including friend requests, friend profiles and a personalised user profile with editable details, avatar customisation and an activity feed.



Technologies: Flutter, Dart, Firebase, Firestore, Cloud Functions, RAWG API, Steam API, Node.js



<https://kszlufik.github.io/FinalProject/>



Academic Title

Operationalising MLOps at the Edge-Deploy, Operate, and Monitor AI at the Edge

Project Areas

- AI/ML Development
- CI/CD & Testing
- Cloud Computing
- DevOps
- Internet of Things
- Work Based Project
- Open Source
- Software Development: (Back End)

Project Supervisor

Peter Windle

FlightCtl manages edge device fleets in a Kubernetes like way. While MLOps is straightforward in cloud platforms, it grows harder at the edge due to constrained resources and connectivity. FlightCtl monitors device health but lacks ML model observability. This project closes that gap using a sidecar pattern, keeping FlightCtl framework-agnostic. The agent is extended with an ML Model Monitor that translates drift scores into Healthy/Warning/Critical status, triggering retraining when thresholds are exceeded. A reference MLOps app demonstrates end-to-end model deployment to edge devices.



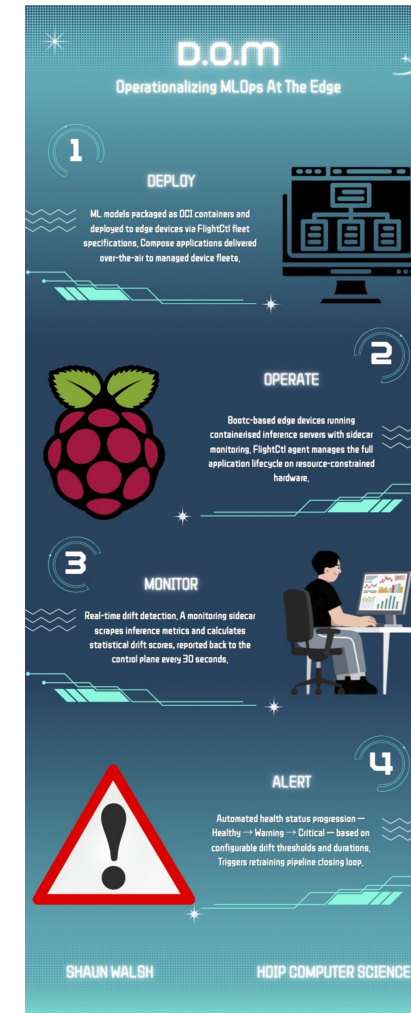
Technologies: FlightCtl, Edge, MLOps, Golang, Python, Podman, Bootc, Quadlets, Inferencing

<https://bit.ly/AI-DOM>

AI: D.O.M.

#101 / TL2.38

by Shaun Walsh





Academic Title

IoT Project on Automating Measurements Using a Temperature Controller and Spectrometer

Project Areas

- Automotive and Automation
- Internet of Things
- Work Based Project
- Software Development: (Core)

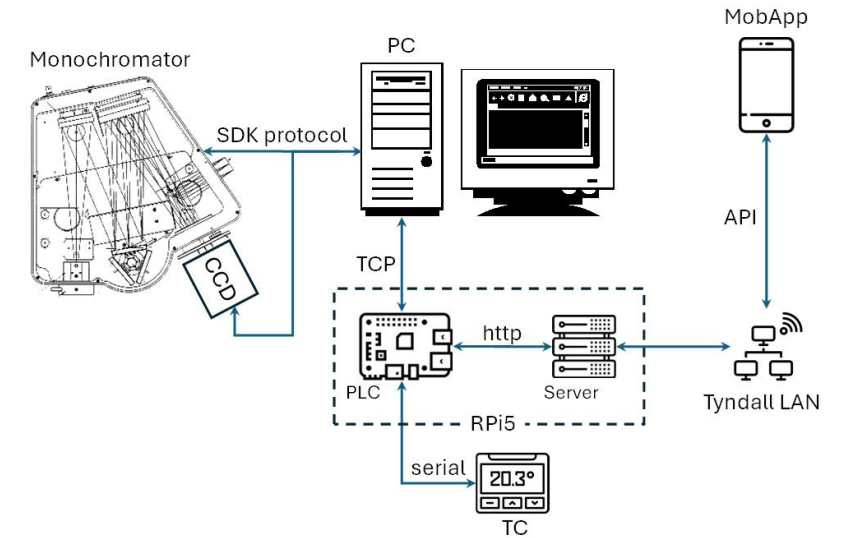
Project Supervisor

Dr Anita Kealy

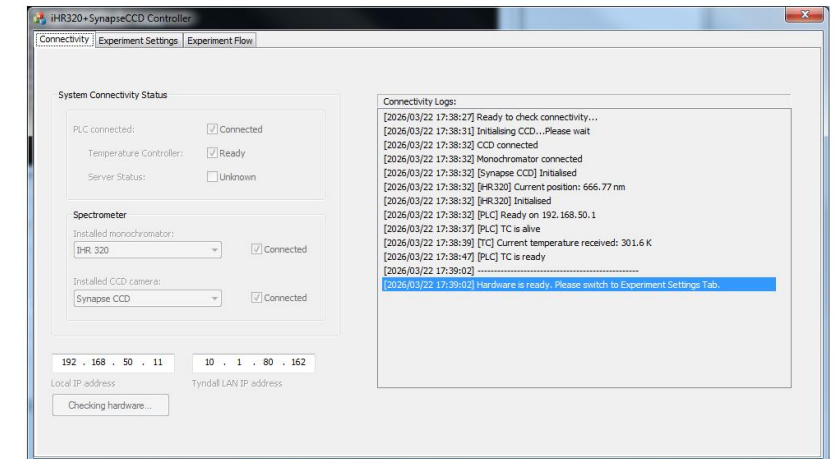
AMTCS

#102 / TL2.38

by Marina Zubialevich



The AMTCS system is a laboratory automation solution that brings together temperature control and spectroscopic measurements into a single workflow. Using a C++-based user interface application and an embedded PLC (Python-based logic on a RPi 5), it integrates and coordinates devices from different suppliers, automating temperature ramps, stabilisation at a target temperature, and spectrum acquisition. This reduces manual intervention, minimises errors, and improves the reliability and repeatability of experiments. The system has been successfully validated under real laboratory conditions.



Technologies: C++, MFC, Python, Raspberry Pi, TCP/IP, Serial Communication, JSON, COM/ActiveX (equipment SDK)

<https://zumavla.github.io/AMTCS-System>





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COMPUTING EXPO '26

Section 3

MASTERS IN SCIENCE

MSc

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MSc in Computer Science (Enterprise Software Systems)

The aim of the MSc in Computer Science (Enterprise Software Systems) is

to produce graduates with the necessary knowledge, skills and expertise in the development and management of software systems. The course also confers on the graduates a set of personal and professional attributes that will allow them greater flexibility in the development of their own career options, over the span of their career. Specifically, the course aims to produce graduates who can:

- Reason and problem-solve to a high level in the context of enterprise software and its role in business, industry and research.
- Participate constructively in the strategic deployment of enterprise software in a mobile or cloud environment.
- Manage the development of high-quality enterprise software products and services.
- Undertake research-based projects, providing effective advice and leadership where required.



Academic Title

Terraform vs Ansible: Cloud Automation

A Comparative Study of Terraform and Ansible for Cloud Infrastructure Automation on AWS

Project Areas

- Cloud Computing

Project Supervisor

Dr Mujahid Tabassum

#103 / Poster

by Fahamidul Hasan

This project compares Terraform and Ansible for automating cloud infrastructure on AWS. It involves deploying a complete architecture using compute, storage, database, and networking services. The study evaluates deployment speed, reproducibility, error rates, and maintainability to determine which tool provides a more efficient, scalable, and reliable solution for real-world cloud automation scenarios. It also examines ease of use, flexibility, and overall effectiveness in managing infrastructure.

A Comparative Study of Terraform and Ansible for Cloud Infrastructure Automation on AWS

Fahamidul Hasan
MSc Computer Science (Enterprise Software Systems)
Supervisor: Dr Mujahid Tabassum



INTRODUCTION

As cloud adoption continues to accelerate, IaC adoption has become very crucial for enhancing and maintaining complex cloud environments. This study compares two widely used IaC tools Terraform and Ansible by deploying identical AWS cloud environments using compute, storage, database, and networking services. This research evaluates several metrics such as deployment time, idempotency, configuration complexity as well as maintainability to identify suitable solutions for cloud infrastructure automation.

OBJECTIVE

- Compare the automation mechanism of Terraform and Ansible
- Analyze deployment workflow of both tools by setting up identical AWS environments
- Evaluate deployment efficiency, idempotency, maintainability, and configuration complexity across both tools

RESEARCH QUESTIONS

- RQ1:** What are the key differences between Terraform and Ansible in terms of infrastructure automation mechanisms?
- RQ2:** How do Terraform and Ansible differ in their deployment workflows and execution processes when implementing cloud infrastructure on AWS?
- RQ3:** How do Terraform and Ansible compare in terms of provisioning performance, idempotency, maintainability, and configuration complexity?

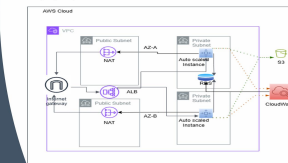
METHODOLOGY

The study uses an experimental approach by deploying identical AWS environments using both terraform and ansible multiple times to observe and analyze various metrics such as deployment time, idempotency, maintainability, and configuration complexity across both tools.



AWS ENVIRONMENT DESIGN

AWS environment is provisioned using compute, storage, database, and networking services including EC2, S3, RDS, VPC and more.



RESULTS

Metric	Terraform	Ansible	Observation
Deployment Time	5m 30s	8m 54s	Terraform completed provisioning 41.8% faster
Idempotency and Drift Detection	0 added, 0 changed, 0 destroyed	Multiple ok and some changed tasks	Terraform demonstrated stronger idempotency and drift detection due to its built-in state management
Maintainability	Easier to manage large infrastructure	More manual tuning required	Terraform provided simpler long-term infrastructure management
Configuration Complexity	Declarative with automatic dependency handling	Sequential task-based configuration	Ansible required more operational control and task ordering

CONCLUSION

This study demonstrated that Terraform provided faster provisioning, stronger idempotency, and more efficient infrastructure lifecycle management compared to Ansible when deploying identical AWS cloud architectures. Terraform's state-based approach enabled better drift detection, dependency management, and automated tear-down, while Ansible required more manual intervention and sequential task handling. The findings suggest that Terraform is more suitable for scalable and maintainable cloud infrastructure automation in complex AWS environments.

REFERENCES

- Saini, A.S. (2025) The Rise of Cloud Computing and the Importance of IaC. International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 11(2), pp. 1756-1764. doi:10.32628/IJSCEIT25112156.
- Syed, A.A.M. and Anasaghy, E. (2023) 'Ansible vs. Terraform: A Comparative Study on Infrastructure as Code (IaC) Efficiency in Enterprise IT', International Journal of Emerging Trends in Computer Science and Information Technology, 4(2), pp. 37-48. doi:10.63282/25505346/IJETSIT-14I2P105.
- Chinnamangoda, S. (2019) Automating Infrastructure with Infrastructure as Code (IaC). International Journal of Science and Research (IJSR), 8(11), pp. 2037-2045. doi:10.21275/SR24829170834.



Technologies: AWS, Terraform, Ansible

<https://github.com/MarSsyy/terraform-vs-ansible-aws>

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Academic Title

Using AI to Predict Telecom Users' Satisfaction and Preferences from Behavioural and Service Data

Project Areas

- AI/ML Development
- Database and Analytics
- Information Systems and Modelling

Project Supervisor

Dr Bernard Butler

This project investigates whether AI models can predict telecom users' satisfaction and preferred mobile plans using survey-based behavioural, perceptual, and service usage data. Motivated by the mismatch between network KPIs and user experience, it applies machine learning with clustering to identify key drivers of satisfaction and segment users. The study aims to provide a practical, data-driven framework for telecom operators to better understand customer behaviour and optimise offerings, improving decision-making and customer experience outcomes.



Technologies: Python, SciKit-Learn, Bokeh, AWS

<https://github.com/shoumik20115758/AI-to-Predict-Telco-Users-Satisfaction>

#104 / Poster

AI to Predict Telco Users' Satisfaction

by Shoumik Hossain

Using AI to Predict Telecom Users' Satisfaction and Preferences from Behavioural and Service Data

Shoumik Hossain
MSc Computer Science Enterprise Software Systems
ID: 20115758
Email: 20115758@setu.ie

Supervised By:
Dr. Bernard Butler



The Problem

- Background & Motivation**
- Mobile KPIs (speed, latency, call drop rates) frequently misalign with how users actually perceive their service experience
 - Bangladesh hosts 4 major operators, 131M+ internet users, high price sensitivity and widespread multi-SIM behaviour
 - Net Promoter Scores often fail to reflect engineering performance; users on identical networks report very different satisfaction levels
 - Behavioural signals such as usage patterns, recharge habits and device type may predict dissatisfaction before it surfaces in operator systems

Survey Methodology

Field	Detail
Platform	Microsoft Forms
Period	January - February 2026
Coverage	Sample of ~85% population of Bangladesh
Section	6 Sections
Perceptual Scale	Likert Scale
Ethics	GDPR principles applied No PII collected

Research Question

- RQ1** Can AI models predict satisfaction from behavioural and perceptual survey data?
- RQ2** Which features most strongly influence predictions?
- RQ3** Do behavioural segments differ in predicted satisfaction?

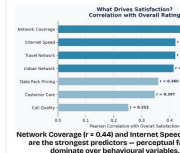
Proof



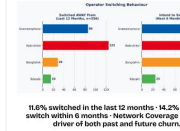
EDA Findings



What Drives Satisfaction



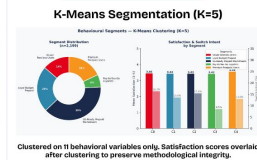
Switching Behaviours



Key Findings

- Banglalink leads satisfaction (3.72/5) despite holding only 3rd place in market share
- 78.7% of respondents want personalised plan recommendations
- Rajshahi (23.4%) and Sulhet (18.5%) record the highest switch intent
- Pay-As-You-Go Loyalists are the most stable segment - only 8.5% switch intent
- Perceptual features are significantly stronger predictors of satisfaction than behavioural features alone

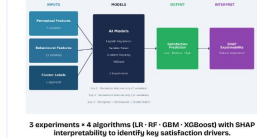
Segmentation



The 5 Segments

Cluster	Name	n	Key Characteristic
C0	Newer Restless Users	300	Highest switch intent: 16.2%
C1	Loyal Budget prepaid	515	Long tenure - 4G only - all prepaid
C2	5G-Ready Mainstream	850	Largest group (39.7%) - all prepaid
C3	Pay-as-you Go Loyalists	141	Lowest switch intent: 8.5%
C4	Premium Postpaid Users	393	Highest satisfaction: 3.56/5

Planned Prediction Framework



Next Steps

- Train and compare ML models across 3 feature set experiments
- Apply SHAP values to identify the strongest satisfaction predictors
- Examine how predicted satisfaction varies across behavioural clusters
- Contribute an integrated segmentation + prediction framework to telecom research

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DATA: Primary survey - Bangladesh - 2025-2026 MSc Dissertation - South East Technological University





AI Enhances Software Engineer Speed

#105 / Poster

Academic Title

Impact of Agentic AI Assistants on Engineer Velocity in Software Engineering Workflows

Project Areas

- AI/ML Development
- Work Based Project
- Software Development: (Core)

Project Supervisor

Dr Siobhan Drohan

by Calvin Hurley

This study investigates the impact of Artificial Intelligence (AI) assistants on engineer velocity in software engineering workflows, employing a comprehensive mixed methods approach, combining a cross-sectional survey of engineer’s opinions and attitudes with AI, quantitative analysis of GitHub Copilot usage data, and qualitative analysis of management interviews. The research aims to provide a nuanced understanding of how AI integration affects productivity across various engineering contexts.

IMPACT OF AGENTIC ARTIFICIAL INTELLIGENCE ASSISTANTS ON ENGINEER VELOCITY IN SOFTWARE ENGINEERING WORKFLOWS

Calvin Hurley: 20017867
Supervisor: Dr Siobhan Drohan
MSc in Computing (Enterprise Software Systems)

ABSTRACT

Agentic AI coding assistants (e.g., GitHub Copilot) significantly improve software engineering productivity by increasing coding speed, reducing cognitive workload, and supporting tasks like searching, testing, and code discovery. Using mixed methods (system logs + surveys), the study found rapid adoption, growing trust in AI accuracy, and strong user intention to continue usage and was reviewed between October 2024 and April 2025. However, effective use requires human oversight, ethical guardrails, and governance to prevent misuse and overdependence.

INTRODUCTION

Agentic AI tools (e.g., GitHub Copilot) are increasingly used in software engineering for coding, testing, documentation, and task automation. While they improve task speed, overall productivity also depends on factors like collaboration, performance, and developer experience. This study investigates how AI assistants impact engineer productivity by combining:

- System usage data (adoption, code generation, interactions)
- Survey insights from engineers and managers (performance, effort, and perception)

A mixed-methods approach helps explain both what AI changes and how it affects developers, including benefits, risks, and implementation needs.

LITERATURE REVIEW

Engineer productivity is multidimensional (e.g., SPACE, DORA) and not just code output. AI tools like GitHub Copilot can improve speed, reduce effort, and enhance satisfaction, but their impact depends on task complexity, user experience, and context. AI is effective for routine coding tasks but less reliable for complex, domain-specific work. It also introduces risks such as overtrust, security issues, and governance challenges, highlighting the need for human oversight and structured implementation.

PROBLEM STATEMENT

Despite rapid adoption, it remains unclear:

- Do they truly improve engineer productivity (velocity)?
- What are the risks (quality, governance, responsibility)?

RESEARCH OBJECTIVES

- Determine how AI assistants affect individual engineer performance and experience.
- Determine organisational-level factors and outcomes from AI implementation in code development.
- Design a roadmap and framework for AI adoption in code development across various contexts.

RESEARCH QUESTIONS

- What is the impact of using Agentic AI in a code development task on the engineer?
- What is the overall impact of using Agentic AI in a code development task for the organisation?
- Can these impacts be correlated to produce a framework for use of Agentic AI in code development tasks?

METHODOLOGY

Approach:

- Quantitative-dominant mixed-methods design
- Combines system data + user insights

Data Sources:

- GitHub Copilot usage logs (Oct 2024–Apr 2025)
- Survey responses (49 AI users + managers/engineers)

Analysis:

- Quantitative: descriptive stats, correlations (Spearman), group comparisons
- Qualitative: thematic analysis of open-ended responses

Purpose:

- Measure AI usage patterns (adoption, code generation, interactions)
- Understand user experience, benefits, risks, implementation factors

Dataset	Rows
All survey responses	63
AI-user survey responses	49
Non-user survey responses	7
Copilot daily records	191
Copilot weekly records	28
Copilot language/editor	9,905

Daily Copilot Chat Turns

Mean Likert Scores Among AI Users

Spearman Correlation Matrix for Survey Measures

KEY FINDING

“Agentic AI achieves controlled acceleration: Engineers save 9.8 hours on average through routine task automation and cognitive support, but require guardrails and critical review to maintain quality.”

Scan this QR code for references



Technologies: GitHub Copilot, Mixed-Methods Research

<https://github.com/20017867/engineering-ai-adoption-research.git>



Academic Title

Deploying Security and Forensics Classroom Lab Environments to the Cloud

Project Areas

- Cloud Computing
- Computer Forensics
- Computer Security
- DevOps

Project Supervisor

Jimmy McGibney

#106 / Poster

by Harry Kelly

This research investigates the utility of Infrastructure as-Code and related technologies for deploying security and forensics lab environments on public cloud infrastructure and the suitability of public cloud infrastructure for this use case. This is explored by developing a prototype and evaluating it on the basis of educator feedback and industry best practices. The research also investigates the feasibility of integrating these technologies with a learning management system to provide learners with a single interface for viewing of lab instructions and deployment of lab infrastructure.



Technologies: Terraform, Packer, Ansible, Amazon Web Services

<https://htkelly.github.io/dle-docs/>



Academic Title

Optimising Blockchain Voting with Zero-Knowledge Rollup Layer 2

Project Areas

- Computer Security
- Information Systems and Modelling
- Software Development: (Core)

Project Supervisor

Dr Kieran Murphy

This project explores how blockchain voting can be improved using Zero-Knowledge Proofs and a Zero-Knowledge Rollup Layer-2 architecture. The framework aims to solve three key challenges in blockchain elections: limited scalability, high transaction costs, and the difficulty of preserving voter privacy while maintaining transparency. By processing votes off-chain and submitting validity proofs to Ethereum Layer 1, the system improves efficiency and reduces costs. Zero-Knowledge Proofs also help protect voter anonymity, prevent double voting, and support verifiable election results.



Technologies: Blockchain, Ethereum, Solidity, Circom, SnarkJS, Smart Contract

<https://hoangphuc552001.github.io/blockchain-voting-zk-rollup-showcase/>


ZK-Rollup Voting System

#107 / Poster

by Hoang Phuc Le

OPTIMISING BLOCKCHAIN VOTING WITH ZERO-KNOWLEDGE ROLLUP L2

Name: Hoang Phuc Le
Supervisor: Dr. Kieran Murphy
 Course: MSc IN COMPUTER SCIENCE (ESS) | MAY 2026



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INTRODUCTION

- Electronic voting requires privacy, transparency, integrity, and scalability.
- Direct Layer-1 blockchain voting struggles with public traceability, low throughput, and high transaction cost.
- This research proposed a custom ZK Rollup L2 framework anchored on Ethereum.

Objective: build a private, verifiable, and scalable blockchain voting proof-of-concept.

SCOPE

- Proof-of-concept for single-choice, high-volume elections.
- Uses Groth16 zk-SNARKs, Circom 2, Poseidon hashing, Merkle proofs, Solidity, and Node.js.
- Deployment and testing on Hardhat and Ethereum Sepolia.
- Evaluates gas per vote, batch efficiency, proof verification success, and double-vote prevention.

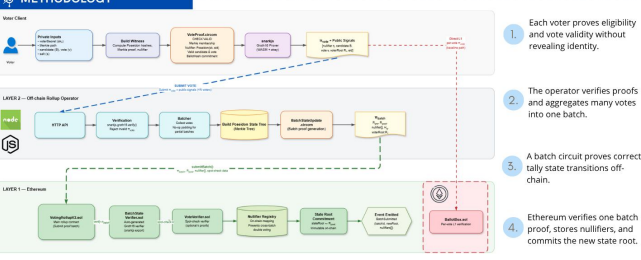
RESEARCH QUESTIONS

- 1 How can ZK proofs plus zk-rollup Layer-2 improve scalability, voter privacy, and verifiability?
- 2 How effectively can ZK proofs guarantee anonymity and ballot secrecy without sacrificing end-to-end verifiability?
- 3 To what extent does a zk-rollup reduce transaction cost and increase throughput compared with direct Layer-1 voting?

LIMITATIONS

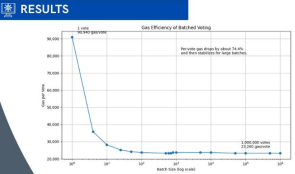
\$1.10 AVG L1 GAS / VOTE | **~40** MAX VOTES / L1 TALLY | **10 M** GAS TO STORE 500 IDs | **7.7 d** TO TALLY 10M @ 15 TPS | **15 TPS** L1 THROUGHPUT CEILING

METHODOLOGY



1. Each voter proves eligibility and vote validity without revealing identity.
2. The operator verifies proofs and aggregates many votes into one batch.
3. A batch circuit proves correct tally state transitions off-chain.
4. Ethereum verifies one batch proof, stores nullifiers, and commits the new state root.

RESULTS



Scenario

- Raw ballot baseline (L1, non-ZK): 76,806
- Per-vote ZK (on-chain proof): 363,777
- Batch ZK raw path (B=16): 41,110
- Batch ZK multi-proof (B=16): 40,857
- Batch ZK + 2/16 spot-check: 68,735

74.45 % Reduction from batch 1 to 700

Nullifier registry prevent double voting

CONCLUSION


- A custom zk-rollup Layer-2 can make blockchain voting more private, scalable, and cost-efficient than direct Layer-1 submission.
- Groth16 with Circom provides practical proof size and low on-chain verification cost for the proof-of-concept.
- Off-chain batching plus on-chain verification preserves end-to-end verifiability while reducing gas overhead.
- The interim implementation already runs across Hardhat and Ethereum Sepolia with batch submission and nullifier checks.

Key findings

- Batch verification becomes highly efficient once batch size exceeds 100 votes.
- The custom rollup roughly halves gas per vote versus a non-ZK L1 baseline on Sepolia.
- Privacy is preserved because individual ballots are not published on-chain.

Next steps: larger stress tests, broader Sepolia benchmarking, comparison with zk-STARKs/Bulletproofs, and comparison against pre-built L2 platforms.

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Gen AI Adoption in Software Testing

#108 / Poster

Academic Title

Understanding and Overcoming Demographic Disparities in Gen AI Adoption for Software Testers

Project Areas

- CI/CD & Testing

Project Supervisor

Mairead Meagher

by Seamus McCarthy

This research investigates the demographic disparities influencing Gen AI adoption within the software testing community. While software engineers rapidly integrate AI to accelerate output, evidence suggests that testing teams may face an uneven adoption rate. By examining factors such as age, gender, and role type, this study identifies the psychological and organisational barriers preventing testers from leveraging AI for tasks within their roles and deliver a strategic framework for AI diversity, providing organisations with the training roadmaps needed to bridge the gap.

**Technologies:** Qualtrics, SPSS<https://seamusmccarthy.github.io/msc-gen-ai/>



Carbon-Aware Scheduling in Kubernetes

#109 / Poster

Academic Title

Carbon-Aware Kubernetes Batch Scheduling with Historical Grid Carbon-Intensity Data

Project Areas

- Cloud Computing
- DevOps
- Software Development: (Back End)

Project Supervisor

Richard Frisby

by Conor McDonagh Rollo

Batch jobs that run on Kubernetes, like model training or data processing rarely need to run immediately. This project uses that flexibility to reduce carbon emissions by scheduling work when and where the grid is cleanest. A Kubernetes based simulation framework evaluates four strategies: baseline immediate execution, temporal deferral, spatial shifting to lower carbon regions, and a combined approach. Synthetic workloads and European grid data can be used to measure emission reductions against performance trades, and modular architecture lets any component be swapped, extended, and reused.

**Technologies:** Python, Kubernetes, Minikube<https://github.com/Conor-McDonagh-Rollo/Carbon-Aware-Kubernetes>



Data Imputation: Traditional vs DL

#110 / Poster

Academic Title

Comparative Analysis of Traditional and Deep Learning for Imputation in Wearable Health Datasets

Project Areas

- AI/ML Development
- Database and Analytics

Project Supervisor

Dr Brenda Mullally

by Gary McManus

This study evaluates imputation methods for missing data in wearable health datasets using both traditional statistical methods and modern DL approaches. Using open-source datasets (WESAD, PAMAP2) it compares techniques such as mean/median imputation, regression-based imputation, KNN, Autoencoders, and GRU-D under three missingness mechanisms (MCAR, MAR, MNAR) at a controlled missingness rate (20%). Performance is measured using RMSE, MAE, Dynamic Time Warping (DTW) to identify when simple methods are sufficient or when more advanced DL models provide improvements in real-world scenarios.

A Comparative Analysis of Traditional and Deep Learning Approaches for Imputation in Wearable Health Monitoring Datasets
 Gary McManus (20104488) | MSc Computing (Enterprise Software Systems) | Supervisor: Dr Brenda Mullally



1. CONTEXT & BACKGROUND

BACKGROUND

- Wearables - Watches, trackers, rings,
- Signals: HR, Sleep, Movement, Temp
- Generate continuous data streams

THE PROBLEM

Missing data due to

- Sensor dropout (Connection loss)
- Device movement
- Irregular sampling
- Removal

RESEARCH GAP

Limited comparison of traditional and DL imputation methods

- Across same datasets
- Under same missingness mechanisms
- Using consistent evaluation metrics

2. METHODOLOGY (QUANTITATIVE COMPARATIVE STUDY)

STUDY DESIGN

- Quantitative comparative Study
- Controlled missingness simulation
- Same datasets across all methods
- Consistent evaluation metrics

DATASETS

- WESAD: Controlled Laboratory Setting
- PAMAP2: Physical Activity Monitoring

MISSINGNESS DESIGN

- 10%, 20%, 30% missingness introduced
- Mechanisms
 - MCAR (Missing Completely At Random)
 - MAR (Missing At Random)
 - MNAR (Missing Not At Random)

METHODS COMPARED

Traditional	Deep Learning	Extension (if time permits)
<ul style="list-style-type: none"> • Mean/Median Imputation • Regression Imputation • K-Nearest Neighbours (KNN) 	<ul style="list-style-type: none"> • Autoencoder • GRU-D 	<ul style="list-style-type: none"> • Random Forest • GAIN

EXPERIMENT PROTOCOL

- Train/test split applied
- Hyperparameter tuning (validation set)
- Repeated trials for robustness
- Performance averaged across runs

EVALUATION METRICS

- RMSE – Root Mean Squared Error
- DTW – Dynamic Time Warping (Temporal patterns)
- MAE – Mean Absolute Error
- Computational Efficiency – Training & Inference time

3. PROGRESS & NEXT STEPS

PROGRESS TO DATE

- ✓ WESAD dataset loaded and structured
- ✓ Signals selected - BVP, EDA, Temp, ACC
- ✓ Data aligned to 4Hz timeline
- ✓ Clean baseline dataset created for experiments
- ✓ MCAR missingness simulated at 10%, 20% and 30%
- ✓ Traditional imputation implemented & evaluated

NEXT STEPS

- 1 Simulate missingness (MAR, MNAR)
- 2 Implement and train deep learning models
- 3 Compare performance across metrics
- 4 Repeat full pipeline for PAMAP2
- 5 Analyse results and draw conclusions

Preprocessing

Sampling rates harmonized to ensure consistent cross-signal analysis

Signal	Original Rate	Resampled Rate	Method
BVP (Heart Rate)	1 Hz	4 Hz	Interpolation
EDA (Skin Temperature)	1 Hz	4 Hz	No Change
Acc (Accelerometry)	50 Hz	4 Hz	Downsampling
Temp (Temperature)	1 Hz	4 Hz	Interpolation

Resampling reduces data density while preserving the underlying data patterns

Synthetic missingness (MCAR)

Random missingness (MCAR) applied uniformly (20%) across the signal

Imputation Performance (MCAR)

KNN imputation consistently achieves lower RMSE than mean imputation across all levels of missingness



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<https://github.com/garimac69/msc-imputation>

#111 / Poster

Can We Make React Code Greener



Academic Title

Evaluating the Efficacy of Green Software Patterns as Applied to React

Project Areas

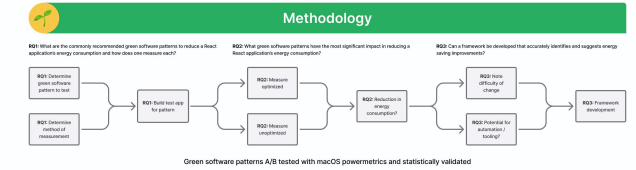
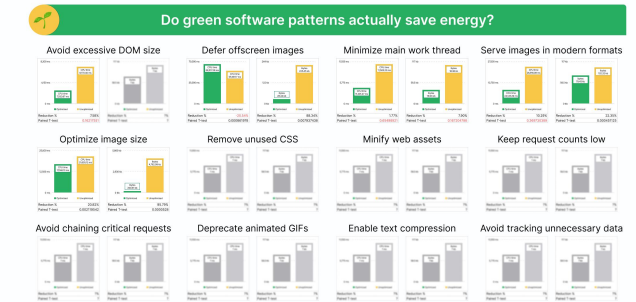
- Software Development: (Front End / Web)

Project Supervisor

Dr Siobhan Drohan

by Joshua Miron

Evaluating the efficacy of green software patterns as applied to React



Green Patterns Test Suite

green-lint

CLI, IDE, Browser



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There is a lack of awareness of green software engineering best practices in web development, partially fueled by a lack of empirical data clearly stating which practices are actually effective. The project addresses that lack by empirically testing about a dozen purported best practices to determine whether they have any measurable effect when used in React. If they prove effective the project aims to develop a framework for applying them to existing code, making it easy for developers to reduce the carbon footprint of their code.



Technologies: React, node.js, Vite, powermetrics, Claude Sonnet 4.5, GitHub, Vercel, Bash, Lighthouse

<https://github.com/joshuamiron/green-patterns-vite>

#112 / Poster

AI Optimised Container Images



Academic Title

Reducing Attack Surface and Ingress Costs: An AI-Powered Framework for Minimal Container Base Image

Project Areas

- AI/ML Development
- CI/CD & Testing
- Cloud Computing
- Computer Security

Project Supervisor

Jerry Horgan

This proposal explores using AI agents to generate minimal container base images for microservices, aiming to reduce security risks and cloud costs. Current images include unnecessary dependencies, increasing CVEs and resource usage. The research designs an AI-driven pipeline to identify only required components, then evaluates impacts on image size, costs, and vulnerabilities. It also examines how prompt engineering affects accuracy, contributing a practical framework for improving container security and efficiency.

by Cathal O'Connor

AI-Driven Minimal Container Image Generation for Cloud-Native Go Applications

Cathal O'Connor | Supervisor: Jerry Horgan
MSc in Computer Science (Enterprise Software Systems)



Motivation

Modern software is 90% open source. Over 512,847 malicious or vulnerable packages were detected in 2024 — a 156% year-on-year increase[1].

Universal base images ship dozens of unused tools, libraries, and binaries that the application never calls. This leads to CVE exposure, higher storage costs, and inflated network transfer.

Software engineers often treat base images as an infrastructure problem, resulting in large, poorly-maintained images in production.

Can an AI pipeline reliably identify the exact OS-level dependencies a containerised Go application needs — and build a working, minimal image from only those?

Research Questions

RQ1: To what extent does a minimal base image reduce costs for Openshift (Kubernetes) workloads?

RQ2: What is the quantifiable impact on security via CVE reduction?

RQ3: How do prompting strategies affect dependency recommendation accuracy?

System Architecture



Key Design Decisions

Initial analysis results

Fast regex scanning handles ~80% of dependencies (~50 ms each). LLM reasoning is applied only when native build files are detected (~2s). Result: ~4.5x faster than a pure-LLM approach with better accuracy on complex builds.

Atomic agent design

Each agent has a single, well-defined responsibility with structured I/O and an AgentError field on every output. Failures are isolated — one agent failing does not abort the pipeline.

Self-correction loop

When a Dockerfile build fails, build errors are fed back to the OS detection agent and generation is retried. A Redis vector store records successful corrections so similar failures benefit from prior fixes in future runs.

Dynamic package resolution

No hardcoded library maps. Agents query live package databases at run time and receive distro-specific package names (e.g. libssl-dev on Debian, openssl-devel on RHEL).

Prototype — Engineering Results

Scope note: These are engineering outcomes from early prototype runs. Systematic evaluation against multiple Go projects is the next phase — RQ1 / RQ2 results are pending.

Pipeline Performance & Validator Output



Next Steps

Evaluation Dataset
Assemble 5-10 real open-source Go projects: containerised, maintained, adequate test coverage (>70%).

Systematic benchmarking
Image size delta, CVE counts using Clair[2], build success rate across the dataset.

Prompt & agent analysis (RQ3)
Compare prompting strategies; quantify accuracy against known-correct images.

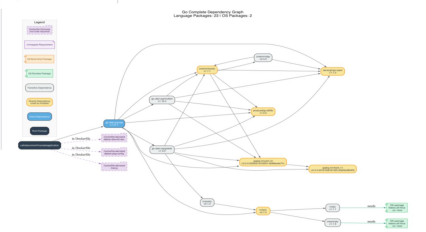
Build validation at scale
Enable Podman build steps in CI for the evaluation dataset.



Evaluation scope: Go-only open-source projects. Off-the-shelf LLMs; no fine-tuning in this phase.

Out of scope: Runtime hardening, network policy, supply-chain attestation, non-Go languages.

Motivation: Builds on Patent 1238605[3] — puts theory into practice on real open-source projects.



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Technologies: Ray, Python, AI, Agents, Pydantic Framework, Openshift

<https://github.com/CathalOConnorRH/MastersThesis>



Academic Title

LLM Code-review Bot Adoption: Contributor Retention and Maintainer Behaviour in Open Source

Project Areas

- AI/ML Development
- Database and Analytics
- Open Source
- Software Development: (Back End / Web)

Project Supervisor

Richard Lacey

This study examines whether LLM code-review bots help or hurt open-source communities. Using openshift/hypershift as the case study, I analysed 1,362 pull requests from 396 contributors across six-month windows before and after CodeRabbit adoption. A Python framework collects GitHub data, computes metrics, runs statistical tests, and generates reports. Key findings: retention stayed flat, human comments increased 40% and reviews became slower and more selective. The bot supplements rather than replaces human review, raising new questions about how AI is reshaping open-source collaboration.



Technologies: Python, SQLite, GitHub REST API, SciPy, Pandas, Matplotlib, VADER, Streamlit, Tekton

<https://github.com/apahim/setu-rp>

#113 / Poster

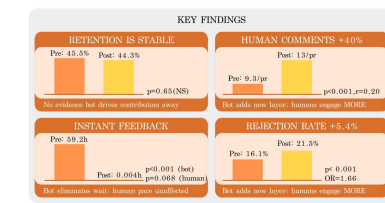
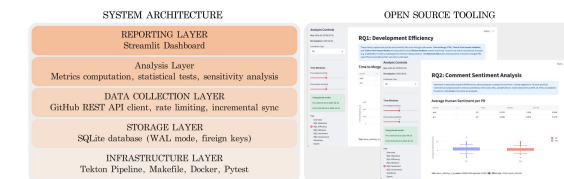
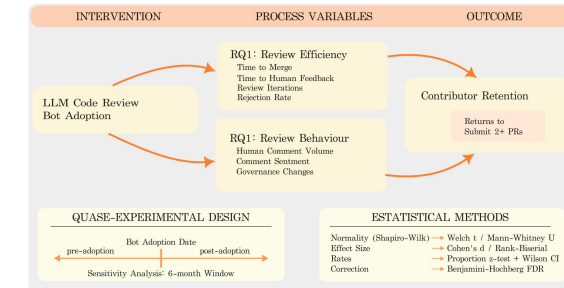
Bots at the Gate: Do Contributors Stay?

by Amador Pahim Segundo

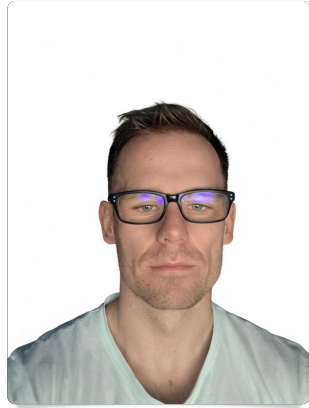
LLM Code-Review Bot Adoption:
Contributor Retention and Maintainer
Behaviour in Open Source



Amador Pahim Segundo | Supervisor: Richard Lacey
MSc Computing (Enterprise Software Systems)
South East Technological University



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“GoRTS”: Smart Test Selection for Golang

#114 / Poster

Academic Title

Change-Based Regression Test Selection for Golang Applications

Project Areas

- CI/CD & Testing
- Open Source
- Software Development: (Core)

Project Supervisor

John Rellis

by Pawel Paszki

Regression testing ensures code changes don't break existing functionality, but running all tests after every change is time-consuming and resource-intensive. This research develops **GoRTS**, a CLI tool that applies coverage-based regression test selection (RTS) to Golang applications. GoRTS analyzes code coverage data to build dependency mappings between source code and tests, then selects only the tests affected by specific code changes. The tool supports both file-level and function-level granularity, using AST-based checksums for precise change detection.



Technologies: Golang, AST, Code Coverage, Git, CLI (Cobra), JSON, SHA256, CI/CD

<https://github.com/pawelpaszki/gorts>





Academic Title

Cost-Performance Trade-offs in Free-Tier E-Commerce Analytics

Project Areas

- Cloud Computing

Project Supervisor

John Ronnan

This study measures the feasibility of a queue-based micro-batch analytics pipeline on AWS Free Tier services to provide infrastructure free production-grade e-commerce analytics. It compares and contrasts the cost, latency and accuracy trade-offs of a streaming system with that of a batch system and explores how different workload and batching can be used to sustain operations within the free-tier constraints as well as provide reasonable analytical performance for small and medium-sized e-commerce applications.



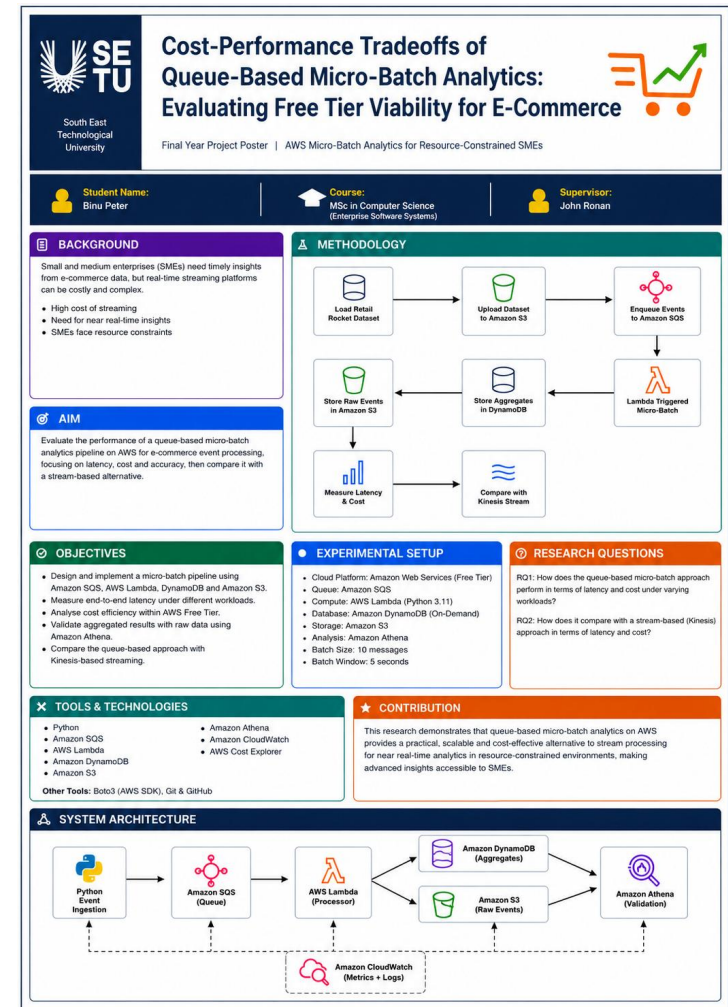
Technologies: Amazon SQS, AWS Lambda, DynamoDB, Amazon S3, Amazon Athena, Cloud-Watch, Python, boto3, pandas, NumPy

<https://github.com/binupeter07/ecommerce-analytics-free-tier.git>

Micro-Batch E-Commerce Analytics

#115 / Poster

by Binu Peter





Academic Title

AI Code Generation from User Stories

A Comparative Analysis of LLM-Driven Code Generation from User Stories

Project Areas

- AI/ML Development
- Software Development: (Back End)

Project Supervisor

Dr Mujahid Tabassum

#116 / Poster

by Yadanar Phyo

A Comparative Analysis of LLM-Driven Code Generation from User Stories



Author: Yadanar Phyo Supervisor: Dr. Mujahid Tabassum
Course: MSc in Computer Science (Enterprise Software Systems)

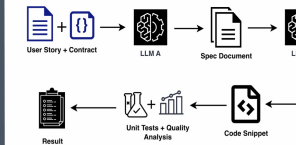
Introduction

Large Language Models (LLMs) have played a crucial role across various stages of software development. In addition, Spec-Driven Development (SDD) has emerged as a widely adopted approach for software implementation. This study evaluates and compares the performance and quality of code generated from user stories by four LLMs: GPT 5.4, Claude Sonnet 4.6, Kimi K2.6 and Qwen 3.6.

Objective

- To investigate the capability of Large Language Models (LLMs) to generate executable code from given user stories.
- To evaluate whether LLMs can produce functionally correct and complete code based on natural-language user story requirements.
- To assess the quality and maintainability of LLM-generated code using static analysis tools, software complexity metrics, and adherence to established coding standards.

Methodology



Metrics

Metric	Output Format	Example
Unit Test	Success Count	3/5 (3 tests passed out of 5)
Code Smell	Count + Severity Breakdown	42 code smells
Reliability Rating (Bugs)	Letter rating A-E (A is the best) Bug count	A, 5 bugs
Security Rating	Letter rating A-E (A is the best) Vulnerability count	B, 3 vulnerabilities
Cyclomatic Complexity	Integer per function	foo:4, bar:7

Research Questions

- RQ1** – Are Large Language Models (LLMs) capable of generating executable code from given user stories?
- RQ2** – If the answer to RQ1 is yes, do Large Language Models generate functionally correct and complete code when provided with natural-language user stories?
- RQ3** – If the answer to RQ1 is yes, what are the quality and maintainability levels of LLM-generated code as measured by static analysis tools, complexity metrics, and adherence to coding standards?

Research Outcome

- Evaluated the capability of LLMs to generate executable code from user stories.
- Assessed the functional correctness and completeness of LLM-generated code based on natural-language user story requirements.
- Collected code quality and maintainability metrics using static analysis tools, complexity measurements, and coding standard evaluations.
- Identified the strengths and limitations of LLM-based code generation within Spec-Driven Development (SDD) practices.

This project explores how Large Language Models (LLMs) can automatically generate source code from user stories, which are widely used in Agile software development to describe system requirements from a user’s perspective.

The study focuses on:

- Understanding how user stories (using formats like “As a user, I want...”) can be transformed into working code
- Comparing the performance of different LLMs in generating accurate, functional, and efficient code
- Evaluating the generated code based on correctness, completeness, and maintainability



Technologies: LLM, AI, Python, C#, Spec-Driven Development

<https://github.com/ydnp20115518/UserStoriesToCode.git>

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Academic Title

Evaluating the Impact of Personal Information on Password Strength Using Large Language Models

Project Areas

- AI/ML Development
- Computer Security

Project Supervisor

Dr John Sheppard

This dissertation explores the use of Large Language Models (LLMs) with tailored prompts to detect personal information in passwords, identify weak passwords, and improve security. Traditional machine learning models rely on manual feature engineering and often miss contextual information, while LLMs like Llama 3.1 and Gemma 2 can detect semantic patterns directly. The study compares LLMs with conventional models using metrics such as accuracy, precision, recall, and F1 score, highlighting their effectiveness in evaluating password strength.

#117 / Poster

by Krishna Rajakumar

Evaluating the Impact of Personal Information on Password Strength using Large Language Models



MSc in Computer Science (Enterprise Software Systems)
Name: Krishna Rajakumar Supervisor: Dr. John Sheppard

1 Introduction

Passwords remain the widely followed and accepted method for user authentication despite the security risks. People often embed personal information such as name, date of birth, hobbies, etc. in passwords making them more vulnerable to attacks.

Traditional machine learning models require manual feature engineering, while Large Language Models (LLMs) can understand contextual relationships without explicit feature extraction. This research investigates whether LLMs can better detect personal information in passwords compared to traditional machine learning methods.

2 Research Questions

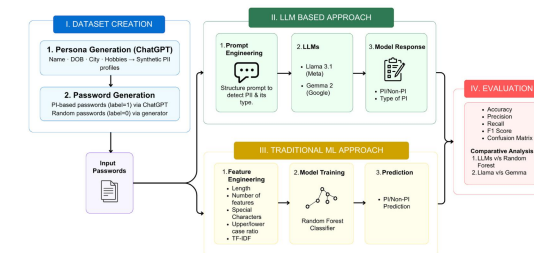
1. Do Large Language Models identify personal information in passwords more accurately than traditional machine learning models?
2. How do different LLMs compare with each other in their ability to detect personal information within passwords?

3 Contribution

1. Investigates the capability of LLMs, particularly Llama 3.1 and Gemma 2, to detect the presence of personal information within passwords.
2. Compare the performance of large language models and traditional machine learning approaches and identify their advantages and limitations in password strength analysis.
3. The research applies standard evaluation metrics, including accuracy, precision, recall, F1 score, and confusion matrices, thereby enabling a transparent evaluation of performance.

4 Methodology

A synthetic dataset is built using PI-based passwords created from ChatGPT-generated user profiles, along with non-PI passwords generated using a random password generator. LLMs predict both PI presence and type, while the Random Forest classifier only detects PI presence.



5 Conclusion

This research aims to provide insights into the potential of Large Language Models for password security analysis by evaluating their ability to identify personal information within passwords. The findings of this study are expected to contribute to improving password strength assessment techniques and advancing cybersecurity research.



Technologies: Large Language Models, Machine Learning

<https://github.com/krishna-rajakumar/PII-Passwords>

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Cloud AI Speed & Load Performance Guide

#118 / Poster

Academic Title

An Evaluation of Latency and Concurrency Effects on Cloud-to-Client AI Inference Performance

Project Areas

- Cloud Computing
- Information Systems and Modelling

Project Supervisor

Dr Denis Flynn

by Sadia Sultana



This study examines how network latency and concurrent user load influence the performance of cloud-to-client AI inference systems. Through controlled experiments in a cloud environment, it evaluates key metrics such as response time, throughput, and queueing delay under varying network conditions and user demand. The research aims to identify performance degradation thresholds and understand how these factors impact user experience, ultimately providing practical insights to support the design, optimisation, and deployment of scalable, responsive AI services in real-world settings.

An Evaluation of Latency and Concurrency Effects on Cloud-to-Client AI Inference Performance

A system-level evaluation & prediction of network latency and concurrent load effects on cloud AI inference environment.

Sadia Sultana | ID 20115757 | Supervisor: Dr Denis Flynn | SETU

Introduction

As cloud-based AI becomes embedded in enterprise systems, a critical gap exists: organisations deploy AI inference services without knowing at what point network latency and concurrent user load will cause performance to collapse. AI servers respond in milliseconds in isolation but real deployments involve shared infrastructure, variable networks, and many simultaneous users. This study measures the full cloud-to-client journey to find where performance degrades and where it thrives, producing a predictive model that tells businesses both the breaking point and the optimum environment for deploying AI at scale.

Scope

Excluded: Model accuracy, training behaviour, autoscaling, GPU hardware
Metrics: Response time, throughput, queue delay, P95 tail latency (per request)
Experimental: 5 latency levels x 5-6 concurrency levels = 25-scenario
Technical: Cloud-hosted Ollama inference server (so far experimented) on AWS EC2, accessed via HTTP API

Pilot Study Results

Fig: RTT vs. Concurrent Requests

Enterprise Context

53% of enterprises cite latency as a critical constraint.
 80%-90% of ML cloud demand for inference, not training.
 210% more organisations deploying AI to production.
 50%+ experience difficulties in their AI infrastructure.

Methodology

- 01 Deploy:** Standard HTTP API (no GPU) | Ollama on AWS EC2 t3.medium
- 02 Capture:** Baseline traffic - latency profiling & Wireshark packet capture
- 03 Inject:** Use tool/netem to simulate specific levels of network latency
- 04 Stress:** Use an ablytics load generator to simulate concurrent user groups, testing the server's capacity to handle simultaneous requests.
- 05 Measure:** Log response time and status depth for every request to identify the weak points of performance.
- 06 Model:** Fit the experimental results into a multivariate regression model to quantify the interaction between latency and concurrency.

Research Questions

RQ1: How does network latency change the overall cloud-to-client response time of an AI inference service when only a few users are active compared to when many users are accessing it at the same time?
RQ2: What happens to response time, throughput, and request waiting behaviour as the number of concurrent users accessing a cloud-hosted inference server increases?
RQ3: At what point does the combination of network latency and concurrent user load start to noticeably affect performance from a user's point of view?

System Architecture

Fig: System Architecture

Predictive Model

Multivariate Regression Formula
 $RTT = b_0 + b_1 \cdot L + b_2 \cdot C + b_3 \cdot (L \cdot C)$
 L: Network Latency injected via tool/netem
 C: Number of Concurrent Users
 b0: Baseline system response time.
 b1 & b2: Coefficients for individual impact of L and C.
 b3: Interaction Term quantifying the non-linear amplification effect (Non-linear Contribution).

Scenarios	Network Latency	Concurrent Users	Predicted RTT	Predicted Queue
Low Load	50ms	10	245ms	0
Medium Load	100ms	20	650ms	4
High Load	300ms	50	2053ms	28

Table: Predicted KPI Output (Expected Deployment Scenario)

Experimental Variables

- Controlled Variables:** AI model weights, server configuration, AWS region, and OS environment.
- Dependent Variables:** Response time (RTT), Throughput (req/s), Queue delay, and P95 tail latency.
- Independent Variables:** Network latency (0, 50, 100, 200, 500ms) and Concurrent users (1, 5, 10, 20, 50+).

Further Work

Future work will expand this study by testing additional latency and concurrency combinations, exploring larger language models. A key goal is to move beyond controlled scripts and replicate genuine enterprise cloud to client AI inference interactions, where unpredictable traffic patterns and varying network conditions reflect the real deployment scenarios organisations face when integrating AI at scale.

Technologies: Python, AWS, Wireshark

<https://github.com/sultana-sadia/Cloud-AI-Speed-Load-Performance-Guide>

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Multi-Angle Ultrasound Reconstruction

#119 / Poster

Academic Title

deepus-reconseg++: Joint Deformable Registration and Transformer-Based Ultrasound Reconstruction

Project Areas

- AI/ML Development

Project Supervisor

Dr Lizy Abraham

by Kazi Md Al Wakil

DEEPU-S-RECONSEG++: MULTI-ANGLE US RECONSTRUCTION & SEGMENTATION

MSc in Computer Science (Enterprise Software Systems), 2025/26
 Kazi Md Al Wakil
 Supervisor: Lizy Abraham

Introduction

Ultrasound imaging is widely used due to its safety, low cost, and real-time capability. However, images captured from different angles often suffer from misalignment, speckle noise, and limited field-of-view, reducing diagnostic accuracy. Multi-angle imaging provides richer information, but combining these views effectively remains a major challenge.

Problem Statement

- Multi-angle ultrasound provides richer anatomical information.
- However, combining multiple views is challenging due to:
 - Probe motion
 - Spatial inconsistency
 - Deformation across views
- Existing methods:
 - Use rigid alignment
 - Process tasks independently
 - Fail under noisy conditions
- A robust unified framework is needed for accurate fusion and analysis.

Research Questions

- RQ1:** How effectively can deformable registration and transformer-based cross-angle fusion improve ultrasound reconstruction quality and anatomical segmentation accuracy under multi-angle acquisition settings?
- RQ2:** Can a unified multi-task learning framework provide robust and reliable ultrasound analysis under noise, misalignment, and missing-angle conditions while maintaining explainability and prediction confidence?



Evaluation Metrics

- Registration**
NCC, TRE
- Reconstruction**
PSNR, SSIM
- Segmentation**
Dice Score, IoU

Conclusion & Future Work

- DeepUS-ReconSeg++ improves:
 - Multi-angle ultrasound fusion
 - Reconstruction quality
 - Segmentation accuracy
- The framework demonstrated:
 - Robust performance
 - Improved interpretability
 - Reliable cross-angle learning
- Future Work Extend to:
 - 3D ultrasound analysis
 - Real-time deployment
- Explore:
 - Lightweight architectures
 - Federated learning

Reference

[1] Z. Yang, J. Li, H. Zhang, D. Zhao, B. Wei, and Y. Xu, "Restore-rwkv: Efficient and effective medical image restoration with rwkv," arXiv preprint arXiv:2407.11087, 2024.

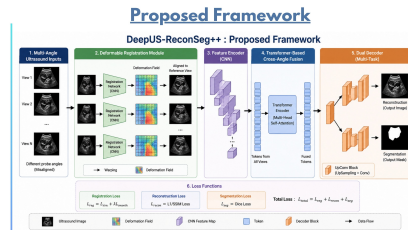


Figure 1: Schematic overview of the DeepUS-ReconSeg++ framework

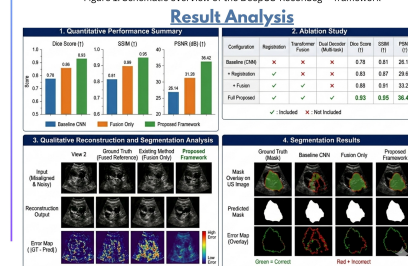
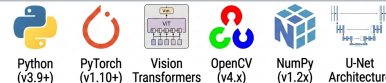


Figure 2: Performance Evaluation and Analysis of the Proposed Framework

Technology Used



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<https://github.com/kazimdalwakil/Msc-Thesis-SETU-.git>



MSc in Computing (Information Systems Processes)

The aim of the MSc in Computing (Information Systems Processes) is

to provide graduates, from any discipline, with a broad sociotechnical perspective of modern information systems and their development. The socio–technical focus renders the MSc in Computing (Information Systems Process) philosophy and objectives as distinct from information technology-oriented programmes.

Whereas information technology oriented programmes focus primarily on the development of technical artefact and data, the MSc in Computing (Information Systems Process) takes a much broader and multidisciplinary perspective to encompass human-centred and organisational processes, knowledge, and values that also comprise an information system and its environment.

Blockchain Academic Certificate Auth Sys

#120 / Poster



Academic Title

Enhancing Academic Certificate Authentication Using a Blockchain Approach

Project Areas

- Cloud Computing
- Computer Networks
- Computer Security
- Database and Analytics
- Information Systems and Modelling
- Personal Independent Project
- Open Source
- Software Development: (Back End / Front End / Web)

Project Supervisor

Dr Mujahid Tabassum

The traditional academic certificate systems have been associated with 3 major threats that include: forgery; it is easy to copy or make counterfeit certificates, tampering; legitimate certificate can be modified to alter grades or credentials, and slow verification; manual verification can take days or weeks. Therefore, a self-controlled blockchain system with a demonstrating that guarantees the integrity of the data, allows verifying it immediately, and offers automatic tampering detection and recovery is necessary.



Technologies: Python, Flask, MySQL, SHA-256, FTP (DriveHQ), ZIP File Format, HTML/CSS, JavaScript, Bootstrap

<https://github.com/kanchana9827-design/Enhancing-Academic-Certificate-Authentication-Using-a-Blockchain-Approach>



by Kanchana Chelappurathu Shanmugham

Enhancing Academic Certificate Authentication Using a Blockchain Approach

Student: Kanchana shanmugham

Supervisor: Dr Mujahid Tabassum

Abstract

Centralized certificate management systems are susceptible to database compromise, unauthorized modification, insider threats and single point failure. Cases of certificate forgery and tampering still create mistrust in academic credentials. Diploma mills and credential fraud cost employers billions annually, and manual verification takes weeks. Blockchain technology offers decentralization, immutability and transparency. However, most available solutions rely on sophisticated public block chains (Ethereum). Hyperledger posing feasibility, cost, and implementation challenges. Moreover, comparative analyses between traditional centralized systems and lightweight custom block chains are absent in literature. This study fills that gap by creating and testing a bespoke blockchain architecture against a conventional web-based system. The aim is to design, develop, and evaluate a custom block chain prototype and compare its performance, tamper resistance, and transparency through controlled experiments.

Introduction

Web-based certificate systems enhance accessibility and simplify processes. Nevertheless, they are susceptible to database compromise, unauthorized modification, insider threats and single point failure. Diploma mills and credential fraud cost employers billions each year, and manual verification takes weeks. Blockchain technology has emerged as a potential substitute because it is decentralized, immutable, and transparent. Saleh et al. (2020) highlighted that block chain models can enhance authentication, authorization, and data integrity by removing a single controlling authority.

Research Objectives and Questions

- **RQ1** – What are the specific security and integrity limitations of a traditional centralized web-based certificate system when subjected to tampering attempts?
- **RQ2** – How does a custom built block chain model (using hashing, block chaining, and distributed backup) perform in terms of tamper detection accuracy, verification speed and transparency compared to a centralized system?
- **RQ3** – Under what conditions can the proposed block chain prototype recover from data corruption using its consensus backup mechanism?

Research Objectives

1. To analyse the existing web-based certificate authentication system and identify its limitations in security, data integrity and verification efficiency (addresses RQ1).
2. To design and implement a custom block chain model that uses SHA-256 hashing, block chaining, and distributed (FTP) backup to ensure secure certificate storage and tamper-resistant verification (addresses RQ2).
3. To compare the centralized system and the block chain prototype by measuring verification time, tamper resistance (accuracy of tamper detection), and system transparency through controlled experiments (addresses RQ2 and RQ3).
4. To test the block chain prototype's recovery capability by deliberately corrupting local or remote copies and verifying that the system can restore the correct data from the remaining valid copy (addresses RQ3).

Literature Review / State of the Art

Boddupalli et al. (2024) – QuickCert achieved 80% accuracy, 70 requests/min, but 5% error rate.
 Saleh et al. (2020) – Proposed Hyperledger Fabric framework; identified authentication, privacy, and ownership requirements.
 Habibi et al. (2022) – Reviewed blockchain benefits: decentralization, immutability, transparency, fault tolerance.
 Pradyumn et al. (2025) – Ethereum-based system with hash mapping; resilient to 51% & Sybil attacks.
 Kareem & Shakir (2023) – Blockchain enhances transparency but scalability and cost challenges remain.
 Lutfiani et al. (2022) – Framework reduces forgery, lowers costs, verifies within minutes.

Proposed Hypothesis / Methodology

Existing Problem: Centralized systems put certificate data in one database. An attacker can alter records undetected. This study will create a traditional web-based system (Phase 1) deliberately made vulnerable.

Proposed Solution (Custom Blockchain – Phase 2): Each block contains: Certificate ID, Student Details, Timestamp, Previous Block Hash, Current Block Hash (SHA-256), Nonce.

Implementation Steps:

- Certificate data written to header and data dat
- Packed into ZIP archive
- SHA-256 hash computed as current block hash
- Genesis block with zero previous hash
- Each new block stores previous block's hash (immutable chain)
- Block ZIP stored locally and uploaded to FTP server (DriveHQ)
- Local backup copy kept for consensus recovery
- Only hashes stored in MySQL – no raw certificate data

Tamper Detection & Recovery: System re-computes hash of ZIP file and compares with stored hash. Any discrepancy indicates tampering. If a valid copy exists (local backup or FTP), one-click restore replaces the damaged copy.
Technology: Python, Flask, MySQL, SHA-256, FTP (DriveHQ), ZIP, HTML/CSS, JavaScript, Bootstrap.

Testing Strategy (Proposed)

- **Functional** – Issue/verify certificates – correct results
- **Tamper Resistance** – Modify ZIP file – 100% detection
- **Recovery** – Corrupt local copy, restore from FTP – successful restore
- **Performance** – Measure verification time – recorded & compared
- **Transparency** – Examine hash chain logs – full audit ability

Expected Outcomes

- Centralized system weaknesses identified
- Functional custom blockchain prototype developed
- Improved tamper resistance demonstrated
- Comparative evidence supporting block chain verified
- Tamper detection: 0% (centralized) vs. 100% (block chain)
- Verification time: days/weeks vs. seconds
- Transparency: no audit trail vs. full hash chain
- Recovery: manual only vs. one-click restore
- Single point of failure: yes vs. no
- Figures: System Architecture Diagram, Add Block Flowchart, Verification Flowchart

Outcomes: Weaknesses identified in centralized systems; functional block chain prototype; improved tamper resistance; comparative evidence.

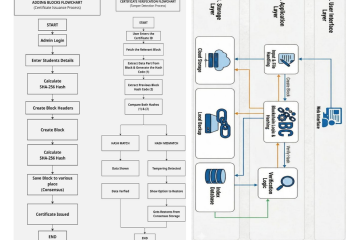


Fig: Block Flowchart Fig: Verification Flowchart Fig: System Architecture Diagram

Conclusions

This study will showcase that a lightweight block chain can offer greater integrity and transparency for academic certificate authentication without sophisticated public block chain systems. The impact will be to understand and build a fully custom, controlled, secure, efficient, and trust-enhanced digital credential verification system for institutional settings.

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#121 / Poster



Academic Title

Digitalisation Adoption of Small and Medium-sized Enterprises

Project Areas

Project Supervisor
Fiona Lynch

Digitalisation adoption of small and medium-sized enterprises in Ireland

Student: Leela Sasi Krishna Danda Supervisor: Fiona Lynch

Abstract:
Digitalisation integrates digital technologies into business operations to enhance efficiency and create value. SMEs face unique challenges. Only 50% to 60% achieve basic digital integration due to financial constraints, knowledge gaps and skills deficits. Despite representing 29% of businesses and 60% to 70% employment in developed economies SMEs struggle with digital adoption. This research investigates how digitalisation impacts business process efficiency in Irish SMEs examining both the benefits and barriers to adoption.

Introduction
Digital transformation is becoming increasingly important for small and medium sized enterprises in improving business efficiency, productivity and competitiveness. Many SMEs are adopting digital technologies to manage operations, communication and customer services more effectively. However financial limitations, lack of technical knowledge and resistance to change continue to create barriers. This study explores the factors influencing digitalisation adoption and its impact on SME performance (Verhoef et al., 2021).

Research Objectives and Questions
Aim: The scope of this research is to explore the effects of digitalisation on making business processes in small to medium-sized businesses. It will look at the enablers to digitalization adoption and the challenges that SME's have to overcome when undertaking digital adoption. In particular, how human and organizational factors affect digital adoption. This research will investigate SME's that are located in Ireland.

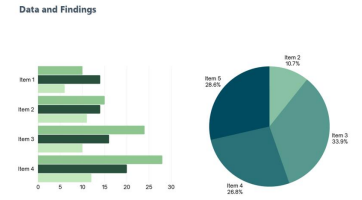
- Objectives:**
- To investigate how the use of digital tools impacts the efficiency of business processes of SMEs by conducting a systematic review of the literature and empirical evidence.
 - To examine the main obstacles linked to the adoption of digitalisation in SME business processes.
 - To determine the impact of the organisational factors on digital adoption among SMEs.
 - To investigate the human factors that influence the implementation and uptake of digitalisation in SME.

- Research Questions:**
1. What are the reasons / enablers for digitalisation?
 2. How can business processes in SMEs be advantaged by the adoption of digital?
 3. What are the obstacles to the digital adoption in SMEs?
 4. How human factors are in play within digital adoption in an SME?

Literature Review / State of the Art
Successful digitalisation requires a holistic approach integrating technological capabilities, organisational preparedness and human capital development. Key recommendations include developing coherent digital strategies, investing in continuous employee training, fostering innovation oriented cultures ensuring strong leadership commitment and using digital initiatives with business objectives (Bankins et al., 2024).

Propositions / Hypotheses / Theory
Organisational readiness including financial capability, infrastructure, expertise, top management support and leadership vision, operational culture, innovation orientation, risk appetite and strategic alignment with business goals are critical determinants. SMEs with strong leadership commitment, supportive cultures and coherent digital strategies achieve better adoption outcomes (Bouwman et al., 2019).

Methodology
This research uses a quantitative approach to examine how digitalisation improves business process efficiency in small and medium-sized enterprises (SMEs). The study focuses on the use of digital tools such as systems, data management software, and automated applications that help organisations reduce manual work, minimise errors, improve data accuracy, and enhance overall operational performance. Primary data will be collected through structured questionnaires distributed to SMEs in Ireland, and the responses will be analysed using statistical methods to understand the relationship between digital adoption and business process efficiency. In addition, the research explores the organisational, human, and technological factors that influence the successful implementation of digital transformation in SMEs (Nayal et al., 2022).



Conclusions
The study concludes that digitalisation can significantly improve the performance and growth of small and medium sized enterprises. Successful adoption depends on strong leadership, employee skills, organisational readiness and continuous learning. Although SMEs face several challenges including financial and technical barriers, proper planning and support can help businesses achieve long term benefits through effective digital transformation strategies.

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Digitalisation is changing how small and medium-sized businesses (SMEs) work by making their daily processes faster and more efficient. This study looks at how digital tools are used in Irish SMEs and how they help improve communication, decision-making, and productivity. However, many SMEs still face problems like limited budgets, lack of digital skills, and resistance to change. At present, only about 50–60% of SMEs have basic digital systems, which shows a gap compared to larger companies.



Technologies: Statistical Package for the Social Sciences(SPSS)

<https://github.com/leelasasikrishnadandams-data/my-adoption>





Academic Title

A Comparative Study of Front-End Application Development Using Vanilla Javascript and Vue.js 3

Project Areas

- Software Development: (Front End / Web)

Project Supervisor

Richie Lyng

This research explores performance and maintainability aspects between modern Vanilla JavaScript (ECMAScript 2024) and Vue.js 3 using Vite as build tool. I am building two identical movie apps using the TMDb API to ensure a fair comparison. Performance is evaluated via Lighthouse and Chrome DevTools, while maintainability is checked through code organisation and scalability. By evaluating on small-to-medium apps, this study provides evidence-based guidance for developers selecting these tools. Completion is scheduled for August 2026.



Technologies: Vanilla JavaScript (ECMA Script 2024), Vue.js 3, Vite

<https://github.com/albertef/movie-app-research>

#122 / Poster

by Albert Francis Emmatty

A Comparative Study of Front-End Application Development Using Vanilla JavaScript and Vue.js 3 with Vite: Performance and Maintainability Analysis

Student: Albert Francis Emmatty

Supervisor: Richie Lyng

Abstract

This research investigates the differences in performance and maintainability between applications built with modern Vanilla JavaScript (ECMAScript 2024) and those built using Vue.js 3 with Vite. By developing two functionally identical movie applications, the study seeks to provide evidence-based guidance for selecting the optimal technology stack for small-to-medium-sized web projects.

Introduction

The front-end landscape has evolved with structured frameworks like Vue.js, yet Vanilla JavaScript remains relevant for developers seeking full control and minimal abstraction. While frameworks offer component-based efficiency, direct DOM manipulation in Vanilla JS can lead to performance benefits in smaller applications. This study addresses the lack of academic literature comparing these modern standards specifically using the Vite build tool.

Research Objectives and Questions

- O1: Create two identical movie applications using modern Vanilla JS and Vue.js 3 with Vite.
- O2: Measure performance scores using Google Lighthouse, Chrome DevTools, and bundle reports.
- O3: Assess maintainability based on code structure, readability, and scalability.
- RQ1: How does contemporary Vanilla JS performance compare to Vue.js 3 utilizing Vite?
- RQ2: What are the distinctions in code maintainability between these two methodologies?

Literature Review / State of the Art

Current literature highlights a major shift toward ES Modules (ESM) and modern build tools like Vite, which utilizes ESBuild for rapid development. However, gaps exist in research comparing modern ECMAScript 2024 standards against framework-based approaches. Most existing studies focus on older tools like Webpack or perform framework-to-framework comparisons, overlooking the baseline of modern Vanilla JavaScript.

Propositions / Hypotheses / Theory

H1: Vue.js 3 with Vite will provide stronger maintainability benefits, while Vanilla JavaScript may show small performance advantages in a small-to-medium application.

Methodology

The study employs a comparative experimental methodology:

- Version 1: Developed with Vanilla JavaScript, ES Modules, and Fetch API.
- Version 2: Developed with Vue.js 3 (Composition API) and Vite.
- Identical Functional Scope: Both versions will utilize the TMDb API for movie listing, searching, and detailed views to ensure a fair performance comparison.

Data and Findings

- Performance Metrics: Focus on First Contentful Paint (FCP), Time to Interactive (TTI), and production bundle size.
- Maintainability Metrics: Analysis of Lines of Code (LOC), cyclomatic complexity, modularity, and ease of adding new features.
- Controlled Testing: Both applications will run under identical conditions and browser versions to maintain consistency.

Positioning of the Study

- Bridges the Gap: Evaluates modern Vanilla JavaScript (ECMAScript 2024) rather than outdated versions.
- Reflects Modern Ecosystems: Specifically uses Vite, the official build tool for Vue.js 3, which is often missing in older academic literature.
- Targeted Focus: Concentrates on small-to-medium-sized applications, where the choice between a framework and Vanilla JS is most impactful.

Technical Implementation / Functional Scope

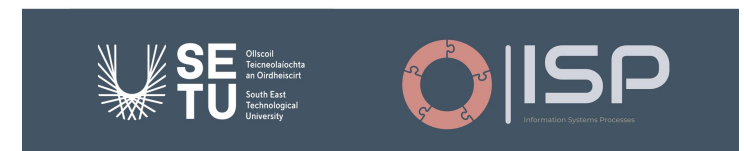
- The "Movie App": Mention the use of the TMDb API for real-world data fetching.
- Core Features: List the identical requirements for both versions: search functionality, dynamic movie listing, and a detailed view.
- Architectural Parity: Explain how you ensured a fair comparison by using identical CSS and functional requirements.

Conclusions

This research will provide practical, evidence-based insights for developers and organizations choosing between framework-free and framework-based development. The findings are expected to clarify whether the structured benefits of Vue.js 3 outweigh the lightweight, direct control advantages of modern Vanilla JavaScript in the context of small-to-medium-sized projects.

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Academic Title

Investigating Effectiveness of AI-Assisted Responsive Web Design on Accessibility & User Engagement

Project Areas

- AI/ML Development
- Software Development: (Core / Front End / Web)

Project Supervisor
Richie Lyng

AI vs Manual Web Design

#123 / Poster

by Satya Krishna Pavan Gundabattula

INVESTIGATING THE EFFECTIVENESS OF AI-ASSISTED RESPONSIVE WEB DESIGN ON ACCESSIBILITY AND USER ENGAGEMENT

Student: Satya Krishna pavan Gundabattula (W20115511) Supervisor: Richie Lyng

This project explores how AI-assisted tools are influencing the way responsive websites are designed and whether they truly improve accessibility and user experience compared to traditional manual approaches. It looks at how websites perform across different devices, how users interact with them, and how efficiently they complete common tasks. By comparing both methods, the study highlights their strengths and limitations, and shows how combining AI capabilities with human design thinking can lead to more practical, accessible, and user-friendly web solutions.



Technologies: HTML, CSS, JavaScript, AI tools, Responsive Web Design, UX testing

<https://github.com/PavanG9391/ai-web-accessibility-study>

Abstract
This research investigates the use of AI-assisted responsive web design (RWD) to enhance accessibility and user engagement as compared to an entirely manual method of web (page) design. The use of a mixed-methods research methodology revealed that AI is superior to manual design methods in terms of efficiency, automation, and personalisation, while manual design methods provide a greater level of usability and contextuality.

Introduction
The increasing integration of AI in web development has transformed the design of websites as well as user experiences (Upadhyaya, 2024). Responsive web design ensures the adaptability of websites to different devices, including smartphones, tablets, and desktops, leading to a rise in the usability and accessibility of the website (Velan, 2025). With mobile devices accounting for a significant share of global web traffic, the demand for responsive and accessible websites has grown substantially (Statista, 2025).

However, despite technological advancements, a large proportion of websites still fail to meet accessibility standards, limiting usability for individuals with disabilities (Dobala and Lingohr, 2024). AI-assisted design tools aim to address these challenges by automating layout generation, improving navigation, and ensuring compliance with accessibility guidelines. However, there is limited empirical evidence comparing AI-generated designs with manually developed websites. This study addresses this gap by evaluating the effectiveness of both approaches in terms of accessibility, user engagement, and usability.

Figure 1: mobile device website traffic worldwide (Source: Statista.com, 2025)



Research Objectives and Questions

- Objectives:**
- To examine the performance of accessibility between AI-assisted and manually designed responsive websites on various devices
 - To measure the engagement of users through analysis of their behaviour through interaction in AI-generated and manually built responsive websites
 - To determine the effectiveness and usability of the task completion for users who interact with the two methods of designing a site
 - To identify strengths and weaknesses perceived regarding AI-assisted responsive design as a tool for enabling an inclusive user experience

- Research questions:**
- RQ.1: What is the performance of AI-assisted responsive websites in terms of accessibility compared to manually designed responsive websites on varying devices?
 - RQ.2: How does the AI-generated responsive web design affect user interaction behaviour and engagement compared to manually designed websites?
 - RQ.3: Is the efficiency of AI-assisted responsive design better at addressing task completion and ease-of-use for users?
 - RQ.4: What are the perceived strengths and weaknesses of AI-assisted responsive design to enable an inclusive and accessible user experience?

Methodology
A positivist philosophy and deductive research approach have been adopted by the researcher to focus on the measurable outcomes of the study. A mixed-method descriptive research design has been followed, providing both qualitative and quantitative insights. An experimental setup has been introduced to collect primary data by involving 10-15 participants, who interacted with two different website prototypes, one AI-generated and one manually designed. Primary data collection methods have been employed with respect to Behavioural analytics (analyzing click patterns, task completion time, error rates), survey (Likert scale questionnaire and MCQs), and structured interviews. The behavioural analytics and survey data have been analysed statistically using descriptive and inferential statistics by SPSS software (t-test and chi-square test), and the qualitative responses from the interview have been thematically analysed for a comprehensive assessment of accessibility, usability and engagement of both website design prototypes (AI-designed and manually designed).

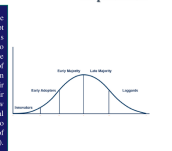
Literature review

The existing literature identifies the increasing influence of AI within web development by means of automated processes, personalisation and greater accessibility (Jadav and Sagar, 2024). AI tools can assist with generating responsive layouts, navigation optimisation and large-scale accessibility testing (Bonniketi and Singh, 2025). The studies show that using AI can also improve efficiencies and lower development time through the use of adaptive user interfaces. However, researchers also highlighted the limitations of this applied design approach, in terms of the lack of creativity, context, and emotional intelligence of the AI-generated designs may lack creativity, context and emotional intelligence (Cen and Shukla, 2020). Additionally, there are also concerns surrounding data security as well as potential over-reliance on automated processes (Sahgal, 2024). Furthermore, research also demonstrates that AI-assisted individualisation creates greater user engagement through the delivery of personalised content (Nayini et al., 2025). However, manual design usually leads to better task completion rates due to more intuitive navigation structures (Velan, 2025). Nevertheless, the critical gap in the literature is the lack of empirical studies comparing AI-assisted design and manual design regarding the practical usability and accessibility of the user experience in a real-world setting.

Theoretical

The Diffusion of Innovations (DOI) concept explains the introduction of technology by society, allowing society to adapt technologies over time (Mutha, 2024). An example of this theoretical approach is the AI-based web design, which falls into this category. New AI-based web design will eventually become mainstream and accepted by the developers or creators of websites. The DOI theory allows us to understand if and when individuals will accept that technology, with respect to their perceived usefulness, perceived ease of use, and behind their acceptance and adoption. It focuses on the effectiveness of new technologies, with respect to acceleration of technical innovation in web design, but also identifies barriers to innovation, such as lack of trust, usability issues or a fear of losing human control (Overby, Thompson and Hamilton, 2025).

implication



Data and findings

From the research results, it is possible to say that AI-based responsive web design creates efficiencies through automation and gives users a greater number of ways to test their websites. It also creates flexible designs to accommodate any device or style of use and produces greater amounts of user-generated content. Personalisation also increases user engagement, decreases time spent to complete tasks, requires less development effort for the designer or the developer and develops adaptable sites.

On the other hand, many end users found the design of the websites produced by AI systems to lack creativity and contextual relevance, resulting in low levels of satisfaction in completing normal tasks. Some end users reported being confused as a result of the countless ways the web pages were constructed, which produced a system or set of systems that were all very similar to each other.

Conclusions

In conclusion, while AI provides valuable data and efficiency in the testing of websites, manual design will always provide the highest level of user experience available. Responsive web design created with the help of AI can be very useful in increasing operational efficiency, accessibility, and scalability. However, AI cannot completely replace human-oriented design; human-designed interfaces are critical to providing users with an efficient, innovative and contextually appropriate interaction.

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Academic Title

The Social Awareness of Data Practices of the Individual Using Online Platforms

Project Areas

- Database and Analytics
- Information Systems and Modelling
- Personal Independent Project

Project Supervisor
Brenda O'Neill

Online Data Use Behind the Screens

#124 / Poster

by Emily Halley

The Social Awareness Of Data Practices Of The Individual Using Online Platforms

Student: Emily Halley Supervisor: Brenda O'Neill

This research dissertation investigates “The Social Awareness of Data Practices of the Individual Using Online Platforms”. It focuses on university students’ understanding of the extensive data collection carried out by the platforms they use daily. It examines their knowledge of how personal information is gathered, processed, and utilised. It explores the origins of their digital literacy through education, personal experience and online engagement. The study also considers their perceptions of trust, fairness and consent to analyse their attitudes toward online platforms.

Abstract
This research dissertation investigates “The Social Awareness of Data Practices of the Individual Using Online Platforms”. It focuses on university students’ understanding of the extensive data collection carried out by the platforms they use daily. It examines their knowledge of how personal information is gathered, processed, and utilised. It explores the origins of their digital literacy through education, personal experience and online engagement. The study also considers their perceptions of trust, fairness and consent to analyse their attitudes toward online platforms.

Introduction
This research dissertation investigates “The Social Awareness of Data Practices of the Individual Using Online Platforms”. As the use of digital systems continues to be reliant for our daily lives. They have reshaped how we learn, shop, communicate, access entertainment and social interactions. (Zhang et al., 2023). As online platforms, rely on data systems to manage learning, wellbeing, and engagement, there are new ethical questions arising in relation to consent, governance and autonomy about how these practices are operated. Hence, due to the rapid integration of technological growth, data practices are now surpassing the development of clear guidelines and policies between the individual using these platforms and potential overreach from the companies themselves and data-brokers. There is a lack of data literacy in order to fully interoperate these privacy policy terms for the individual and is seen within the societal and technological context (Wang, Zhang and Wang, 2021; Ginting, 2025). The aim is to understand the individual’s awareness, ethics and digital literacy surrounding online platforms.

Research Questions, Research Objectives and Hypotheses Theory

Research Question (RQ)	Research Objective (RO)	Hypothesis (H)
RQ1: Are individuals aware of the nature and extent of data collection and usage practices of the online platforms they use?	RO1: Measure awareness of online data collection practices across various online platforms.	H1: Students will understand the nature and extent of data collection practices across various online platforms.
RQ2: Where do individuals get their digital literacy from?	RO2: Identify sources of digital literacy across various platforms.	H2: Students who rely on formal learning sources will report higher digital literacy scores than those who rely on informal education.
RQ3: Where do individuals get their ethical awareness and digital literacy in relation to data practices?	RO3: Measure ethical awareness and digital literacy scores by comparing literacy scores across various platforms.	H3: Lower awareness of data practices will be linked with lower ethical awareness and digital literacy scores.

Methodology
Mixed-method approach
Google Forms Survey
University students in SETU
Tools – Excel, NVivo
Clean, prepare, stats, thematic patterns
Compare findings across methods
Wider insight and data quality
Clearer understanding
Ethical Concerns and GDPR rules
Converging parallel & triangulation design

Literature Review

Topic	Abstract	Key
Online and Mobile Data Collection	This research study aims to explore the extent of data collection by online and mobile platforms. The study includes a literature review, a survey of university students, and an analysis of the data collected. The findings indicate that a significant portion of students are unaware of the extent of data collection by these platforms.	Online and mobile data collection, data privacy, university students, survey, data analysis.
The Impact of Social Media, Streaming, and Gaming Data	This research study aims to explore the impact of social media, streaming, and gaming data on the digital literacy of university students. The study includes a literature review, a survey of university students, and an analysis of the data collected. The findings indicate that social media, streaming, and gaming data have a significant impact on the digital literacy of university students.	Social media, streaming, gaming data, digital literacy, university students, survey, data analysis.
Consumer Awareness of Data Collection	This research study aims to explore the consumer awareness of data collection practices by online platforms. The study includes a literature review, a survey of university students, and an analysis of the data collected. The findings indicate that consumers have a low level of awareness of data collection practices by online platforms.	Consumer awareness, data collection, online platforms, university students, survey, data analysis.
Digital Literacy and Ethical Awareness	This research study aims to explore the relationship between digital literacy and ethical awareness in the context of online data collection. The study includes a literature review, a survey of university students, and an analysis of the data collected. The findings indicate that digital literacy is positively related to ethical awareness in the context of online data collection.	Digital literacy, ethical awareness, online data collection, university students, survey, data analysis.



Conclusions
This research has given a holistic view of addressing the research gaps in the context of digital literacy and ethical awareness in the context of online data collection. The findings indicate that university students have a low level of awareness of data collection practices by online platforms. This research has given a holistic view of addressing the research gaps in the context of digital literacy and ethical awareness in the context of online data collection.

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Technologies: Google Forms, Excel, NVivo

<https://linktr.ee/emilymastersdissertation>



Academic Title

Operational Energy Consumption in Monolithic and Micro Services Architectures

Project Areas

- CI/CD & Testing
- Cloud Computing
- Information Systems and Modelling
- Software Development: (Core)

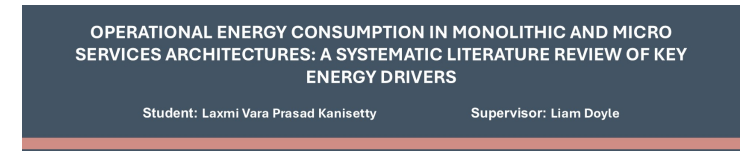
Project Supervisor

Liam Doyle

Sustainable Software Arch Analysis

#125 / Poster

by Laxmi Vara Prasad Kanisetty



Abstract

This paper presents a comprehensive review of energy use in monolithic and microservices architectures by studying operational energy consumption to find major energy factors and trade-offs between different architectures. According to the results, monolithic systems usually consume less energy because there is less communication overhead. On the other hand, microservices allow scaling but raise energy consumption due to containerization and orchestration. The study underlines the role of energy-conscious architecture choices in designing software systems that are not only scalable and cost-efficient but also sustainable.

Introduction

As cloud computing and distributed systems become more prevalent, software architecture plays a crucial role in system performance, scalability, and sustainability (Kraemer, 2025). Data centers consumed around 415 TWh of electricity in 2023, accounting for 1.3% of global electricity consumption (IEA, 2024). Monolithic architecture minimizes communication costs due to centralized processing, but microservices enhance scalability through independent services, while also consuming more energy due to containerisation, orchestration, and communication costs (Punnamkumar, 2025). Previous research indicates microservices use 40% more energy than monoliths (Sul, 2023), but there is a lack of information to support energy-efficient design choices, so this work is important for green software development.

Research Objectives and Questions

Aim
The study aims to systematically analyse and compare the energy consumption of monolithic and microservices software architectures, highlighting the key technical and operational factors that contribute to increasing energy usage based on existing academic research.

- Objectives**
- To review existing literature on methods and approaches for measuring the operational energy consumption of software systems
 - To compare the documented findings on energy usage between monolithic and microservices architectures
 - To identify and categorize the primary architectural and functional factors that influence energy consumption in both types of software architecture
 - To analyse the reported trade-offs between energy consumption and other attributes of software quality, such as performance and scalability
 - To synthesize the findings into energy-aware guidelines that help in making informed decisions in software architecture design

- Questions**
1. What aspects of operational energy consumption are being measured and examined in current research on monolithic and microservice architectures?
 2. How does the literature compare the operational energy consumption of microservices and monolithic architectures?
 3. What are the most common operational and technical causes of increased energy consumption in microservices and monolithic systems?
 4. What established trade-offs exist between energy usage and other aspects of software quality, like scalability and performance?

Literature Review

Previous research has shown that the energy consumption of a software system while running is affected by its architecture and deployment environment. Energy consumption is measured using energy meters, including hardware-based ones (such as IBM's Power Processor Tool) and software-defined meters (such as SmartMatrix) (Shanbhara et al., 2022; Tran et al., 2020). Research on monolithic vs. microservices has mixed results. Monolithic systems typically have lower energy consumption due to reduced networking costs (Ranghi et al., 2025); however, microservices increase scalability via selective horizontal scaling, with added energy costs from APIs, containers, and orchestration (Ranghi et al., 2024; Baber et al., 2022). Green Software Engineering processes optimising CPU, memory and network resources for sustainability, and Distributed Systems Theory provides insights into load distribution and coordination (Freed et al., 2023; Ghosh and Ghosh, 2023). Yet, there is a lack of standardized energy-aware design principles to balance energy efficiency, performance and scalability.

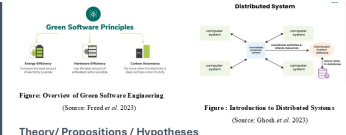
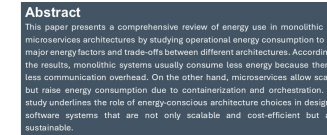


Figure 1: Overview of Green Software Engineering (Source: Freed et al., 2023)

Figure 2: Introduction to Distributed Systems (Source: Ghosh et al., 2023)

Theory/ Propositions / Hypotheses
The current research builds on Green Software Engineering and Distributed Systems Theory. Microservices architectures are expected to have a higher operational energy consumption than monolithic architectures due to container orchestration, inter-service communication, and service replication, whereas monolithic architectures reduce energy consumption overhead through general communication and processing.

Hypotheses

- H1: Under the same workload, microservice architectures are more energy-consuming than monolithic systems.
- H2: Higher network traffic between services and container orchestration has a positive impact on energy consumption in microservices architecture.
- H3: High scalability in microservices comes at the cost of increased operational energy.

Methodology

This study uses a Systematic Literature Review (SLR) to review literature on monolithic and microservices architectural operational energy consumption. The reviewed studies are from peer-reviewed journals and articles from IEEE Xplore, ACM Digital Library, Springerlink, and Scopus, searching for keywords like "Microservices AND energy efficiency" and "Monolithic architecture AND energy consumption". The literature search is conducted by well-known academic databases, which have high-quality research on software engineering (Ibrahim et al., 2024). Articles were selected for being in English and discussing operational stage software energy consumption. The results are analyzed using thematic analysis and PRISMA 2020 to understand trends, compare studies and enhance the quality and rigour of the review.

Data and Findings

The findings demonstrate monolithic systems typically have lower operational energy consumption as inter-component communication happens within the same process, and there is no network overhead and cost of managing containers (Ranghi et al., 2025). On the other hand, microservices enhance scalability via independent deployment and horizontal scaling, but cause energy wastage through API calls, service duplication, communication, and orchestration patterns (Ranghi et al., 2024; Baber et al., 2022). Research shows microservices can utilize around 44% and 20% higher energy consumption and CPU usage than monolithic systems, respectively (Sul, 2023).

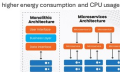


Figure 3: Monolithic vs. Microservices: Key Differences & Benefits (Source: AhsanGajjar et al., 2024)

Conclusions

This research finds that software architecture plays a crucial role in energy consumption. Monolithic architectures are more energy-efficient, but microservices offer improved scalability at the expense of increased energy consumption. Energy-efficient architectures, coupled with Green Software Engineering practices, is crucial for delivering environmentally sustainable, cost-effective, and efficient software systems.

References

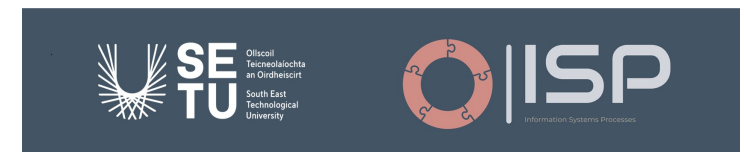
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Project focuses on the environmental sustainability of software systems by analyzing the energy consumption of monolithic and microservices architectures. I explore how different architectural decisions - such as service granularity, communication overhead, and container orchestration - directly impact electricity usage in cloud environments. By identifying the primary drivers of energy waste, this work provides practical, energy-aware guidelines for developers. This goal is to bridge the gap between high-performance software engineering and carbon-efficient digital infrastructure in future



Technologies: Microservices, Monolithic Architecture, Cloud Computing, Kubernetes, Energy Monitoring tools

<https://github.com/prasad564/Energy-Efficiency-Monolith-vs-Microservices>





Better Agile, Better Delivery

Academic Title

Collaborative Modelling Techniques for Enhancing Requirements Elicitation in Agile Process

Project Areas

- Information Systems and Modelling
- Software Development: (Back End / Core / Front End / Mobile Native / Mobile Hybrid / Web)

Project Supervisor

Cian Murphy

Agile grew fast but still more than half of agile projects run late or over budget due to requirement issues. This research looks at how collaborative modelling techniques like user story mapping and event storming help close the gap between what stakeholders want and what teams deliver. Using surveys and interviews, the study looks at how human factors, team culture and communication affect requirements gathering. The goal is to give agile teams useful tools to complete projects more successfully and keep stakeholders happy.

#126 / Poster

Collaborative Modelling Techniques for Enhancing Requirements Elicitation in Agile Process

Mixed-Methods Research on Requirements Gaps, Collaborative Modelling, and Stakeholder Outcomes
Roshan Khamkar | MSc Computing Science (SPI) | SETU Waterford | Supervisor: Cian Murphy

1. Research Problem

- Agile projects frequently show a mismatch between stakeholder expectations and delivered requirements.
- 85% of organisations use agile, yet 50% of projects are delayed due to requirement issues (Vierthaler, 2025).
- 47% of agile transformations fail — 67% linked to requirement gaps.
- This study examines whether collaborative modelling can reduce this gap and improve requirements quality.

7. Section Means (Likert 1-5)

8. Requirements Gap (mean = 2.91 / 5)

- Products sometimes differ from stakeholder expectations (mean=2.2, SD=1.2).
- Requirement changes cause significant rework (mean=3.3, SD=1.2).
- Ambiguous or incomplete specs are a common sprint issue (mean=3.2, SD=1.2).
- Time pressure limits proper requirements analysis (mean=3.4, SD=1.1).
- Requirement issues cause delays and budget overruns (mean=3.4, SD=1.1).
- Clear measurable gap between documented requirements and delivery (mean=2.8, SD=1.2).

9. Collaborative Modelling Use (mean = 3.59 / 5)

- User story mapping and model storming used regularly (mean=3.7, SD=1.2).
- Scenarios involve both technical and business stakeholders (mean=4.2, SD=0.9).
- Shared models referred to during development (mean=4.0, SD=1.0).
- Digital tools such as Miro and Jira seen as effective (mean=4.0, SD=0.9).
- Use embedded as a repeatable agile practice (mean=3.5, SD=1.0).
- Preliminary positive correlation between experience and usage (r = 0.25).

3. Research Questions

- RQ1A: Is there a significant gap between the product delivered and actual requirements in agile projects?
- RQ2B: To what extent does collaborative modelling relate to a reduction in this gap?
- RQ2C: How does collaborative modelling affect stakeholder satisfaction?
- RQ2D: To what extent does collaborative modelling relate to reduced requirement-related rework?

4. Methodology

- Mixed-methods research design integrating quantitative survey and qualitative interviews.
- Quantitative: Google Forms survey (22 questions across 5 sections, Likert scale 1-5).
- Analysis: Python / Pandas — descriptive statistics, correlation tests, hypothesis testing.
- Qualitative: semi-structured interviews (target 15-20 participants, grounded).
- Integrated analysis: interview data contextualises and validates survey findings.

5. Dataset & Sample (n = 26)

- 100% consent rate.
- 65% Developers (n=18) | 12% Scrum Masters (n=3)
- 46% with 0-10 years experience (n=12) | 15% > 10 yrs.
- 85% use Scrum (n=22) | 1 feature & Custom/Hybrid minor
- 62% mixed remote | 23% fully distributed | 15% co-located

6. Hypotheses (Preliminary)

- H1: There is a statistically significant gap between actual requirements and product delivered in agile projects.
- H2: Collaborative modelling techniques lead to a corresponding reduction in this gap.
- H3: The use of collaborative modelling improves stakeholder satisfaction and reduces requirement-related rework.

10. Perceived Benefits (mean = 4.24 / 5)

- Requirements became clearer and less ambiguous (mean=4.5, SD=0.7).
- Rework was reduced when modelling was applied (mean=4.5, SD=0.8).
- Features aligned more closely with stakeholder requests (mean=4.5, SD=0.6).
- Misunderstandings detected earlier in development (mean=4.6, SD=0.7).
- Stakeholder satisfaction improved (mean=4.5, SD=0.8).
- Trust, communication and shared understanding all improved (mean=4.7, SD=0.7).

11. Discussion

- Moderate gap scores in Section 8 confirm that requirement-delivery mismatches persist in agile practice.
- Strong benefit scores in Section 10 contrast with moderate usage scores (3.59), suggesting teams benefit from modelling but do not always use it systematically.
- Results are consistent with Putsch et al. (2020), Senzani et al. (2019), and Moe et al. (2022).

12. Limitations

- Preliminary data — 26 responses, target is 50+.
- Survey only at this stage; interviews not yet conducted.
- Self-reported data may carry response bias.
- Convenience sampling — may not generalise to all agile contexts.

13. Future Work

- Close survey and carry out full statistical analysis (correlations, hypothesis testing).
- Conduct 15-20 semi-structured interviews with agile practitioners.
- Integrate qualitative and quantitative findings in the discussion chapter.
- Validate hypotheses with combined dataset.
- Produce practitioner recommendations for embedding collaborative modelling in agile teams.

Fig 1. Respondent Role Distribution

Fig 2. Agile Framework Usage

Fig 3. Team Distribution

Conclusion: Early survey results (n=26) indicate that collaborative modelling is associated with improved requirements quality, reduced rework, and stronger stakeholder alignment. The Section D mean of 4.24/5 provides early empirical support for both research hypotheses. Full analysis and interview data will be integrated in the final discussion chapter to validate these findings comprehensively.

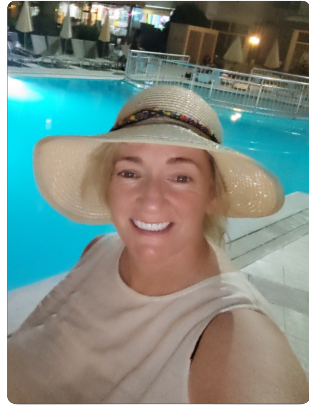
Keywords: Agile • Collaborative Modelling • Requirements Elicitation • Mixed-Methods • Stakeholder Satisfaction • Rework
MSc Computing Science | Information Systems & Process Management | SETU Waterford | 2025-2026 | Supervisor: Cian Murphy



Technologies: Google Forms, SPSS, Python, Miro, Jira, Confluence, Zoom, Microsoft Teams

<https://github.com/Ross17/Collaborative-Modelling-Techniques-for-Enhancing-Requirements-Elicitation-in-Agile-Process>





Academic Title

Bridging the Digital Divide

Project Areas

- Information Systems and Modelling

Project Supervisor

Cian Murphy

Closing the Digital Gap

#127 / Poster

by Patrice Lawlor

Bridging the Digital Divide.

Patrice Lawlor

Supervisor: Cian Murphy

Abstract

This research explores how digital literacy and digital confidence influence entrepreneurial opportunity within disadvantaged communities in Waterford, Ireland. The study investigates whether varies relating to technology access, digital skills, and digital anxiety affect entrepreneurial awareness and participation. A mixed methods approach using pilot questionnaires and surveys was adopted. Preliminary findings suggest links between digital confidence, inclusion, and entrepreneurial intention.

Introduction

Despite Ireland's focus on digital transformation and entrepreneurship, digital inequality remains a challenge. Lower socio-economic groups may experience reduced access to technology, lower digital confidence, and barriers to participation within the digital economy.

Research Objectives and Questions

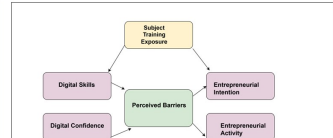
- Investigate digital literacy levels
- Explore digital confidence and entrepreneurial intention
- Identify barriers to participation
- Examine digital inclusion and opportunity
- Does digital literacy influence entrepreneurial opportunity?
- Does digital confidence affect entrepreneurial intention?
- What barriers limit digital participation?

Literature Review / State of the Art

Research suggests digital inequality is linked to socio-economic disadvantage, reduced opportunity, and lower participation in education, employment and entrepreneurship.

Propositions / Hypotheses / Theory

- Lower digital literacy may reduce entrepreneurial participation
- Higher digital confidence increases entrepreneurial intention.



Methodology

Mixed methods exploratory study using pilot questionnaires and surveys and interviews within disadvantaged communities in Waterford city.

Data and Findings

- Digital confidence influenced participation
- Technology access varied significantly
- Digital anxiety emerged as a barrier
- Participants linked digital skills to opportunity

Limitations

- Research remains ongoing
- Sample size currently limited
- Findings remain preliminary

Future Recommendations

- Expand research across Ireland
- Develop community digital literacy supports
- Promote inclusive entrepreneurship initiatives

Conclusions

Preliminary findings suggest digital literacy and digital confidence may influence entrepreneurial opportunity and social inclusion within disadvantaged communities

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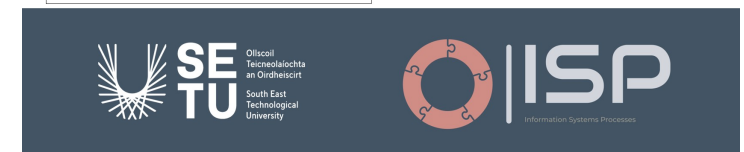
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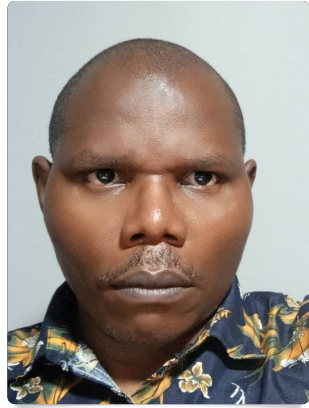
This research explores digital literacy in socio-economically disadvantaged areas of Waterford City and how it affects entrepreneurial opportunity. It focuses on access, skills, and confidence as key factors influencing people's ability to engage in business activity. Using surveys and follow-up interviews, the study examines whether training leads to real confidence and practical use. The research highlights a local gap and aims to support more inclusive, targeted approaches to digital and enterprise development



Technologies: Word, Excel, SPSS, Google Forms, Teams (manual thematic analysis)

<https://not-applicable.com>





Academic Title

Project Areas

- AI/ML Development
- Cloud Computing
- Database and Analytics
- Information Systems and Modelling
- Software Development: (Front End / Web)

Project Supervisor
Richie Lyng

Improving Accessibility to Hansards

Improving Accessibility to Malawi Parliament Hansard with AI Summaries and Topic Tagging

#128 / Poster

by Geoffrey Masamba

Enhancing Accessibility to Parliamentary Hansards Using AI-Driven Summarisation and Topic Tagging
Case Study: Parliament of Malawi
Student: Geoffrey Masamba Supervisor: Richie Lyng

Abstract
Parliamentary Hansard records are essential for transparency and legislative accountability, yet their length, limited navigability, and unstructured format hinder effective access, especially in resource-constrained contexts. This study evaluates whether AI-assisted summarisation and topic tagging improve accessibility to Hansard records in the Parliament of Malawi. A mixed-methods quasi-experimental design is used, combining baseline analysis with task-based evaluation of an AI-assisted tool incorporating summarisation, topic grouping, and semantic retrieval. Accessibility is assessed through task success, completion time, and accuracy, while user perceptions support interpretation of results. The study provides empirical evidence on AI-assisted access to parliamentary records in a Sub-Saharan African context.

Introduction
Hansard records are official transcripts of parliamentary proceedings and support transparency and policy analysis. However, their length, multi-topic structure, and PDF-based format make it difficult to locate relevant information efficiently. In contexts such as Malawi, these challenges are intensified by time pressure, limited search tools, and reliance on intermediaries. This study examines whether AI-assisted summarisation and topic tagging can reduce these barriers and improve access to parliamentary information.

Research Objectives and Questions
Objectives:

- Identify current Hansard usage patterns and barriers
- Configure an AI-assisted tool with summarisation, topic grouping, and semantic retrieval
- Evaluate impact on accessibility through task performance
- Examine user perceptions as supporting factors
- Identify implementation considerations

Research Questions:
RQ1: What are the current patterns and barriers in Hansard use?
RQ2: To what extent does AI-assisted access improve users' ability to locate relevant information?

Literature Review
Studies show that digital availability of Hansards does not guarantee accessibility. Common challenges in African contexts include unstructured documents, weak metadata, and reliance on intermediaries. AI techniques such as summarisation, topic modelling, and retrieval-augmented generation offer potential for improving access, but empirical evidence in Sub-Saharan parliamentary settings remains limited.

Theoretical Foundation

- **Information Search Process (ISP):** explains how users recognise needs, search, and refine information.
- **Cognitive Load Theory (CLT):** explains how complex structures increase cognitive effort.

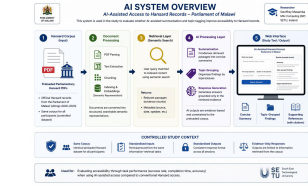
AI-assisted summarisation, topic grouping, and semantic retrieval are examined as mechanisms for reducing search effort and cognitive burden, thereby improving accessibility.

Methodology
A mixed-methods quasi-experimental design is used. Baseline data establish current Hansard usage and barriers. An AI-assisted tool is configured using a preloaded Malawi Hansard corpus. Participants complete controlled retrieval tasks using both conventional and AI-assisted methods. Quantitative analysis focuses on task success, completion time, and accuracy, while qualitative data explain observed accessibility outcomes.

Data and Findings
Data collection is ongoing. The study compares performance between conventional and AI-assisted access during controlled tasks. Primary measures include:

- task success rate
- completion time
- Accuracy

Qualitative feedback and perception data are used to support interpretation of results.



Significance of the Study
This study contributes in three ways. Practically, it examines whether AI-assisted tools improve access to legislative information. Empirically, it provides evidence from a Sub-Saharan parliamentary context. More broadly, it supports efforts to enhance parliamentary transparency and information access in resource-constrained environments.

Conclusion
This study evaluates whether AI-driven summarisation and topic tagging improve accessibility to Hansard records in the Parliament of Malawi. By focusing on task-based performance, it assesses whether AI-assisted tools reduce search effort and improve information access. The findings aim to inform future development of parliamentary information systems in Malawi and similar contexts.

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This project explores how AI can improve access to parliamentary Hansards in the Parliament of Malawi. Long, unstructured transcripts are difficult for MPs and staff to quickly find relevant debates and statements. The study uses an existing AI agent with Retrieval Augmented Generation (RAG) to compare traditional document search with AI-assisted summarisation and topic-based retrieval. Using task-based evaluation, surveys and interviews, the project measures efficiency, usability and user acceptance, showing how AI can support evidence-based decision-making in low-resourced parliaments.



Technologies: Python, NLP, Transformers, RAG, FastAPI, PostgreSQL, React, SPSS, NVivo

<https://github.com/20115492/hansard-ai-access>





Academic Title

AI Analytics for Hospital Length of Stay Prediction

Project Areas

- Animation
- Cloud Computing
- Database and Analytics
- Information Systems and Modelling
- Personal Independent Project

Project Supervisor

Liam Doyle

This project explores how AI-powered data analytics can be used to predict how long patients are likely to stay in hospital. The focus is not only on building accurate prediction models but also on showing how these predictions can help hospitals make better decisions about bed capacity, patient flow, and staffing levels. It also examines the technical, organizational, and ethical challenges of using AI in real hospital settings and suggests practical governance measures for safe and responsible implementation.

LOS-AI-Project

#129 / Poster

by Vijaya Rama Seshu Meruva



Abstract

The study explores the use of data analytics using artificial intelligence (AI) to forecast hospital length of stay (LOS) and inform decision-making. Various machine learning and deep learning models such as linear regression, Random Forest, Gradient Boosting, and Artificial Neural Networks (ANN) were built and evaluated using a big data set of 100,000 patient records. Results reveal that better models particularly ANN have high accuracy. The findings suggest LOS prediction can play an important role in capacity planning and staffing. But challenges in data, model interpretability and implementation highlight the importance of robust governance and practical strategies for integrating AI into healthcare.

Introduction

The Length of Stay (LOS) in hospitals is a crucial measure of health care efficiency, resource management and patient flow management. Overcrowding, delayed admission and poor distribution of staff are some of the operational problems that arise due to the increase in demand among patients and the limited number of hospital beds (NHI, 2024). Conventional approaches to estimating LOS use the historical average and they do not tend to reflect the intricate interactions among clinical, demographic and organisational factors. This paper uses AI-enabled data analytics to create predictive models to estimate the LOS upon admission. Through the application of machine learning and deep learning algorithms the study will help convert raw healthcare data into useful insights. These forecasts can assist hospital administrators in better planning bed capacity, decreasing operation bottlenecks, and scheduling workforce optimally which will help to ensure the efficiency of the entire healthcare system.

Research Aim and Objectives

Aim: To produce predictive models of hospital LOS using AI and test their usefulness in the bed capacity and staffing decisions.

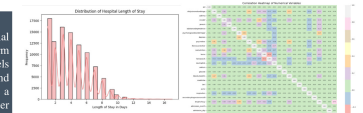
- Objectives:**
- To examine the correlation between patient, clinical and organisational factors that affect LOS.
 - To create machine learning and deep learning methodologies to predict.
 - To measure the model performance with statistical measures.
 - To extract predictions to make decisions on hospital operations.
 - To determine implementation issues and governance issues.

Methodology

The study has a quantitative and explanatory research design that allows numerical prediction and associations of relationships between variables that influence LOS. **Dataset Description:** Kaggle Microsoft Hospital LOS Dataset and Size: 100,000 patient records. **Variables:** Clinical outcomes, demographics, and hospital variables. **Data Preprocessing:** Date conversion (extracted features of admissions). There are data leakage variables (e.g., discharge date) that are removed, Encoding categorical variables and Scaling of features and missing values. **Models Used:** Linear Regression (baseline), Decision Tree, Random Forest, Gradient Boosting and Artificial Neural Network (ANN). **Evaluation Metrics:** Mean Squared Error (MSE), Root Mean Squared Error (RMSE) and R² Score.

Data Analysis & Visualisation

An exploratory data analysis was conducted to identify LOS patterns and the factors that impact them. The key observations are Average LOS = 4 days LOS differs by facilities and conditions of patients, there is a strong influence on clinical indicators (e.g., glucose, creatinine, BMI) and Distribution shows variation in the length of stay.



The results indicate that LOS is a variable that depends on various interacting variables hence the application of the advanced predictive models.

Model Performance Results

The real test data were used to evaluate the models. The developed models are better than the classical regression. Complex patterns are captured using ensemble and deep learning models. The more complex the model, the better the predictive performance.

	Model	MSE	RMSE	R ² Score
0	Linear Regression	4.207	2.051	0.703
1	Decision Tree	0.400	0.632	0.841
2	Random Forest	0.402	0.633	0.840
3	Gradient Boosting	0.348	0.590	0.847
4	ANN	0.245	0.495	0.907

Operational Application

The predictive insights of the predictive models can be applied in hospital management to improve the efficiency of the hospital. In terms of bed-planning, the longer the predicted length of stay (LOS), the more the bed occupancy and can make early predictions and allocate beds to patients more effectively to avoid delays and bottlenecks (Almeida, et al., 2024). For workforce planning, the hospitals can use the predicted LOS of patients with longer LOS to provide more care to these patients, allowing them to plan the workforce more efficiently and have an equal workload. Further, predictive analytics helps in patient flow by identifying long-stay patients early, allowing them to plan for discharge early and improve hospital efficiency (Hirani, et al., 2025). This demonstrates that predictive analytics are useful in ensuring that the technical modelling process is an effective gap filler between the technical modelled world and decision-making.

Challenges & Limitations

Although it has good predictive accuracy, several limitations are presents technical that is risk of overfitting, the complexity of the model vs interpretability, and data bias may be found in the secondary dataset. A small sample of all possible settings of hospitals and operations is that it is complicated to become a part of hospital systems, needs to be organisationally ready and trained and raises ethical issues such as data privacy concerns, bias in the algorithms and fairness (Okwor, et al., 2024). These obstacles emphasise the need to implement and govern them carefully.

Conclusion

This study has demonstrated that predictive analytics based on AI are able to accurately predict hospital length of stay. More sophisticated methods, such as deep learning, perform better than more traditional methods since they can identify complex relationships within health care data. This research has shown that the prediction of the LOS is not purely a technical exercise but a helpful aid to decision-making. Linked to predictive insights, bed and staffing allocation can help hospitals become efficient, resilient, and effective in caring for patients.

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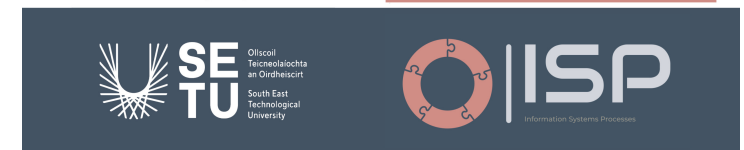
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Technologies: Python, AI, Machine Learning, Data Analytics, VS Code, Jupyter Notebook, Scikit-learn, Pandas

<https://github.com/ramaseshu-Data/LOS-AI-Project>





PathFinder AI: Smart Career Guide

#130 / Poster

Academic Title

AI-Human Career Guidance for Gaza-Evacuated Students in Ireland

Project Areas

- CI/CD & Testing
- Database and Analytics
- Information Systems and Modelling
- Personal Independent Project

Project Supervisor

Komal Komal

by Hanan N I Alhajahmed

This project explores the career guidance challenges faced by Gaza-evacuated students in Ireland, including uncertainty, lack of direction, and limited access to personalized support. Using a human-centered design approach, it combines surveys and interviews to identify key user needs and gaps in existing systems. The project proposes PathFinder AI, a hybrid AI-human platform that provides personalized guidance, clear career pathways, and accessible support to help students make informed decisions.

Designing a Human-Centered Career Guidance Platform

Case Study of Evacuated Gaza Students in Ireland
South East Technological University, Cork Road, Waterford
Student: Hanan Alhajahmed **Supervisor:** Komal Komal

Abstract

- Explores career guidance challenges among evacuated Gaza students in Ireland.
- Uses surveys and interviews within a human-centered design framework.
- Proposes a hybrid AI-human career guidance platform.

Introduction and Objectives

Evacuated Gaza students in Ireland face career planning and mentorship challenges in a new educational environment.

Figure 1. Career Challenges Faced by Participants

Figure 2. Research Objectives

Methodology

A mixed-method approach was applied using surveys (18 participants), semi-structured interviews, and descriptive and thematic analysis within a human-centered design framework.

Figure 3. Human-Centered Design Research Process

Findings

- Most participants reported moderate career confidence.
- Existing career guidance services did not fully meet participants' needs.
- Participants showed positive attitudes toward hybrid AI-human career guidance systems.

Figure 4. Career Confidence Levels

Figure 5. Attitudes Toward AI-Supported Career Guidance

Conclusion

- Existing career guidance services lack personalization.
- Participants showed positive attitudes toward hybrid AI-human support.
- Human-centered AI platforms may improve mentorship accessibility and career decision-making.

Future Work

- Prototype development and usability testing.
- Improving mentorship and AI recommendation features.
- Extending the platform to wider student audiences.

Technologies: Figma, OpenAI API, UX Design, Human-Centered Design

<https://www.figma.com/design/BBjT04nhPtPnzxkix13tN5r/PathAI-Finder?node-id=0-1&t=kFEhKWZajXLTv>

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hananiSahmed@gmail.com

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Academic Title

Project Governance and Digital Transformation Success in Irish it Org

Project Areas

Project Supervisor
Liam Doyle

Influence of PROJ. GOV. & DX PROJ

#131 / Poster

by Rodney Kotey Nikoi

This Dissertation examines the influence of Project governance mechanisms on Digital transformation projects Success in the context of Irish IT service Organizations. Governance mechanisms assessed include Business Case Quality, Roles and Accountability, Executive Sponsorship, Stakeholder Engagement, Monitoring and Reporting, Risk and Issue Management adopted from literature review. Success factors measured include Delivery Success, Adoption Success, Benefits Realisation adopted from literature review.



Technologies: GitHub repository

<https://github.com/Nii-Rodney/MSc-Dissertation.git>



Evaluating Development Time in Low-Code

#132 / Poster

Academic Title

A SAFe-Based Comparative Analysis of Mendix and OutSystems

Project Areas

- Information Systems and Modelling
- Software Development: (Back End / Core / Front End)

Project Supervisor

Fiona Lynch

by Wickramage Ravan Sanjaka Perera

Evaluating Enterprise Agility Capabilities in Low-Code Platforms through SAFe Principles: A Comparative Study of Mendix and OutSystems

Student: Ravan Perera Supervisor: Fiona Lynch

Abstract

This study evaluates enterprise agility capabilities in low-code platforms through the lens of SAFe principles. A comparative analysis of Mendix and OutSystems is conducted using three SAFe-aligned criteria: Adaptability to Business Change, Enterprise Integration & Scalability, and Continuous Delivery & Operational Responsiveness.

A systematic review of academic articles, industry reports, and vendor documentation provides the basis for the evaluation. Findings indicate that both platforms enable enterprise agility, yet differ in how they support flexibility, scalability, and continuous delivery. Implications for organizations selecting a low-code platform are discussed.

Introduction

Enterprises increasingly require agile capabilities to respond to dynamic markets and customer needs. Low-code platforms promise faster delivery and flexibility, but their ability to deliver enterprise agility varies. SAFe provides a principled framework for scaling agility across the organization. This study applies SAFe principles to evaluate and compare the enterprise agility capabilities of Mendix and OutSystems.

Research Objectives and Questions

Objectives:

- To evaluate the agility capabilities of Mendix and OutSystems using SAFe principles.
- To compare the platforms across three SAFe-aligned agility criteria.
- To identify strengths, limitations, and implications for organizations.

Research Questions:

1. How does Mendix support enterprise agility compared to OutSystems based on SAFe principles?
2. How do the platforms differ in terms of adaptability to change, integration & scalability, and continuous delivery capability?
3. What are the implications for organizations selecting a low-code platform for enterprise agility?

Literature Review / State of the Art

- Low-code platforms enhance agility by abstracting complexity and enabling faster development (Fitzgerald et al., 2020).
- SAFe principles emphasize flow, adaptability, alignment, and continuous value delivery (Scaled Agile, 2023).
- Studies highlight differences in governance, extensibility, and DevOps maturity between Mendix and OutSystems (Gartner, Forrester, 2022-2024).

Propositions / Hypotheses / Theory

Proposition: Low-code platforms that better enable adaptability, scalability, and continuous delivery in alignment with SAFe principles will demonstrate stronger enterprise agility capabilities.

Theory: SAFe principles (Adaptability, Systems Thinking, Flow, Continuous Delivery, and Value Alignment) underpin the evaluation framework used in this study.

Methodology

- **Research Design:** Qualitative, comparative desktop study.
- **Data Sources:** Academic journals, industry reports (Gartner, Forrester, IDC), vendor documentation, and white papers.
- **Data Analysis:** Thematic analysis using SAFe-aligned criteria to compare Mendix and OutSystems.

Data and Findings

Findings are based on a systematic review of academic literature, industry reports, and vendor publications.

Agility Criteria (SAFe Alignment)	mxdx mendix	o outsystems
 1. Adaptability to Business Change SAFe Principles 3 & 9	<ul style="list-style-type: none"> • Strong visual modeling and model-driven approach enable rapid changes. • High flexibility for iterative development and evolving business needs. • Empowers business users with citizen development capabilities. 	<ul style="list-style-type: none"> • Robust change management with structured governance. • Reusable components and modular architecture support maintainability. • Enterprise-grade security and version control aid controlled change.
 2. Enterprise Integration & Scalability SAFe Principles 2 & 10	<ul style="list-style-type: none"> • Open architecture with strong API and integration connectors. • Scales across teams with modular applications. • Supports value-stream alignment through collaboration features. 	<ul style="list-style-type: none"> • Extensive pre-built connectors and integration patterns. • Designed for large-scale enterprise environments. • Strong governance, roles and lifecycle management for scaling.
 3. Continuous Delivery & Operational Responsiveness SAFe Principles 5 & 7	<ul style="list-style-type: none"> • Built-in DevOps integration and automated deployment pipelines. • Supports continuous testing and environment management. • Enables incremental delivery and fast feedback loops. 	<ul style="list-style-type: none"> • Mature DevOps ecosystem and CI/CD tooling. • Automated builds, testing and deployment capabilities. • Strong support for frequent releases and operational monitoring.

Conclusions

- Both Mendix and OutSystems enable enterprise agility aligned with SAFe principles, but differ in their strengths.
- Mendix excels in flexibility and rapid adaptability, supporting business user empowerment and iterative change.
- OutSystems demonstrates strength in enterprise integration, scalability, and mature DevOps capabilities.
- Organizations should align platform choice with strategic priorities: flexibility and empowerment (Mendix) versus governance and scale (OutSystems).

References

Key sources include:

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- Vendor white papers and official documentation from Mendix and OutSystems.

This dissertation explores how low-code development platforms influence software development time as an indicator of agile delivery. Focusing on Mendix and OutSystems, the study evaluates how each platform supports faster application development through principles derived from the Scaled Agile Framework (SAFe). By comparing their capabilities, this research aims to understand how low-code technologies can help organisations respond more quickly to changing business needs while improving efficiency in modern software development practices.



Technologies: Low Code Development Platforms

<https://notfinalisedyet.com>





Academic Title

Designing Intelligent Business Processes

Designing Intelligent Business Processes Using Robotic Process Automation (rpa)

Project Areas

- AI/ML Development
- Software Development: (Core / Web)

Project Supervisor
Liam Doyle

#133 / Poster

by Sathya Prakash Vallepalli



Abstract

This study focuses on improving business process automation by integrating Robotic Process Automation (RPA), Business Process Management (BPM), and intelligent technologies. While RPA enhances efficiency by automating repetitive tasks, it often fails to optimize underlying processes. This research addresses this limitation by proposing a unified framework that combines process optimization, task automation, and data-driven decision-making. The study adopts a qualitative and conceptual approach, using literature analysis and framework design. The proposed model enables organizations to achieve improved efficiency, scalability, and adaptability, supporting long-term digital transformation.

Introduction

The rapid advancement of digital technologies has significantly transformed organizational operations, driving the adoption of automation to improve efficiency and reduce costs. Robotic Process Automation (RPA) has emerged as a key solution for automating repetitive and rule-based tasks across various business functions. However, many organizations implement RPA without optimizing their underlying processes, resulting in inefficient workflows being automated rather than improved. Business Process Management (BPM) provides a structured approach to analyzing and redesigning processes, while intelligent technologies such as artificial intelligence enable adaptive and data-driven decision-making. This study focuses on integrating RPA, BPM, and intelligent technologies to develop a more efficient, scalable, and intelligent approach to business process automation.

Research Objectives and Questions

- Analyse RPA, BPM, and intelligent automation
 - Identify limitations of traditional RPA systems
 - Explore BPM for process modelling and optimisation
 - Integrate machine learning and process mining
 - Develop an intelligent automation framework
 - Evaluate efficiency, scalability, and adaptability
- QUESTIONS**
- What are the limitations of existing RPA systems?
 - How can BPM improve automation efficiency?
 - How can intelligent technologies enhance RPA?
 - How can integration improve scalability and flexibility?

Literature Review / State of the Art

Robotic Process Automation (RPA) has gained significant attention for its ability to automate repetitive and rule-based tasks, leading to improved operational efficiency and cost reduction (Drolo and Palma dos Reis, 2024). However, research indicates that RPA is primarily limited to task-level automation and does not inherently optimize broader business processes. Business Process Management (BPM) provides a structured approach to analyzing, modelling, and improving workflows, ensuring that processes are efficient and aligned with organizational objectives before automation is implemented (Dumas et al., 2024). Recent studies emphasize the growing role of intelligent automation, where the integration of RPA and BPM with advanced technologies such as machine learning and data analytics enhances decision-making and process adaptability (Santos, Santos and Manoh, 2023). Furthermore, intelligent automation frameworks enable organizations to achieve higher levels of flexibility, scalability, and performance (Santos and Santos, 2023). Process mining and data-driven insights also play a crucial role in identifying inefficiencies and supporting continuous process improvement (van der Aalst, 2023). Despite these advancements, there remains a lack of a unified framework that effectively integrates RPA, BPM, and intelligent technologies into a cohesive system for intelligent business process automation.

Methodology

This study adopts a qualitative and conceptual research approach based on an extensive review of existing literature on RPA, BPM, and intelligent automation. A design-oriented methodology is used to identify limitations in traditional automation systems and develop an integrated framework. The research process involves literature analysis, gap identification, framework design, and conceptual evaluation. Secondary data from academic sources such as IEEE, Springer, and ScienceDirect is analyzed to ensure theoretical grounding. The proposed framework is evaluated conceptually based on its ability to improve efficiency, scalability, and adaptability in business processes.

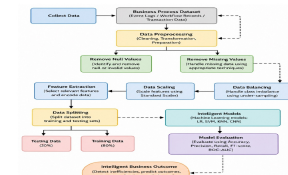


Fig 1: System Architecture diagram

Data and Findings

The analysis of secondary data indicates that Robotic Process Automation (RPA) significantly improves efficiency by automating repetitive and rule-based tasks, while Business Process Management (BPM) enhances process optimization through structured workflow design. Intelligent technologies such as machine learning and process mining further contribute by enabling data-driven and adaptive decision-making. However, the findings also reveal that standalone RPA lacks flexibility and fails to optimize entire business processes when applied without prior analysis. The integration of BPM, RPA, and intelligent technologies demonstrates improved performance, scalability, and adaptability, highlighting the importance of a unified framework for effective business process automation.

Conclusions

This study highlights that traditional Robotic Process Automation (RPA) is limited to task-level automation and does not ensure overall process efficiency. Business Process Management (BPM) plays a critical role in optimizing workflows before automation, while intelligent technologies such as artificial intelligence enable adaptive and data-driven decision-making. The integration of BPM, RPA, and intelligent technologies provides a more effective approach to business process automation by improving efficiency, scalability, and flexibility, thereby supporting sustainable digital transformation.

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This project proposes a framework merging BPM, RPA, and AI to create intelligent operations. It addresses the “automation of inefficiency,” where firms automate poor workflows without prior optimization. □ The model uses a four-layer architecture: □

- Process (BPM): Redesigns workflows first. □
- Automation (RPA): Executes rule-based tasks. □
- Intelligence (AI): Adds adaptive decision-making via machine learning. □
- Data: Ensures secure governance. □ This integrated approach helps organizations move from simple task-bots to scalable, data-driven systems.



Technologies: Python, Automation, Data analytics, pipeline optimisation

<https://github.com>





Academic Title

AI-Driven Network Fault Prediction and Self-Healing Mechanisms for Proactive Network Management

Project Areas

- Computer Networks

Project Supervisor

Dr Mujahid Tabassum

This project develops an AI-driven system for predicting network faults and enabling proactive maintenance. Traditional approaches are reactive and lead to downtime. The proposed system uses machine learning to analyse network parameters such as latency, traffic, and packet loss to predict failures in advance. A simulation-first approach using GNS3 is adopted for safe testing. The project also explores self-healing mechanisms to automate fault resolution, improving network reliability, reducing downtime, and enhancing overall operational efficiency.



Technologies: Python, Machine Learning, GNS3, Scikit-learn, Pandas, NumPy, Network Simulation, Data Analysis

<https://github.com/JhansiVeeravalli/AI-Driven-Network-fault-prediction.git>

AI-Based Network Fault Prediction

#134 / Poster

by Jhansi Veeravalli

AI-Driven Network Fault Prediction and Self-Healing Mechanisms

Student: Jhansi Veeravalli

Supervisor: Dr. Mujahid Tabassum

Abstract

This study focuses on developing an intelligent network fault prediction system using machine learning and self-healing techniques. The research uses simulated network environments to analyse faults such as latency packet loss and congestion. The proposed system improves network reliability reduces downtime and supports proactive network management through automated fault prediction and recovery processes.

Introduction

Computer networks play a vital role in delivering essential services in telecommunication, cloud computing and medical services. rapid evolution of the Internet of Things (IoT), 5G and distributed computing has led to very complex networks. This makes faults such as latency, packet loss and congestion more likely (Pammi and Zadeh, 2023). Current reactive network management approaches are not enough, so there's a need for smarter, proactive approaches to ensure system reliability and availability.

Research Objectives and Questions

The goal of this study is to create an intelligent system for Fault Prediction and Automated Recovery of Network faults. The goals are to build a simulated network with GNS3, create a machine learning algorithm to forecast faults, pinpoint the essential network performance parameters and develop an automated self-healing system. These goals all contribute to better network performance, decreased downtime and increased reliability through the use of automation.

Literature Review / State of the Art

Current research demonstrates that traditional systems can only take a reactive approach, while machine learning techniques like Random Forest and Neural Networks can enhance fault prediction performance (Pammi and Zadeh, 2023). Basic network performance measures such as packet loss and latency must be studied. Self-healing networks enable automatic recovery. But most research concentrates on either prediction or recovery, revealing a need for comprehensive solutions with both features.

Propositions / Hypotheses / Theory

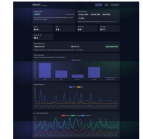
An experiment design based on simulation is implemented using GNS3 to model networks. Variations such as network failures, loss and spikes in latency are systematically introduced. This design permits controlled testing and experimentation without impacting the actual networks. This approach enables the accurate assessment of the model performance under different scenarios and facilitates proper experimentation (Mata et al., 2024).

Methodology

The research employs a quantitative and experimental approach with a foundation in the positivist philosophy, using objective and empirical data. We adopt an inductive approach in that we analyse data acquired from computer networks and draw inferences to develop models. This approach facilitates structured decision-making processes and forms the basis for developing accurate models, which is ideal for predicting complex network traffic patterns using machine learning technologies (Oshupfitt et al., 2023).

Data and Findings

Data collection is a vital part of this research and is performed in the simulated environment. Data capturing tools such as GNS3, Wireshark and network monitoring are used to collect network performance data. This data encompasses important metrics like latency, jitter, packet loss, CPU consumption and network throughput (Mata et al., 2024). Data analysis involves preprocessing, feature extraction, model training and evaluation. Random Forest algorithms are employed as they are precise and robust. The model's performance is assessed through accuracy, precision, recall and F1-score. This evaluation guarantees the model's ability to predict network faults and to rank significant parameters that affect network performance (Zhang, Zhu and Hossain, 2022).



Expected Outcomes and Significance

The research aims to increase the accuracy in predicting potential faults, thereby minimizing network outages and boosting system dependability. The study enhances smart network management through the integration of machine learning and self-healing. It lowers costs and human intervention, improving quality (Zhang, Zhu and Hossain, 2022). The results are useful for various sectors that depend on robust network operations, aiding the creation of self-operating systems.

Conclusions

Our study presents a comprehensive approach that integrates fault prediction using machine learning and automated self-healing. The simulation-based approach allows for safe experimentation and validation. It improves network reliability through predictions and self-healing. Based on this, the research facilitates the transition to smart, proactive and self-adaptive networks to manage contemporary technological challenges.

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Academic Title

Enhancing Security in Data Exchange Between IoT Devices

Project Areas

- Internet of Things

Project Supervisor

John Ronan

Secure Data Transmission in IoT Devices

#135 / Poster

by Barath Raj Kumar Vijayakumar

Enhancing Security in Data Exchange Between IoT Devices

Ascon-128, X25519+Kyber-512, and Ed25519+Dilithium2

Barath Raj Kumar Vijayakumar | MSc Computing (Information Systems & Processes) | Supervisor: John Ronan (Walton Institute, SETU)

Abstract

The rapid proliferation of IoT devices across critical sectors demands cryptographic solutions that satisfy both limited hardware resources and long-term security against quantum threats. Traditional schemes (AES-GCM, RSA) impose prohibitive overhead on ultra-constrained microcontrollers, while remaining vulnerable to Shor's algorithm.

This dissertation proposes and locally evaluates a hybrid cryptographic architecture integrating three components: Ascon-128 (NIST-selected lightweight AEAD) for efficient symmetric-key data protection; hybrid key exchange combining X25519 with CRISTALS-Kyber-512 (ML-KEM, FIPS 203) ensuring session keys resist both classical and quantum adversaries; and hybrid digital signatures combining Ed25519 with CRISTALS-Dilithium2 (ML-DSA, FIPS 204) for defense-in-depth authentication.

Implemented and benchmarked across Arduino Uno (2 KB SRAM), ESP8266 (80 KB), ESP32 (520 KB), and Raspberry Pi (4 GB), Ascon-128 outperformed AES-128-GCM by 2.7x on Arduino, 2.8x on ESP8266 at 64-byte payload; hybrid KEX completed in 1,066 ms (ESP8266) and 1.54 ms (RPi); hybrid signing in 3,360 ms (ESP8266) and 3.25 ms (RPi). Ascon-128 consumed only 176 bytes SRAM (the lowest footprint of all evaluated AEAD schemes).

Introduction

IoT devices permeate critical infrastructure healthcare, industrial automation, smart cities, environmental monitoring yet most operate with severely constrained resources as little as 2 KB RAM and 32 KB Flash. Standard TLS stacks, AES-GCM, and RSA-based key exchange are computationally prohibitive on such hardware. Simultaneously, the anticipated arrival of fault-tolerant quantum computers threatens the mathematical foundations of all currently deployed asymmetric cryptography (Shor, 1994), IoT devices with 10–20 year operational lifetimes.

Research Questions

- Can Ascon-128 provide efficient AEAD on ESP8266, Arduino Uno, and Raspberry Pi?
- Hybrid KEX (X25519 + Kyber-512) feasible on constrained MCUs in terms of latency?
- How can hybrid signatures (Ed25519 + Dilithium2) be integrated without overwhelming MCU resources?

Literature Review / State of the Art

Ascon-128 (NIST LWC 2023): Sponge-based AEAD cipher no lookup tables, 320-bit state, designed for 8/12/16-bit MCUs, RFC 9377 standardization in progress.

CRISTALS-Kyber (ML-KEM, FIPS 203): Lattice-based KEM hardness on Module-LWE. Kyber-512 offers 128-bit post-quantum security with 800-byte public keys.

CRISTALS-Dilithium (ML-DSA, FIPS 204): Lattice-based signatures. Dilithium2 provides 128-bit PQ security with 1,312-byte public keys and 2,420-byte signatures.

X25519 (RFC 7748): Constant-time Curve25519 DH 32-byte keys, high performance.

Ed25519 (RFC 8032): Schnorr signatures on Twisted Edwards curve 64-byte signatures.

Hybrid rationale: NIST, ENISA, BSI all recommend hybrid classical+PQC during transition to maintain security if either primitive is broken.

Methodology

- Hardware:**
- Arduino Uno (Atmega328P; 16 MHz, 2 KB SRAM, 32 KB Flash)
 - ESP8266 NodeMCU (Xtensa LX106, 80 MHz, 80 KB DRAM, 4 MB Flash)
 - ESP32 DevKit (Xtensa L306 dual, 240 MHz, 320 KB DRAM, 4 MB Flash)
 - Raspberry Pi 4 (ARM Cortex-A53, 1.2 GHz, 1 GB RAM, Linux)

Tools: 100 iterations per operation, averaged; 5-run avg for heavy ops

Payload: 64-byte fixed message for Ascon-128 benchmarks

Libraries: Ascon reference C v1.2.2, TweetNaCl (Ed25519, X25519), liboqs 0.10.1 (Kyber/Dilithium)

Codebase: Single shared C codebase with #ifdef platform guards, zero-duplication

Tools: Arduino IDE 2.x, PlatformIO, GCC 12 (RPi), custom Python timing harness

Data & Findings

Benchmark across 100 trials per operation on four hardware platforms. Tables below present full results; key highlights:

- Ascon-128 is 2.7–2.8x faster than AES-128-GCM on constrained MCUs
- Hybrid KEX adds ~60% overhead vs X25519 alone — acceptable at gateway tier
- Ultra-constrained MCUs (Arduino Uno) require gateway offloading for PQC
- Ascon-128 SRAM: only 176 bytes — lowest footprint of all tested AEAD schemes

Conclusions

1. Ascon-128 is the clear winner for constrained AEAD — 2.7x faster than AES-128-GCM on Arduino Uno, 2.8x on ESP8266, with only 176 B SRAM. Feasible on all four boards.
2. Hybrid KEX (X25519+Kyber-512) is feasible on ESP32 and RPi. ESP8266 requires ~1 s acceptable for session establishment in low-frequency IoT protocols.
3. Hybrid signing (Ed25519+Dilithium2) at 3,360 ms on ESP8266 is dominated by Dilithium2 matrix operations. Feasible for infrequent authentication; a gateway-offload model is recommended for signing-heavy workloads on Class 1 hardware.
4. Arduino Uno cannot fit Kyber-512 or Dilithium2 (32 KB Flash budget insufficient). A tiered architecture offloading PQC to a gateway is the practical solution.
5. The hybrid approach remains secure as long as either classical or PQC primitive withstands attack a robust transitional strategy endorsed by NIST, ENISA, and BSI.

Future work: energy benchmarking (µJ/ops), Ascon-DTLS protocol stack, Kyber-768 evaluation on ARM Cortex-M, RISC-V extension optimizations.

Board	MCU / OS	Opnd	SRAM / RAM	Flash	IoT Class
Arduino Uno	Atmega328P	16MHz	2 KB	32 KB	Class 1
ESP8266	Xtensa LX106	80MHz	80 KB	4 MB	Class 1.2
ESP32	Xtensa LX306 dual	240MHz	320 KB	4 MB	Class 2
Raspberry Pi	ARM Cortex-A53	1.2 GHz	1 GB	32 GB	Gateway

Board	Ascon-128 (AEAD)	AES-128-GCM (AEAD)	Speedup	Ascon SRAM
Arduino Uno	~176 µs	~470 µs	2.7x	176 B
ESP8266	~176 µs	~470 µs	2.8x	176 B
ESP32	~176 µs	~470 µs	2.7x	176 B
Raspberry Pi	~176 µs	~470 µs	2.7x	176 B

Operation	Arduino Uno	ESP8266	ESP32	Raspberry Pi
X25519 DH	~100 µs	~100 µs	~100 µs	~100 µs
Kyber-512 Encap	~100 µs	~100 µs	~100 µs	~100 µs
Kyber-512 Decap	~100 µs	~100 µs	~100 µs	~100 µs
Ed25519 Sign	~100 µs	~100 µs	~100 µs	~100 µs
Ed25519 Verif	~100 µs	~100 µs	~100 µs	~100 µs
Hybrid Sign Total	~100 µs	~100 µs	~100 µs	~100 µs
Ed25519+Dilithium2 Sign	~100 µs	~100 µs	~100 µs	~100 µs

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- Seneviratne, I. et al. (2020). PQC in Smart City IoT with Raspberry Pi.
- BSI (2021). Migration to Post-Quantum Cryptography. Federal Office for Information Security.
- ENISA (2021). Post-Quantum Cryptography: Current state and quantum migration. ENISA.

This project benchmarks a hybrid cryptographic architecture for constrained IoT devices, combining **Ascon-128** (NIST lightweight AEAD) with hybrid key exchange (X25519+Kyber-512) and hybrid signatures (Ed25519+Dilithium2) to address resource limits and quantum threats. Tested across Arduino Uno, ESP8266, ESP32, and Raspberry Pi, Ascon-128 outperformed AES-128-GCM by 2.7–2.8x using only 176 bytes of SRAM. Hybrid key exchange completed in 3.54 ms on Raspberry Pi and 1 s on ESP8266, confirming feasibility on mid-tier IoT hardware.



Technologies: Ascon-128, X25519, Kyber-512, Ed25519, Dilithium2, Arduino, ESP8266, ESP32, Raspberry Pi, C

https://github.com/20115547-pixel/My_Research



#136 / Poster



AI Customer Service vs Human Support

Academic Title

The Impact of AI Chatbot on Traditional Customer Service

Project Areas

- Information Systems and Modelling
- Personal Independent Project

Project Supervisor

Cian Murphy

by Zhiyuan Xu

A Comparative Study: The Impact of AI Chatbot with Retrieval-Augmented Generation On Traditional Customer Service Information Systems in After-Sales Scenario



Student: Zhiyuan Xu Program: MSc Information System Process
Supervisor: Cian Murphy

Abstract

This study investigates whether AI customer service systems enhanced by Retrieval-Augmented Generation (RAG) and Large Language Models (LLMs) can outperform traditional human service in e-commerce after-sales scenarios. It evaluates response efficiency, problem-solving accuracy, and customer satisfaction using the DeLone and McLean IS Success Model. A quantitative survey is used to compare user experiences and assess AI service effectiveness.

Introduction

Customer service has evolved from human interaction to AI-driven systems. While human agents provide empathy, they are limited in efficiency and scalability. With advances in RAG and LLMs, AI systems can now deliver faster and more accurate support. This study explores whether AI can surpass human service in after-sales contexts.

Research Objectives & Questions

This study aims to compare AI-based and human customer service in e-commerce. It focuses on three aspects:

RQ1: How does AI customer service based on LLM and RAG compare with traditional manual customer service in terms of perceived response efficiency within the after-sales consultation process of e-commerce platforms?

RQ2: How does AI customer service based on LLM and RAG compare with traditional human customer service in terms of perceived accuracy of problem resolution in after-sales service processes?

RQ3: In the after-sales scenario, how do AI chatbots based on LLM and RAG differ from traditional human agent channels in terms of customer satisfaction and perceived service quality?

Hypothesis

H1: AI customer service is perceived as more efficient than human service.
H2: AI customer service is perceived as more accurate in problem resolution.
H3: AI customer service leads to higher customer satisfaction than human service.

Literature Review

Early chatbots improved efficiency but struggled with complex tasks. Recent technologies such as LLMs, RAG, and knowledge integration have enhanced AI capabilities. The DeLone and McLean IS Success Model provides a framework to evaluate system and service performance successfully. However, empirical comparisons between advanced AI and human service remain limited about which Information System are more successful.

Key Terms	Definitions
Customer Service Information System	It is a system to design for interaction between the company and customer
Retrieve Augment Generation	A technology that combines external knowledge retrieval with generative artificial intelligence models, by first retrieving relevant information and then generating answers, to enhance the accuracy and reliability of the content.
Large Language Model	It is an artificial intelligence model trained on a large amount of text data, capable of understanding and generating natural language, and used for tasks such as answering questions, writing, and conversation.
DeLone and McLean's information system success	A model that assesses the success of an information system by factors such as system quality, information quality and service quality, which affect user usage and satisfaction, and ultimately generate personal and organizational
Artificial Intelligence Customer Service	It is a service to serve customers by AI.
Human Customer Service	It is a service to serve customers by human.

Methodology

This study adopts a quantitative approach using a recall-based survey. Participants evaluate a past after-sales experience with either AI or human service. A between-group design is applied, and data is collected using Likert-scale measures of efficiency, accuracy, and satisfaction to test the hypotheses.

This project explores the effectiveness of AI-powered customer service systems based on Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG) in e-commerce after-sales scenarios. It compares AI chatbots with traditional human service using the DeLone and McLean Information System Success Model. A quantitative survey is conducted to evaluate response efficiency, problem-solving accuracy, and customer satisfaction. The study aims to provide empirical evidence on whether AI systems can enhance service performance and compare user experience in complex after-sales interactions.



Technologies: SPSS, python for survey data analysis

<https://github.com/Frankie222222222222/A-Comparative-Study.git>

Projects by Subject Area

AI/ML Development

Leanne Ahern

Evaluating LLM & RAG Based TTRPG Rule Assistants with a Focus on D&D 5e #72 / TL2.38 80

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