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South East
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COMPUTING PROJECTS SHOWCASE 2023

Welcome

I am delighted to present this, the Final Year Project handbook, of our first graduating cohort of South East Technological University.

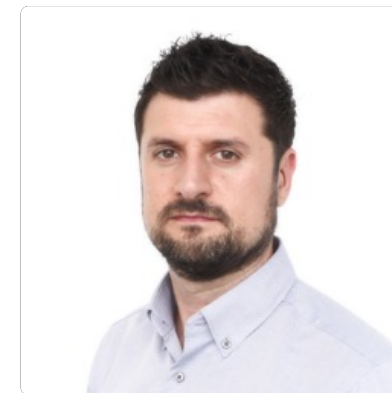
As Waterford Institute of Technology we have developed an international reputation for excellence in computing research and development. This has allowed our students to get first-hand experience of the latest skills and knowledge of emerging computing disciplines. Now as we embark on an exciting future as South East Technological University we will build on efforts to ensure that every student is empowered to achieve their full potential.

Our programmes are highly practical, focusing on enabling the students to develop meaningful and deep learning experiences that are relevant and for today's working environment. Students are offered industrial placements or the opportunity to study abroad as an integral part of each programme.

The Final Year Project represents, for most of our students, the culmination of 4 years of study in their chosen programme. It capstones their learning and in many cases it allows them to showcase skills that they have developed outside of the lecture room and computing lab. The class of 2023 has also faced the challenge of the COVID-19 pandemic during their years of study. This has provided the students with important experiences in adaptability and resourcefulness to ensure they completed their studies to the high standard expected of SETU graduates. Seeing our graduates come through this period and to deliver high quality projects brings immense pride to our staff.

The 2023 Computing Projects Brochure provides the students with an opportunity to showcase their project. We hope that our industry partners use this brochure as an opportunity to discover excellent student projects, possibly with a view to exploring recruitment opportunities.

The showcase is split into three sections: undergraduate BSc programmes, online HDip programme, and MSc programmes.



**Dr Alan Davy,
Head of Department of Computing & Mathematics,
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 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 Project 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 brochure/online showcase will help you to easily navigate the final year projects by course or subject area. You're in for a treat!

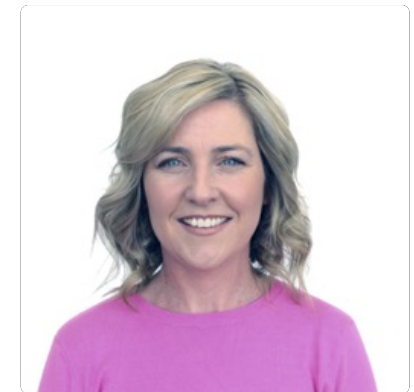
A final word to our students ...

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 Project 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.

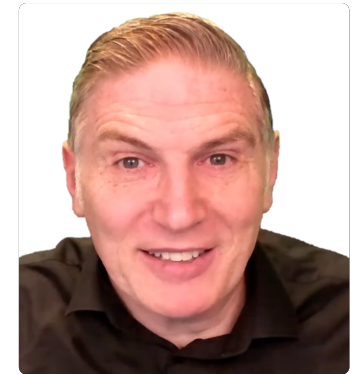
Enjoy and have fun!

Lucy



Welcome from Colm Dunphy, the HDip Project Co-ordinator

The Higher Diploma in Computer Science (online) was the first fully online programme from WIT, now SETU. Students graduate as full-stack oriented developers. The programme was designed to be delivered online, with an emphasis on student experience, engagement, and building a learner community promoting peer learning. The programme has pioneered the innovative Agile Semester approach to delivery. This showcase of projects presented in April 2023 highlights the diverse range of graduate capabilities from this programme. Students on the programme complete their studies while on a six month work placement. During this time they complete a capstone project. Students and graduates continue to be highly sought after. If your company is interested in mentoring a student on work placement please contact joan.mangan@setu.ie



This year projects include native android app development, web apps, and a combination of both, in the one project. We also saw some leverage hybrid and progressive web approaches to building both web and mobile apps. There were projects focusing on DevOps, SysOps, creating cloud CI/CD pipelines, testing gradles, and IOT and physical computing projects involving hardware sensors with web and mobile interfaces. We had workplace projects leveraging the Microsoft Power platform, Amazon's AWS, MS-Azure, and Red Hat OpenShift. A number of workplace projects are private (the details of which are withheld under NDAs). A number of projects contributed to the open source community including tutors.dev, and Strimzi. We also had dashboard and data analytics projects. Student projects use multiple APIs, and are deployed in different environments (AWS, AZURE, OpenShift).

Within the HDip section of this booklet, student thumbnails link to project videos, student names link to the project page. The project pages summarise the project and includes links to github, Youtube and web pages for the project, deployment details, etc. QR codes for each project are also provided.

In summary, we are often asked what our course is about and what can you 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 the students for their work over the last few years, and we wish you every success which you will no doubt have in the future.

Regards,
Colm Dunphy

Industry Engagement

The Department of Computing & Mathematics in the School of Science & Computing is working with our Industry partners to shape our third level curriculum and to ensure that our courses are of the highest standard. Our graduates are high calibre with strong innovative and creative skills that allows them to fill vacancies across a wide variety of interesting sectors, in flexible and well-paid computing roles. This has led to a high percentage of our computing graduates gaining employment within a few months of completing their course and often quickly getting promoted in their new careers.

ICT Industry Board

In December last year, the School of Science and Computing at SETU reactivated its ICT Industry board with members from 15 organisations spread throughout the South East of Ireland. This was in line with the National Strategy for Higher Education 2030. The department of Computing & Mathematics are committed to engagement with Business and Industry in our region and beyond. The ICT Industry Board will address the:

- Creation of a mutually beneficial ICT partnership between SETU and our stakeholders.
- Provide guidance on the creation of new ICT programmes at SETU.
- Knowledge transfer and the creation of joint research projects that support regional needs.
- Development and provision of education and training for employees to address the need for lifelong learning and upskilling.
- Development of new high-quality internships and work placements for students while evaluating current internships and placements.
- Provision of employer feedback on graduate employability and competency skills.
- Provision of employer guidance on current curriculum content and structure and course delivery in relation to theory and practice.
- Development of initiatives which will cater for the increased capacity in higher education going forward and address funding and operational challenges associated with these initiatives.
- Need to support University initiatives for promotion and marketing of ICT in the region.
- Management of the School of Science and Computing relationships and activities with industry in an informative and constructive manner.
- Development of Memorandums of Understanding with suitable Industry Partners.

Work Placement Programme

The **Work Placement Programme** for Computing students at SETU is an integral, accredited set of modules for all of our third year undergraduate students. Work Placement gives students the opportunity to apply the theory they have acquired on their degree programme to real-world problems and tasks, in an industry setting. It also enables the Department of Computing & Mathematics to be informed of the ever-changing needs of our industry partners and to build on our relationships with companies in the region and nationally.

Further information is available at <https://www.wit.ie/schools/science/industry-engagement> or you can contact our Work Placement Manager, Tracy Murphy, at tracy.murphy@setu.ie.

Industry-led Final Year Projects

Do you have an idea for a final year project which is based on your experience in industry? Increasingly, students engage in projects that have a strong industry focus. Please note however that students will not be able to work on projects which have industry deadlines and an expectation of concrete deliverables. You can submit your ideas by contacting Tracy Murphy, at tracy.murphy@setu.ie.

Collaborative Agreements

In an effort to formalise links between the Department of Computing & Mathematics and our industry partners we are seeking to sign **Collaborative Agreements** with these partners. These agreements are not binding in any way but rather document areas where there is ongoing collaboration and identifies areas where there is potential for further activity. The document covers

- Sponsorship
- Placements
- Graduate recruitment
- Research opportunities
- Points of contact

Specifying the points of contact details for the industry partner and for SETU under a range of headings will ensure that there is an appropriate flow of information between the parties.

Second-Level School Visits

The department has modified the way we conduct school visits by integrating employees of Red Hat and Sun Life into our visits to Secondary schools. We have also brought students who are already doing courses in our department to these schools, some of which are often past pupils. This new innovative approach has revolutionised our school visits as it allows those who are already students to give an insight to our courses and outline a typical day, this is complemented by employees

from industry outlining their careers so far and the vast array of opportunities that are available in the world of technology. School feedback has been excellent from this initiative.

It is hoped that more companies will come onboard to support our visits next year to add different perspectives from other ICT sectors. Please contact TJ Mc Donald at tj.mcdonald@setu.ie if your organisation is willing to support this initiative.

Women in Technology 2023

SETU were delighted to host the 3rd 'Women in Technology' event sponsored by Red Hat on our campus at the SETU Arena last March. This event was a huge success and attracted over 1,200 female students from Cork, Tipperary, Kilkenny, Wexford and Waterford. The event had female keynote speakers from companies like Red Hat, Sun Life, Intel, Cartoon Saloon, IDA and the Walton Institute. Over 20 companies from the region took stands on the day and gave insightful information to the visiting TY, 5th & 6th year students and their teachers on ICT careers and opportunities.

The event showcased the very best of Women in Technology, provided inspiration and encouragement to all those who attended, some of whom may have been curious about a job in technology and further inspired those that already saw this as a pathway to a great career. Attendees met with and talked to women who have interesting and varied careers in technology, engineering, ICT, physics and software development. Women who are changing the face of technology and society. We are looking forward to 2024 already, please contact TJ Mc Donald tj.mcdonald@setu.ie if your organisation would like to be a part of it next year.

Computing and Engineering Building

SETU has secured government funding for a new **Engineering, Computing & General Teaching Building** which will open in Q3/Q4 2026. This 12,800 m² building will revolutionise the teaching of computing in the region and will be a catalyst for increased cooperation with industry. We are very grateful to our industry partners for their help in securing the funding and we look forward to working together to ensure that the building realises its full potential.



Computers for Schools

The **Computers for Schools initiative** is an attempt by WIT and the local IT industry to address the hardware needs of schools in the Waterford City region by recycling computers into schools. In 2019, Sun Life Financial recycled 40 of their 3 year-old computers through this scheme into two local schools. The reactivation of this programme seeks to create a sustainable pipeline of computers for schools from industry. Further information is available by contact TJ Mc Donald tj.mcdonald@setu.ie or at <https://www.wit.ie/computers4schools>

Projects by Programme

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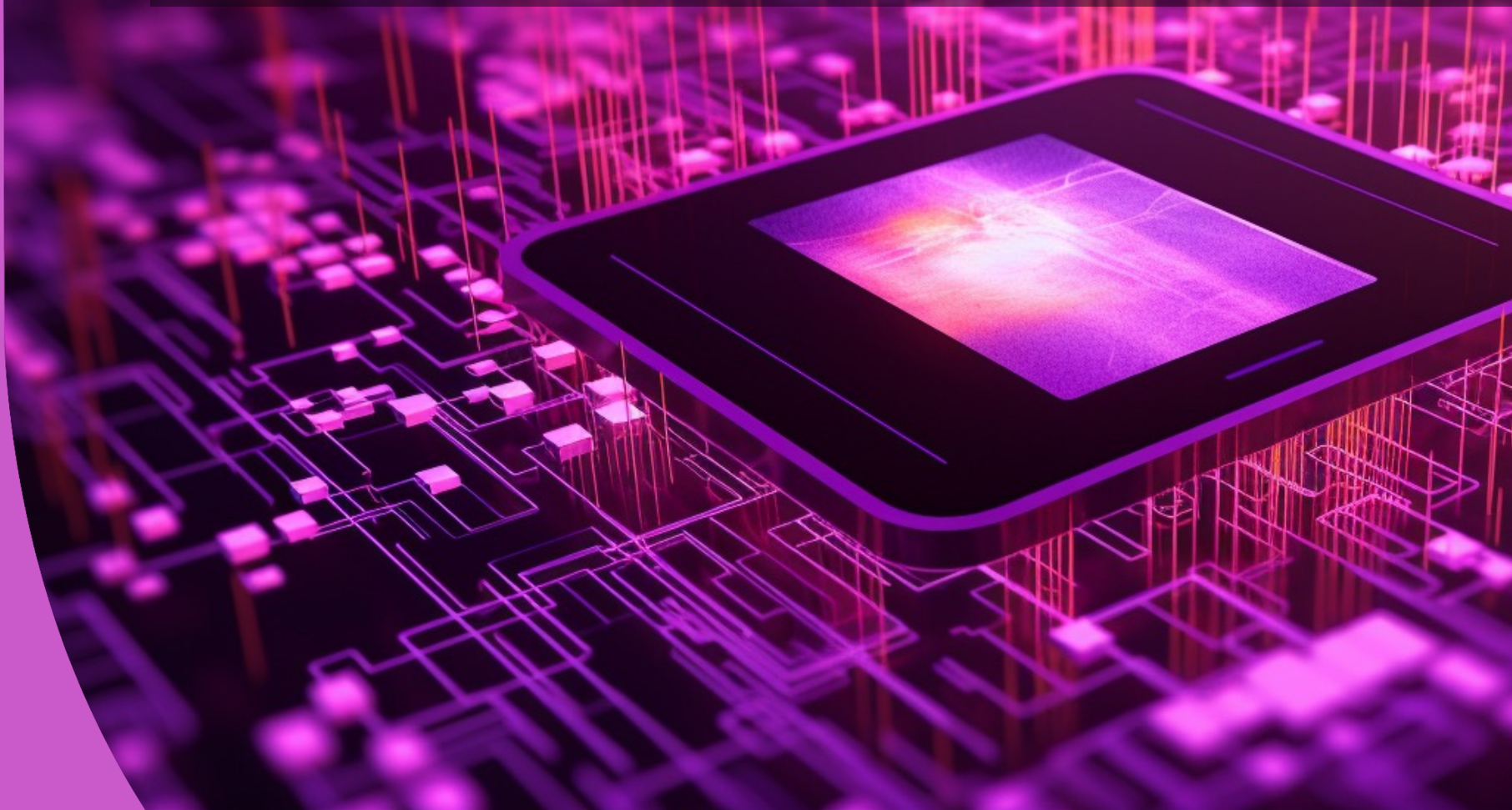
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SECTION 1

Bachelor of Science (Hons) – BSc (Hons)



BSc (Hons) in Applied Computing

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

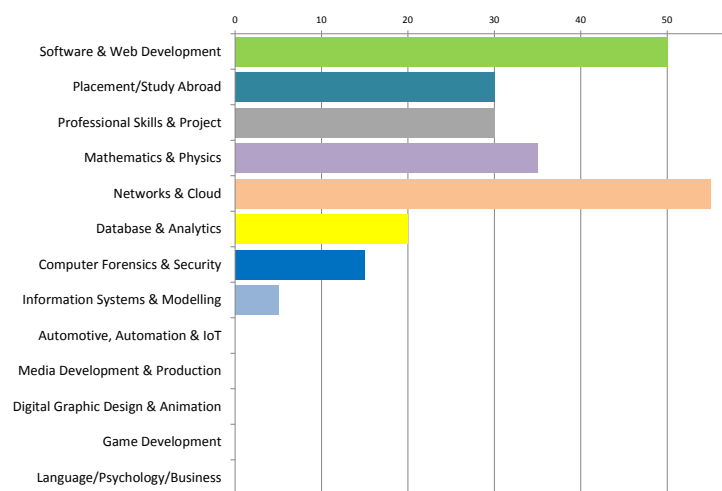
to provide a broad but focused, curriculum of computing and software development concepts. This is complemented by the study of particular problem domain areas (e.g. Games Development, Cloud Computing). The intention is for the student to not only learn the technical skills, but also to form an appreciation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

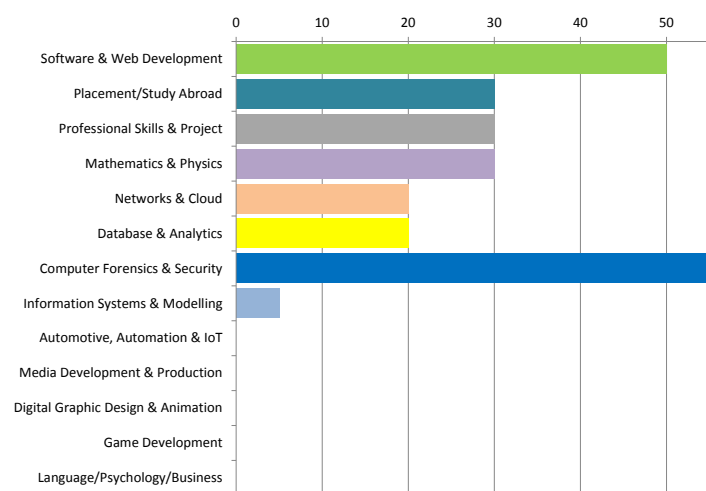
It is important that the student be conversant with current trends and paradigms when they enter the job market. However, it is equally important that they will have transferable skills that will facilitate their career progression (e.g. project management, communication skills). To this end, throughout 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.

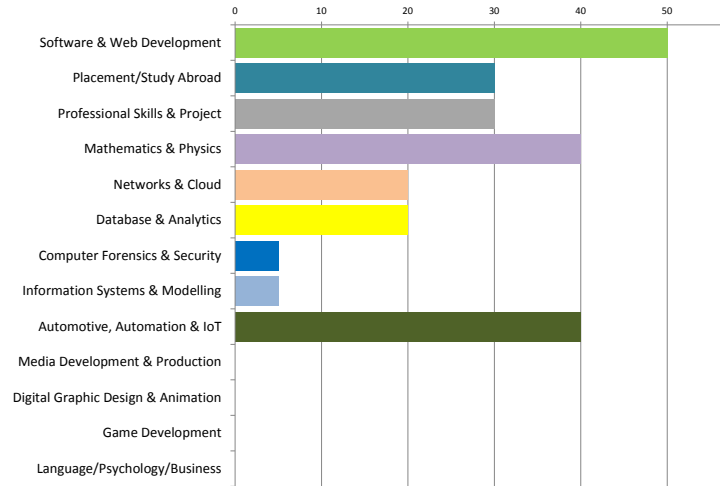
The breakdown of course credits across the four years on each specialism is illustrated by the following charts.



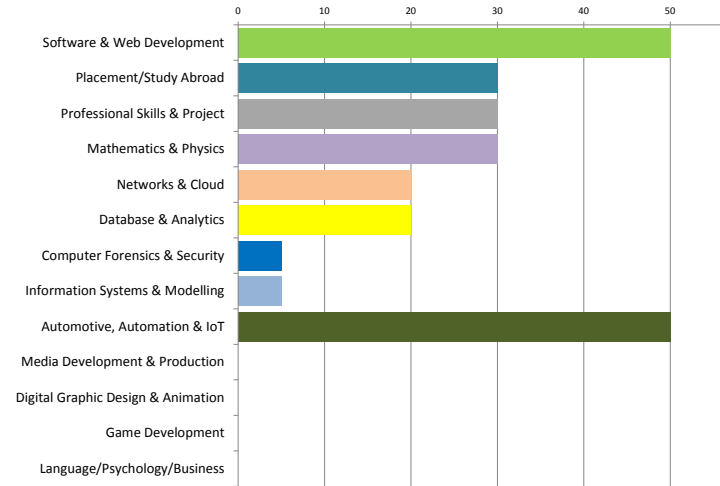
Networks & Cloud



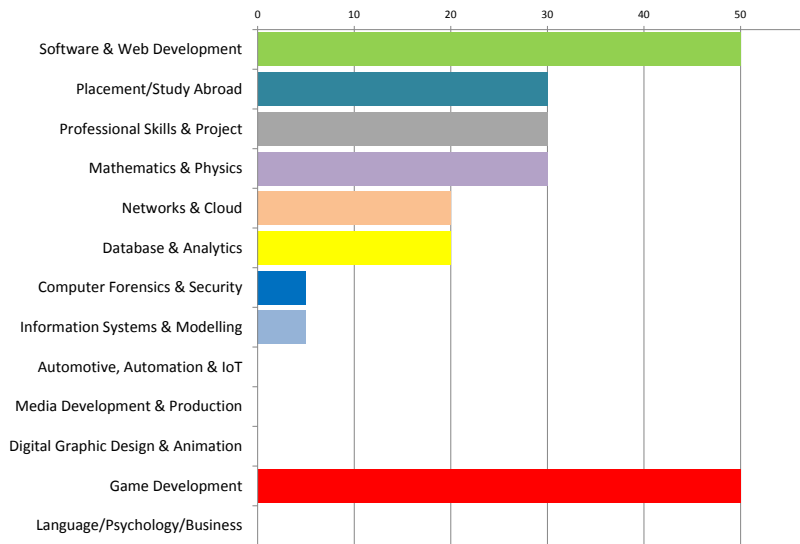
Computer Forensics & Security



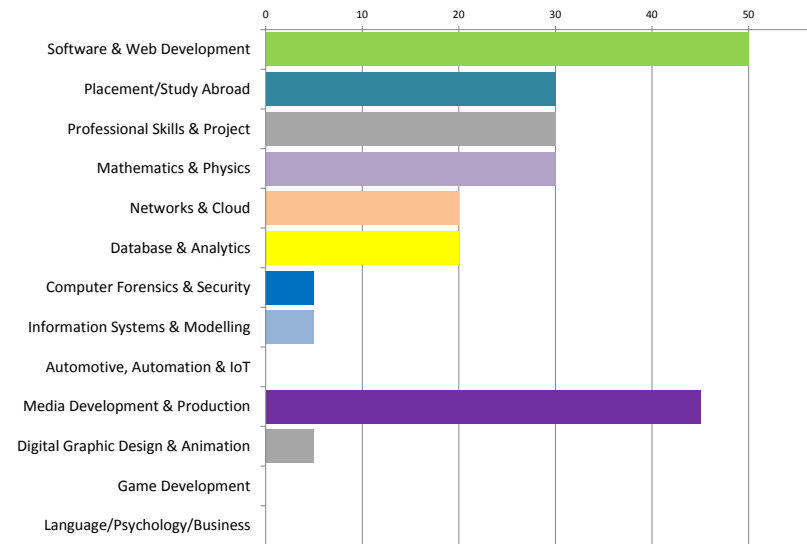
Automotive & Automation Systems



Internet of Things



Game Development



Media Development

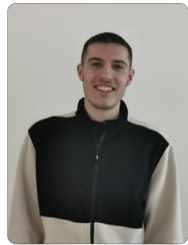
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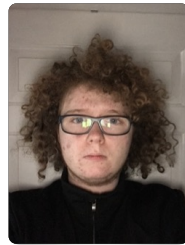
Dominik Wawak
USV LIR 2.0 24



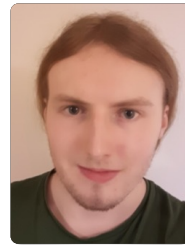
Abaz Bajrami



Mark Bates



Tommy Dalton



Jack Fitzpatrick



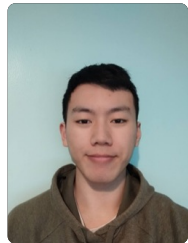
Robert Jacob



Ryan Jenkins



Bryan Keane



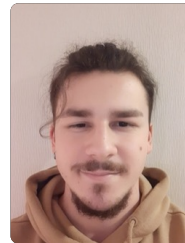
Tony JinHui Liu



Anthony Lonergan



Caolan Maher



Denis Moskalenko



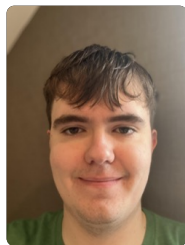
Milan Ples



Jakub Poczatek



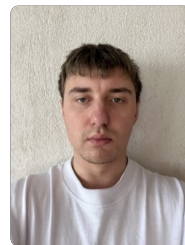
Jason Power



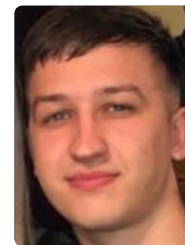
Aaron Russell



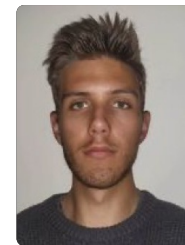
Patryk Stefanski



Allen Terescenco



Ernestas Trakys



Dominik Wawak

Car Park Monitoring Drone

by Abaz Bajrami



The car park monitoring drone is used to monitor car parks in realtime. Users can use the app "Prime Parking" to find out how many available parking spaces there are in the destination they are about to commute to. This helps solve the problem of everyday commuters travelling to a location, only to find out there are no parking spaces available, which may lead to them trying to find parking elsewhere. The "Prime Parking" drone and app can also be used

by businesses/institutes to monitor their car park for safety and security reasons. Inspiration: A large number of students commute to college using cars. When they commute to college, students find it difficult to find parking spaces during rush hours, for example in the morning between 8:30am - 9:30am. When students arrive at college, they are not guaranteed a parking space because of high congestion in college car parks, which may even force them to look for parking elsewhere. Some students may even miss part of their lecture time due to the difficulty of finding a parking spot. The app "Prime Parking" solves this issue by showing the students the amount of available parking spaces before they even leave their homes.

Technologies:

VS Code, Python, Amazon Web Services[S3, Lambda, Rekognition], DJI Drone





Car Park Drone

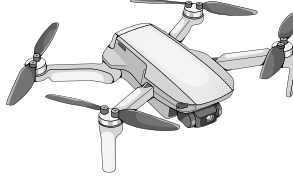
Abaz Bajrami (20085199)
BSc (Hons) in Applied Computing (Internet of Things)
School of Science and Computing

Abstract

The car park monitoring drone is used to monitor car parks in real time. Users can use the app "Prime Parking" to find out how many available parking spaces there are in the destination they're about to commute to. This helps solve the problem of everyday commuters travelling to a location, only to find out there are no parking spaces available, which may lead to them trying to find parking elsewhere. The "Prime Parking" drone and app can also be used by businesses/institutes to monitor their car park for safety and security reasons.

Benefits

- Cost:** With a drone at a mid-altitude, you can monitor the whole car park with just one drone, instead of needing multiple cameras that would cost a lot of money to implement. You won't just need to buy the cameras, but you'll need to pay someone to set them up, and in some cases, you may even need to build some infrastructure for the cameras to stand on. A good-quality drone doesn't cost a lot and is easy to set up.
- Adaptability:** When the infrastructure of a car park changes, E.g. more parking spots are being made, then you may need to install new cameras in the new areas being built. With a drone, you won't need to do this. Using drones also reduces the numbers of cameras you need in a parking area, and they are faster to set up.
- Data:** In the AWS cloud, using AI and complex algorithms, the amount of free parking space is counted and then sent to the application.
- Safety:** The drone can send the live feed to the cloud at AWS Cloud Services and then can upload it to the app, where someone can have a live view of the car park. If they see any suspicious behaviour, then go to the car park and see for themselves.
- Environment:** One or more drones could be enough to monitor one entire car park. This is far better environmentally than it would be just using a normal car park camera. Also, it takes far fewer materials to build a drone than you would need to make multiple cameras for a car park.



DJI MINI 2

Inspiration

A large number of students commute to college using cars. When they commute to college, students find it difficult to find parking spaces during rush hours, for example in the morning between 8:30am - 9: 30am. When students arrive at college, they are not guaranteed a parking space because of high congestion in college car parks, which may even force them to look for parking elsewhere. Some students may even miss part of their lecture time due to the difficulty of finding a parking spot. The app "Prime Parking" solves this issue by showing the students the amount of available parking spaces before they even leave their homes.











Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Android and Arduino Based Plant Monitoring System

TL251 – 26

by Mark Bates



Inspired by current and future technologies and practices that aim to encourage a greener way of living, this project was created with the idea of adopting

the growing of household plants in built up urban areas where the presence of natural greenery is limited. This is achieved with the use of Internet of Things (IoT) technologies and an intuitive android based mobile app in the hope that this can be smoothly integrated into everyday life. The objective of this project is to make the process of caring for houseplants and home grown produce care-free while also keeping the person using the device involved in the process. This

is achieved with a mix of hardware and software technologies. Using an Arduino maker board attached to a number of relevant and useful sensors, the device gathers important data about the state of the plants environment such as soil moisture, temperature and humidity. This is stored on a database where it is then sent and displayed to the user via a mobile application. This then prompts the user to intervene if necessary for the plants overall health.

Technologies:

Kotlin, C++, Firebase, WiFi

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Android and Arduino based plant monitoring system

Home Grower

Mark Bates

Description

Home Grower combines hardware and software to create a solution that enables people to experience growing their own plants and produce. The device is equipped with the appropriate sensors to monitor the plants environment. This is then sent to a cloud platform which is used to pull the data to be presented to the user via a mobile app.

Features

The Mobile app has the ability to create and configure multiple "Plant Pens". A Plant Pen is a hardware device for tracking different plants and produce that the user may be tending to. Users can monitor the data sent from the Cloud Database and get a general idea of the plants health. The Plant Pen is equipped with a temperature, humidity and soil moisture sensor.

Methodology

The project was developed using an Agile and Sprint methodology. Work was split up into two week sprints and tracked using a Kanban board created in Trello. This allows for the work to be planned in advance and spread out accordingly.

How it Works

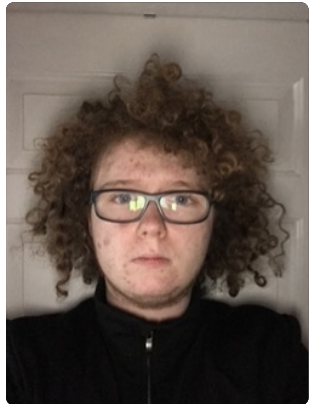
1. the device is configured by connecting it to your Wi-Fi network.
2. Once connected, the Plant Pen will configure wit your device.
3. Creating new Nodes for your Plant Pen to send data to
4. Plant Pen sends data to Firebase
5. Data collected on Firebase is sent to and displayed on the mobile app

Mark Bates | BSc Applied Computing | South Eastern Technological University

Isometric Low-Poly Rogue-Like Video Game

TL251 – 27

by Tommy Dalton



The main aim of this project is to create a Rogue-Like Isometric video game. The

main goal of this video game will be to beat a series of levels with one life, death will result in being sent back to the start in order to play through the game again. The following are the complex features that will be present in the project: Procedural Generation: these methods are often employed in video games for content generation and will be developed in this project to

randomly generate the environments for a different experience each time it is played. Smart AI systems: will be developed to ensure engaging AI that is able to make smart decisions and replan once circumstances change to avoid failure. Internal Economy: Balancing the games internal economy will be crucial in order to balance the games overall difficulty.

Technologies:

C#, Unity, Blender, PlasticSCM, Github

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

FLETCHER
AN ISOMETRIC LOW-POLY VIDEO GAME

INTRODUCTION
Fletcher is an isometric roguelike developed in the Unity Game Engine. Set within the cold ominous confines of an asteroid belt, you command a drone which must fight its way through the asteroid belt navigating anomalies and groups of hostile enemies.

PROCEDURAL GENERATION
Procedural Generation is a means to generate content randomly. In Fletcher procedural generation is used to generate levels using Cellular Automata. The resulting levels take the shape of two dimensional cavern like spaces. After their generation can be modified to fit the needs of the game.

BEHAVIOUR TREES
Behaviour Trees are a form of AI plan execution tasked with carrying out repetitive tasks quickly and switching between different sets of tasks in a modular fashion. In this project it is used for different AI behaviour types based on attributes such as their current state and position etc.

INTERNAL ECONOMY
Internal Economy refers to the probability-scope of the game in regards to the items and interactions within it which can affect and command the players decision making, resulting in more engagement with the game.

METHODOLOGY
This Project was developed using the SCRUM methodology. Development of the Project took place over 2 week Sprints. Planning took place at the start of each sprint with the work being reviewed at the end of the sprint.

Unity, blender, Visual Studio, GitHub, plasticscm, Trello

Tommy Dalton, BSc (Hons) Applied Computing, Department of Computing and Mathematics, SETU

TL251 – 28

The Use of Quadcopters in Conjunction with Machine Learning Technology to Provide Autonomous Aid in Search and Rescue

by Jack Fitzpatrick



In the past decade high quality quadcopters have drastically come down in price, portable cameras have become significantly better and training/using machine learning models to process

live data on consumer level hardware in realtime is now very much possible. Despite the potential these technologies have in conjunction with each other to assist in search and rescue operations, it is rare to see them used. Search and rescue is often voluntary and can be stressful. Despite best effort it is unfortunately not always successful either. This project was created to explore and test the potential use of these technologies to autonomously assist with search and rescue missions. This is achieved by using

Python scripts to automatically generate path plans and send commands to one or many Tello Drones to scout a set area. While this is happening data and video footage is being received from each drone. Video footage is fed into a trained Computer Vision algorithm and the output from this is used to determine further action such as adjusting quadcopter flight paths, notifying a search and rescue team something has been spotted, or summoning all quadcopters to a site for further analysis.

Technologies:

Tello Drones, Python, OpenCV, Tensorflow, Microbit, Vision Systems

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

AUTONOMOUS SEARCH AND RESCUE DRONES
 THE USE OF QUADCOPTERS IN CONJUNCTION WITH MACHINE LEARNING TECHNOLOGY TO PROVIDE AUTONOMOUS AID IN SEARCH AND RESCUE OPERATIONS

ABSTRACT
 In the past decade high quality quadcopters have drastically come down in price, portable cameras have become significantly better and training/using machine learning models to process live data on consumer level hardware in real time is now very much possible. Despite the potential these technologies have in conjunction with each other to assist in Search and Rescue operations, it is rare to see them used. Search and Rescue is often voluntary and can be stressful. Despite best effort it is unfortunately not always successful either.

This project was created to explore and test the potential use of these technologies to autonomously assist with Search and Rescue missions. This is achieved by using Python scripts to automatically generate path plans and send commands to one or many Tello Drones to scout a set area. While this is happening data and video footage is being received from each drone. Video footage is fed into a trained Computer Vision algorithm and the output from this is used to determine further action such as adjusting quadcopter flight paths, notifying a Search and Rescue team something has been spotted, or summoning all quadcopters to a site for further analysis.

MISSION LOGIC

```

    graph TD
        Start([Start Mission]) --> TakeOff[Take Off]
        TakeOff --> FollowPath[Follow Assigned Path]
        FollowPath --> Completed{Completed Path?}
        Completed -- No --> FollowPath
        Completed -- Yes --> Detected{Detected Person?}
        Detected -- No --> FollowPath
        Detected -- Yes --> CreateAlert[Create Alert]
        CreateAlert --> FurtherActions{Further Actions?}
        FurtherActions -- No --> FollowPath
        FurtherActions -- Yes --> TakeAction[Take Further Action]
        TakeAction --> ReturnHome[Return to Home]
        ReturnHome --> End([End Mission])
    
```

TECHNOLOGIES
 Python, OpenCV, Tello, micro:bit, TensorFlow

SYSTEM DESCRIPTION
 The Control and Processing side of the system runs a Python script to initialize and handle the system. It first plans out paths for each drone. This is then sent as a series of sequential commands.

The Communication side acts as a bridge and makes sure the messages are formatted correctly and reach their destination drone. The communication to the Tello drone is done through UDP which means losses can be an issue. The communication side handles any of these issues.

Control and Processing ↔ **Communication** ↔ **Drones**

- Control and Processing: Path Processing, Logic and Controls; SEND/RECEIVE; Camera Feed and Sensor data.
- Communication: Handle Communication to and from Drone/Drones.
- Drones: Path Processing, Logic and Controls; SEND/RECEIVE; Camera Feed and Sensor data; Follow commands and send back data.

On the Drone end once the Tello drones receive their commands they will perform actions and send back status messages to assure everything is running smoothly. They will also send back a constant video feed and sensor data. This data is sent back through the stack to the Control and Processing end which then takes the data and processes it.

It is done in a stack this way so hardware acceleration on the likes of a GPU can be done to allow the processing of multiple video streams or higher quality video. It is also done to easily accommodate the use of cheap "dumb" drones with no onboard computing.

The video data is fed into a Computer Vision algorithm to spot any potential targets for rescue. The output from this data processing is used to decide on further action, such as continuing the mission, raising an alert to the Search and Rescue team or calling all drones back.

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 Department of Computing and Maths | School of Science and Computing | SETU

Software Defined Vehicle, Open Vehicle API Research and Prototyping

by Robert Jacob



Efforts are being made within the automotive industry to abstract the control functions of vehicles from the interfaces to those functions to facilitate the development of reusable interfaces. This trend in the industry has led to researching and developing generic vehicle APIs to interface with systems in the modern car such as climate control and infotainment. These generic vehicle APIs

can then be used universally among vehicle models, standardizing the access to vehicle functions, and enabling new user applications. The possibilities with this technology include the remote control of vehicle functions to mobile applications, enhancing the experience of the end user. This project researches the current approaches to the generic vehicle API within the automotive industry and develops a vehicle API prototype based on the popular COVESA Vehicle Signal Specification (VSS) standard, running on the Vector CANoe platform. The system can be used as a test bench for integrating VSS with existing vehicle network architectures.

Technologies:

Vector CANoe, CAPL, Python, MQTT, VSS, VISS

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Lift It

TL251 – 30

by Ryan Jenkins



Lift It is a VR fitness game designed to teach people how to perform exercises correctly and safely. This game/application is a per-

fect way to make exercising more enjoyable. The idea for this was inspired during covid times. When gyms are closed people had no other option then to do home workouts which after a while became tedious and un-interesting. Lift It is the perfect alternative. Lift It demonstrates to it's players how to correctly perform exercises in a safe environment while also testing their ability. Once the player has finished their workout they will receive a score for what

they have done and this score will be saved and they can access it when they play again. This will be a great motivator for the player and will encourage them to play again and to beat their score. Lift It incorporates many VR mechanics to allow this game to work proficiently. These mechanics are as follows: - Movement - Sight - Physics - Interaction. Lift It was designed in order to help and teach people and to put a fun twist into exercising.

Technologies:

Unity, C#, VR, Teaching/Learning, Databases, Animation, Networking

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



TL251 – 31

Heimdall: A Custom Kubernetes Extension Which Enables Atomic Resource Ownership

by Bryan Keane



My final year project, Heimdall, is a custom Kubernetes extension designed to address the issue of conflicting changes to Resources

by Operators. By default, Kubernetes does not allow atomic Resource ownership and there is no existing solution to enable this functionality. Heimdall allows Resources to be configured with an atomic owner. When Heimdall is set to monitor a Resource, any incoming changes from its non-owner will be detected and blocked. This is done by reconfiguring the Role permissions of the Operator or Controller, preventing them from making

further changes to the Resource. Heimdall also aims to make the process of fixing the problem easier. It sends an interactive notification via Slack to the team, providing a link to the problem Resource and Operator. The Controller comes with a comprehensive Wiki, including a guide on its use, Prometheus metrics, and Grafana support for a dashboard overview of Heimdall's metrics and performance.

Technologies:

Go, Kubernetes, YAML, Prometheus, Grafana, Jekyll, LaTeX, Git, Docker



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
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HEIMDALL
A Kubernetes Extension for Atomic Resource Ownership and Conflict Prevention

Heimdall is a custom Kubernetes extension that implements atomic Resource ownership, which allows an operator to be the only entity with the ability to make changes to a Resource. Heimdall can be installed on any Kubernetes cluster to watch specified Resources of varying importance, block changes from non-owner Operators, and send interactive slack notifications to the developer.

- Watches Core & Custom Resources for issues
- Allows an atomic owner to be set
- Blocks changes from non-owners
- Builds platform-agnostic URL for Resources
- Prioritizes more important Resource
- Sends interactive Slack notifications
- Notification cadence is based on priority
- Includes Prometheus metrics
- Comes with documentation at heimdall.wiki

System Architecture

Methodology

Supports all major Kubernetes providers

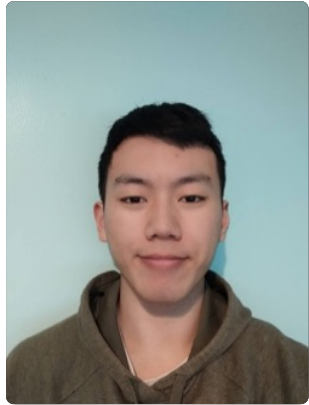
aws, Azure, GoogleCloud, OPENSIFT

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Recognition Shopping App

TL251 – 32

by Tony JinHui Liu



This project aims to develop a mobile app that enhances the shopping experience using technologies such as Image Recognition with TensorFlow, Android Studio,

Kotlin, and Firebase. The app will also employ the MVVM architecture to deliver an efficient and user-friendly interface that offers a range of functionalities. The app's features will include user registration and login, security code scanning, product scanning, cart page, profile page, payment page, and order history page. Users can create an account and log in to their account, and the app will store their information. To access the main store

page, the app will need users to scan a security code unique to the store. Once on the main store page, users can scan products and view product information and add them to their cart. The cart page will display a list of the items the user scanned and added to their cart. Then allow for payment from the app. By using the latest technologies, this project aims to provide a solution that prioritizes convenience, speed, and simplicity for users.

Technologies:

Android studio, Kotlin, Firebase, TensorFlow image recognition

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Image Recognition Shopping Android App

Abstract

This project aims to develop a mobile app that enhances the shopping experience using technologies such as Image Recognition with TensorFlow an open-source software library used for machine learning and artificial intelligence. It is made to build, train, and design machine learning models, Android Studio, Kotlin, and Firebase. The app will also employ the MVVM architecture to deliver an efficient and user-friendly interface that offers a range of functionalities.

The app's features will include: user registration and login, security code scanning, product scanning, cart page, profile page, payment page, and order history page. Users can create an account and log in to their account, and the app will store their information. To access the main store page, the app will need users to scan a security code unique to the store. Once on the main store page, users can scan products and view product information and add them to their cart. The cart page will display a list of the items the user scanned and added to their cart. Then allow for payment from the app.

By using the latest technologies, this project aims to provide a solution that prioritizes convenience, speed, and simplicity for users.

Features

- Users can login/SignUp.
- Users can view list of products.
- scan product using image recognition or barcodes.
- Can add to cart.
- Can delete from cart.
- Can view product details.
- Users can view shopping history..
- Users can checkout.
- can select product quantity,

Agile Methodology

I used the agile methodology because it is a flexible and adaptable methodology, which is why it's a popular choice for mobile app development. Agile methodology is suited for projects that are likely to change as they are being built.

System Architecture

Technologies

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 Made with PosterMyWall.com

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TL251 – 33

Investigating the Aftermath of a Ransomware Attack

by Anthony Lonergan



mental understanding of the ransomware field. To address the research questions, the study employs two different methods which are a reproducible experiment and content analysis. The experiment involves replicating an attack using sample ransomware. This experiment along with content analysis are then used to answer my research questions. The findings highlight critical factors that non-essential organizations should consider when a ransom is demanded, including negotiating strategies and the role of law enforcement. Furthermore, the paper identifies measures that organizations can take to prevent follow-up attacks, such as implementing security protocols and providing staff training. The paper also identifies what indicators can help organizations identify if a successful ransomware attack has occurred. Overall, this paper contributes to the understanding of ransomware attacks on non-essential organizations and provides guidance for organizations to mitigate the risk of ransomware attacks.

This paper examines the impact of ransomware attacks on non-essential organizations. The paper provides an overview of ransomware attacks and their trends, to establish a funda-

Technologies:

VMware Workstation Pro, Excel, Word, LaTeX

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Investigating the Aftermath of a Ransomware Attack

Abstract

This project examines the impact of ransomware attacks on non-essential organizations and investigates the factors that organizations should consider when responding to a ransom demand. This project provides an overview of ransomware attacks and their trends, to establish a fundamental understanding of the ransomware field. To address the research questions, the study employs two different methods which are a reproducible experiment and content analysis. The experiment involves using a sample ransomware attack to identify the signs and changes that are left behind after an attack. This experiment along with content analysis are then used to answer the research questions. The findings highlight critical factors that non-essential organizations should consider when a ransom is demanded, including negotiating strategies, the role of law enforcement, and the importance of preparedness. Furthermore, this project identifies measures that organizations can take to prevent follow-up attacks, such as implementing security protocols and providing staff training. This project also provides some indicators that can help organizations identify if a successful ransomware attack has occurred. Overall, this project contributes to the understanding of ransomware attacks on non-essential organizations and provides guidance for organizations to mitigate the risk of ransomware attacks.

Research Questions

What factors should a non-essential organization consider when a ransom is demanded from them?
 What precautions should be taken by a non-essential organisation to ensure a follow up ransomware attack does not occur?
 What are the indicators to a non-essential organisation that a successful ransomware attack has been perpetrated against them?

Methodology

The approach I used to answer my research questions was a hybrid one. This approach was a qualitative/experimental one.
Qualitative
 I use qualitative analysis to answer the research questions. There are multiple different ways to do qualitative analysis, but I believed content analysis to be the best approach for this project.
Experiment
 I also used an Experiment to help answer my research questions. To do this I exploited a Virtual Machine using a sample ransomware script. Once I successfully exploited the Virtual Machine, I used different tools to analyze what happened and what had changed on the as a result of the attack.
 Content analysis is a research tool used to determine the presence of certain words, themes, or concepts within some given qualitative data (i.e., text).
 I looked for and evaluated patterns in my sources for key words that appear frequently so that I stayed on topic as much as I possibly could.
 I believed this approach was not only very interesting to see but I also think that it was very informative in giving me an insight into how these attacks work and what signs are left behind as a result of the attack.

Flowchart of a Typical Ransomware Attack

Stage 1: Delivery
 The network is breached by phishing or an exploit of internet-facing service.

Stage 2: Command and control
 Once inside the network the ransomware establishes access to the system.

Stage 3: Credential access
 While remaining undetected the malware continues to pave the way for its attack by stealing credentials.

Stage 4: Canvas
 The virus searches for files to encrypt both locally and on any network it has managed to access through lateral movement.

Stage 5: Extortion
 The cybercriminals will now begin to exfiltrate all of the local and network files. After this the attacker will then demand a ransom to have them decrypted.
 My project looks at the middle of stage 5 once encryption has occurred and onwards.

Scale of the Ransomware Threat

554 IT professionals were asked the following:
 Is ransomware a real business threat, or is it over-hyped?

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 South East Technological University

TL250 – 34

Procedurally Generated 2D Unity Game with Advanced Enemy AI and Dynamic Difficulty Adjustment

by Caolan Maher



Split Heart is a 2D game where if the player dies, they are sent back to the very start with new randomised levels. The game is set in a cyberpunk dystopian future where

greed and power have consumed the leaders of the world. Bandits have taken over the once powerful city of Xadena. You play as Banks, a Xadenian soldier who was captured and kept as a prisoner. Escape your prison and fight your way through an army of bandits and bosses using your unique soul-splitting mechanic to get the upper hand on your enemies and free Xadena of this tyranny. Use an array of weapons such as a katana, dual swords, and a hand

gun. Split Heart contains many complex features such as procedurally generated levels so every play through is different, advanced enemy AI that will keep the player on their toes with grouping and damage blocking mechanics, and dynamic difficulty adjustment where the game will cater the difficulty of the game to how well the player is doing. Split Heart also has an economy where coins dropped from enemies can be used to buy permanent and temporary upgrades.



Technologies:

Unity, C#, Git, GitHub, Trello, PixelArt

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

SPLIT HEART

A Procedurally Generated 2D Unity Game With Advanced Enemy AI And Dynamic Difficulty Adjustment

Dynamic Difficulty Adjustment
Split Heart features dynamic difficulty adjustment to cater to the player's ability. The player's performance is tracked and the game will adjust to the player's performance. The game will adjust features such as level generation and enemy AI. This keeps the player engaged at all times by not allowing the game to become too difficult or too easy.

A Broken World
Split Heart is set in a cyberpunk dystopian future where greed and power have consumed the world. You play as Banks, a soldier who was captured by the evil bandit organisation known as the Chronorder. Use your unique soul-splitting ability to escape the prison and take down the Chronorder.

Procedural Generation
Split Heart features procedurally generated levels to ensure a new experience with every play through. This stops the game being predictable and makes the player adapt to every change. Levels also feature branching which reward the player for exploring.

Advanced Enemy AI
Split Heart features AI not typically found in other roguelikes. Enemies can use tactics against the player such as grouping to attack as a team, blocking attacks, and dodging attacks. Enemy AI is controlled using a behaviour tree to ensure the correct actions take place. There are multiple enemy types and bosses the player can encounter with different abilities to keep the player learning and feeling challenged.

Caolan Maher, BSc (Hons) Applied Computing, Department of Computing and Mathematics, SETU

Unity Trello VS Code GitHub

Giants Conquest

by Denis Moskalenko



Procedurally generated open world game where you play as a giant trying

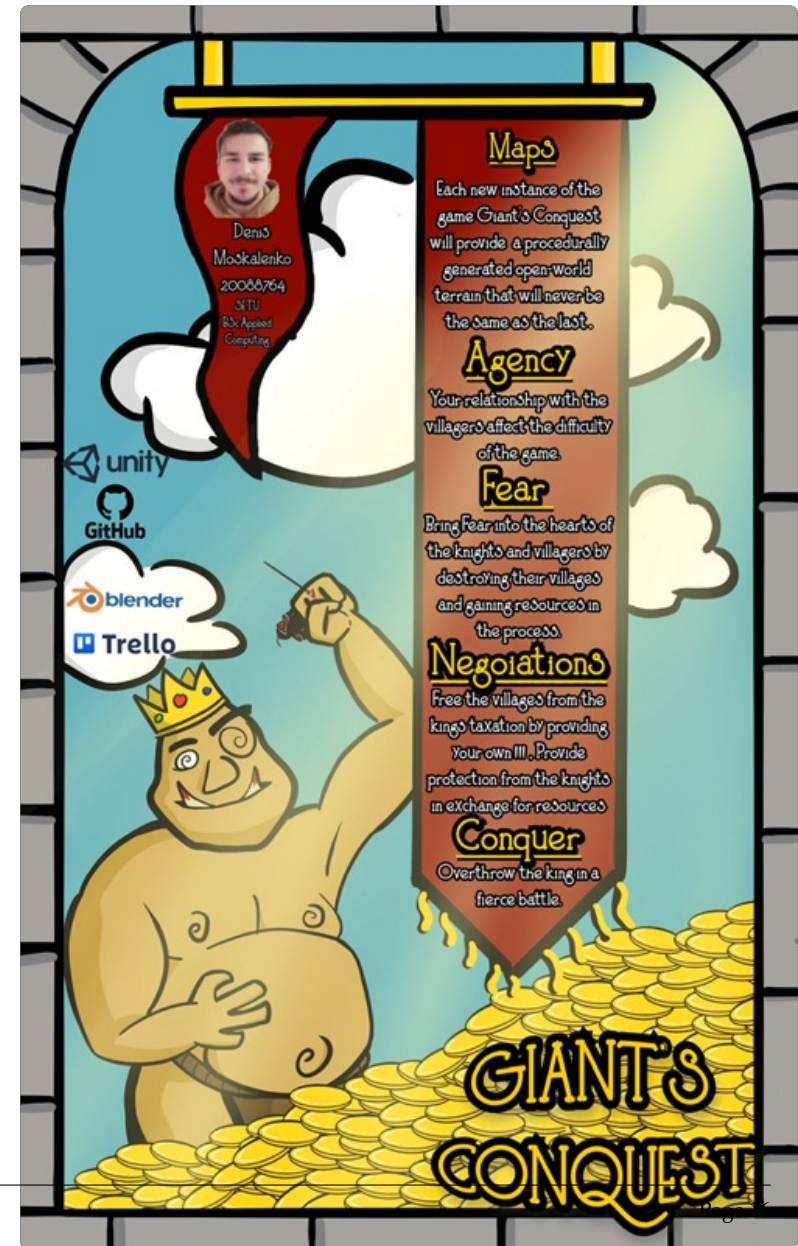
to overthrow the king. You do this by either destroying villages along with villagers or negotiating with villages for resources. Destroying villages will impact resource production of other villages. The kings knights will attempt to retake the villages to hinder your progress. Your actions will impact two dynamics, The fear index and The negotiation index. Both of these indexes

resources, Fear index will allow for easier negotiation but worse resource production. Negotiation index is directly linked to the fear index, the less fear the harder it is to negotiate due to the villages being more protected by the knights. Once you have collected enough resources you face off with the kings army along with an army of your own depending on how many villages are under your rule.

Technologies:

Unity, Blender, GitHub, Trello

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



TL250 – 36

by Milan Ples

Automation Pipeline



The objective of this project is to streamline the software development process by

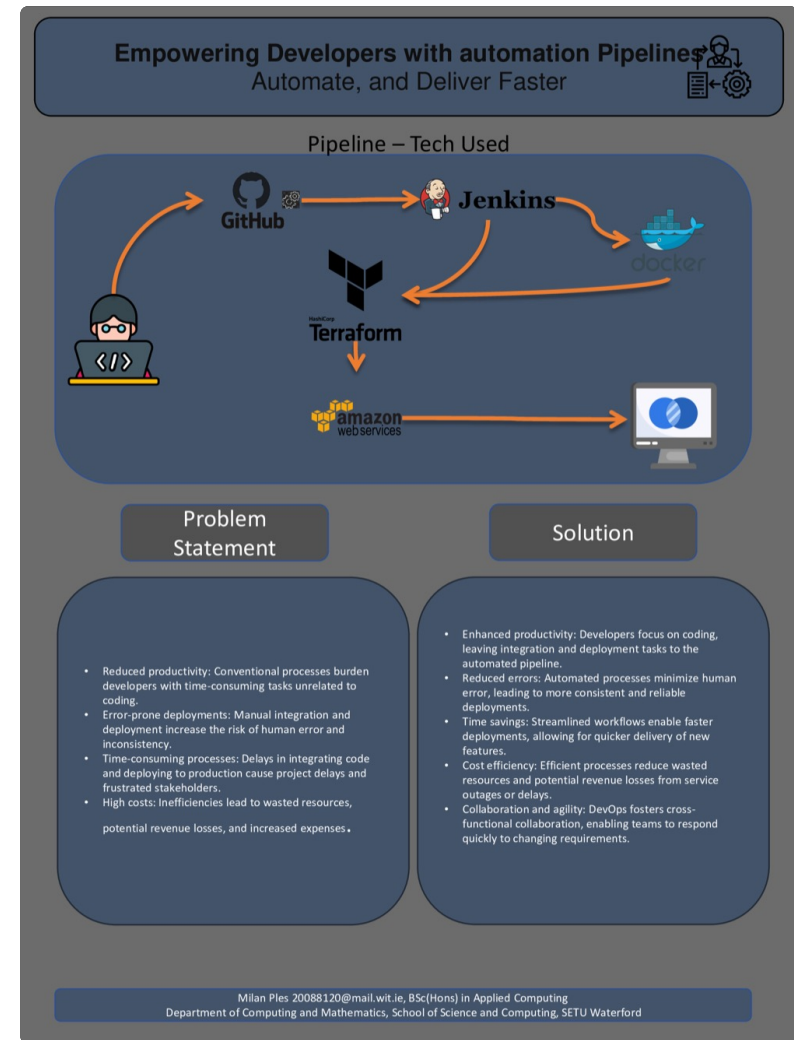
implementing automation pipelines using tools like Jenkins, Terraform, Ansible, Docker, and AWS. By doing so, developers will have a structured approach to building, testing, and deploying code changes, reducing the time and effort required. A central repository for code will also be established, improving collaboration and ensuring consistency among team members.

Automation pipelines will facilitate the automation of tasks such as provisioning, testing, and deployment, reducing the likelihood of errors, improving efficiency, and enhancing the quality of the codebase. Ultimately, this project aims to simplify and streamline the software development process, freeing up developers to focus on producing high-quality code.

Technologies:

Terraform, Ansible, Docker, AWS, Jenkins

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



TL250 – 37

Unity3D Based Low Poly Isometric Empire Building Game with Advanced AI, Procedural Generation and Population Management

by Jakub Poczatek



Rise From Ashes is an empire-building game set in an ancient, mediaeval world ruled by nature, not yet touched by human industrialization. As an orphaned prince of a desolate

kingdom, the player must rebuild the once-great civilization from the ground up, managing citizens' rest periods, daily food intake, and job assignments while constructing and upgrading structures. The game's low-poly art style evokes the simplicity of the medieval age, emphasizing the raw beauty of the natural world. The procedurally generated world features three biomes with randomly distributed resources, and dynamic difficulty adjustments ensure a unique experience for each player. Citizen management

is key to success, with players making strategic decisions on everything from individual job assignments to macro-level resource allocation. Players must fend off invading barbarians and enemy spies infiltrating their kingdom, using everything from defensive structures to combat tactics. With deep strategy elements and endless replayability, Rise From Ashes offers a challenging and customizable gameplay experience that will keep players engaged for hours on end.



Technologies:

Unity3D, Blender, Krita, C#

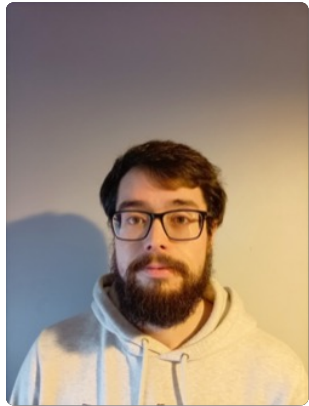
Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



TL250 – 38

by Jason Power

Progressive Web Application for Personal Safety Alerts



Airdeall is a Progressive Web Application (PWA) designed to work as a general purpose SOS alerting ap-

plication which can be installed on a users mobile device while also being accessible from any device that has a browser. This application gives users the ability to create and activate alerts that can be fully customised with options such as SMS messaging, location information and social media integration. Airdeall will also allow the owner of any kind of business to register with the application, and define their business

as a safe point where users can seek refuge if they feel threatened. This approach to safety could be seen as reactive, however Airdeall will also help to provide a pro-active approach by providing a user with helpful tips to ensure they stay safe. The application will provide a simple and easy to use interface which will both allow app users to activate alerts quickly and efficiently and allow anyone with access to use it.

Technologies:

React, JavaScript, HTML/CSS, Firebase, GitHub, WebStorm

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Progressive Web Application for personal safety alerts

Official Technopoints an Orduscript
South East Technological University

Airdeall

Airdeall (ar-dill) alertness in Irish

Project Abstract

Airdeall is a Progressive Web Application (PWA) designed to work as a general purpose SOS alerting application which can be installed on a user's mobile device while also being accessible from any device that has a browser. This application gives users the ability to create and activate alerts that can be fully customised with options such as SMS messaging, Location Information and Social media integration.

System Overview

Github Repo

Alert Features

- Integrated map
- Integration with social media
- Sounding a high-pitched alarm
- Proximity alerts to close by users
- A Countdown in case of a misread situation
- The ability for a business to register as a "safe point"
- Automatic recording of the situation with cloud backups
- The ability to use the Flashlight as a signalling feature/deterrent
- SMS to selected contacts with location information, and a help message

Jason Power, B.Sc. In Applied Computing, Cloud & Networks | 20076537

TL250 – 39

Django-Based Web Application for Upgrading and Configuring Network Devices

by Aaron Russell



This project aims to develop a web application named NetNua, which uses the Django web framework with Python, and will allow network administra-

tors to upgrade network devices' firmware easily. Additionally, NetNua will enable administrators to create configuration changes at scale, streamlining network device management. The application will provide a user-friendly interface allowing users to schedule automatic upgrades for their devices and script configuration changes at the touch of a button. The application will be vendor-agnostic, enabling it to be used across various network devices. NetNua will be security con-

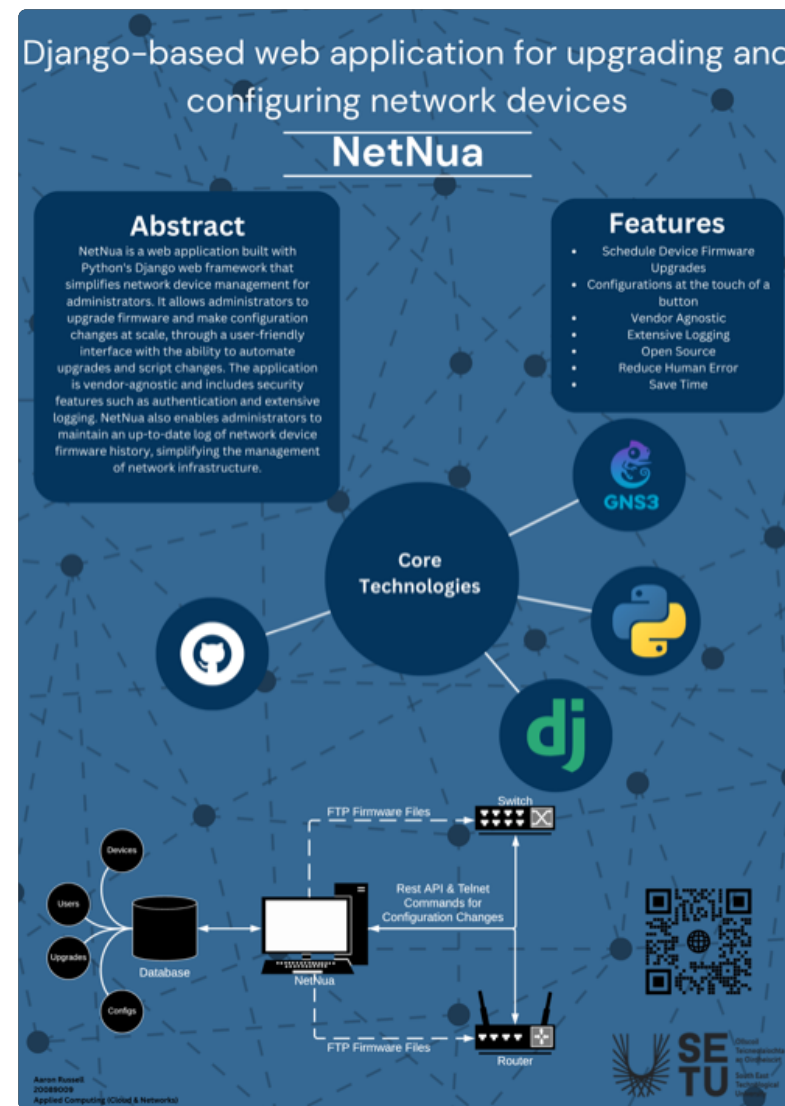
scious, requiring authentication for every aspect, and includes extensive logging for every change. In addition, the application will allow users to easily view the current firmware versions of their network devices, enabling them to maintain an up-to-date log of the device's firmware history. Netnua will help streamline certain aspects of network device management, making it easier for administrators to manage their network infrastructure.

Technologies:

Django, Python, SQLite, GNS3



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



TL250 – 40

Continuous Integration and Delivery, Implemented Using a GitOps Framework

by Patryk Stefanski



This project will implement a robust CI/CD framework utilising GitOps principles and various DevOps tools and technologies. The goal of this project is to streamline, through automation,


the deployment process, reduce errors and increase productivity in the application development and deployment cycle. Kubernetes will be used as the container orchestrator and Podman as the applications containerisation platform—Helm, to manage Kubernetes resources. While GitHub Actions and ArgoCD will serve as the CI framework, I aim to garner experience and expertise in and through implementing real-world GitOps frameworks using cutting-edge DevOps tools and technolo-

gies. The result will provide an ability to recommend different technology stacks for GitOps and CI/CD based on context and project requirements. The end users for implementation of GitOps would typically include the developers and operations teams who are responsible for managing and deploying the applications and infrastructure. The implementation of GitOps would result in a reliable, scalable, and resilient system while also boosting productivity.

Technologies:

Kubernetes, Docker/Podman, KIND, Helm, ArgoCD, GitHub Action, Golang, CI/CD

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



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(Automotive & Automation Systems)


Continuous Integration and Delivery, Implemented using a GitOps Framework

Abstract
This project implements a robust CI/CD framework utilizing GitOps principles and various DevOps tools and technologies. The goal of this project is to streamline, through automation, the deployment process, reduce errors, and increase productivity in the application development and deployment cycle.


Kubernetes is used as the container orchestrator and Podman as the application's containerization platform—Helm, to manage Kubernetes resources. GitHub Actions and ArgoCD serve as the CI framework.

The aim is to garner experience and expertise in and through implementing real-world GitOps frameworks using cutting-edge DevOps tools and technologies. The result provides an ability to recommend different technology stacks for GitOps and CI/CD based on context and project requirements.

Key Technologies




GitOps Flow



- The user has to set up the configuration repo so that ArgoCD can detect the changes.
- The user makes and commits changes to the application source code on a development branch.
- A user creates a pull request from the application development branch against the master branch.
- GitHub actions are run on every pull request and the following stages are run (dependent on the success of the previous stage):
 - Building and testing new images.
 - The new image is pushed to the Docker hub (image registry)
 - The image tag in the Helm chart repository is updated
- Argo CD polls Helm chart repository every 3 minutes
 - Detect if any changes have been made to the configuration repository
 - Check the current cluster configuration and synchronize if necessary to match the Helm chart.
- Kubernetes cluster applies new configuration and deploys to staging.

Benefits Of GitOps

- Improved visibility and transparency:** provides a centralized view of changes made to infrastructure and applications, making it easier to track changes, identify issues, and perform audits.
- Faster and more reliable deployments:** using Git as the single source of truth, GitOps enables automated, repeatable deployments, reducing the risk of human error and enabling faster releases.
- Greater scalability and flexibility:** GitOps enables infrastructure and application configurations to be versioned and managed as code, making it easier to scale applications, replicate configurations across environments, and make changes to both, infrastructure and applications, as needed.



TL249 – 41

by Allen Terescenco

TypeScript Web App Platform for Third-level Esports Students



Irish Collegiate Esports Platform is a TypeScript web application where third level students can sign up to connect with other

students studying at the same university and create teams to register into tournaments ran by organisers. This project aims to help break down the barrier between organisers having to verify student statuses for university/college only tournaments. Another aim is for connectivity between students who share the same interests in competing in third-level esports competitions. Ireland’s National Education & Research Network’s service

Edugate is being utilised as a way for students to verify themselves as active third-level students to verify themselves to play, similar to how UNiDAYS works. Once a student is verified they can connect with other students on the website to create teams and sign up to tournaments. They can also join their college/university Discord server as another means of connectivity. As this is an issue currently in Esports Ireland as it takes place heavily online.

Technologies:

Next.js, Auth.js, Docker, TypeScript, Azure, Edugate, Prisma, MySQL, NGiNX



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Collegiate Esports Web Application

Irish Collegiate Esports Platform

Abstract.

In 2023, SETU announced their esports scholarship. This is the first of its kind in Ireland.

Collegiate esports in Ireland have been around for the last number of years. Nativz is currently the main Irish esports organiser, currently the Nativz' Discord server, there are over 1275 members as of the 17th of December 2022. In Nativz' Winter League 2022, there were over 80 teams registered to play, with team sizes ranging from 3 to 6 players, excluding substitutes and coaches.

Nativz and other organisers struggle with the authenticity of student eligibility for their tournaments. The Irish Collegiate Esports Platform is a web application which solves this issue through a verification process where third level students can sign up using their student's email address and connect with other students studying at the same university to create teams and sign up to tournaments ran by organisers.

Along with verification statuses, a Discord bot is available to Irish University Discord servers across Ireland to provide roles to students to help Club and Society committee members manage their members.

System Design.

Methodology.

Agile Methodology is the process of breaking down the project into phases, which is tackled in smaller "sprints". I used agile to ensure continuous progress had been made in the form of one month long sprints to allow for flexibility and balance between other academic workloads.

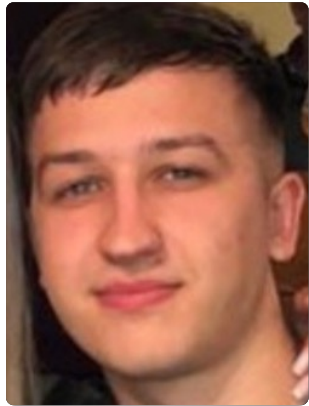
Technologies.

Allen Terescenco
BSc (Hons) in Applied Computing Department of Computing and Mathematics, SETU

TL249 – 42

by Ernestas Trakys

New Feature Development with Shortest Path Algorithms



PROJECT TOPIC Design and Development of a Routing Feature with Real-World Road Incident Data providing Safer Routing Abstract: A Development of a new

Road Routing Feature which uses road data gathered from Government websites. The main objective is to provide users with an optional Routing Feature that takes previous road incidents into account before displaying the quickest route to a destination. Understanding, Using and Altering Algorithms that traverse a Network for a specified output. This project helps users that are looking to travel on safer roads to destinations. Travelling unvisited roads can

be weary for a lot of people, especially when they might be far from home. This app will provide users with a peace of mind, knowing that they will not be going through blackspots or avoiding poorly developed roads. A website for front-end and user accessibility is enough for the initial service. This will be connected to a created server which is stored and connected to via Cloud Services. Front-end will be created with AWS Services and pointed to the server.

Technologies:

Java, JavaScript, Docker, AWS, Linode, Python, Pandas JSON, GEOJSON

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Designed & Created by Ernestas | <https://github.com/erneas13/RoadRouting>

SAFEROUTE

INCORPORATING SAFETY IN ROUTING ALGORITHMS

A Real-Time Solution to Enhance Road Safety

BSc (Hons) in Applied Computing (Automotive & Automation Systems)
Department of Computing and Mathematics, South East Technological University

Objective:

This project enhances road safety by developing a routing algorithm that incorporates real-time incident data into the scoring system of the shortest path.

Methodology:

Agile methodology is an approach that involves dividing the project into smaller phases, which are completed in short iterations. I used agile methodology to ensure continuous progress while balancing other academic workloads.

FEATURES

REAL INCIDENT DATA:

The algorithm receives and analyzes real incident data to provide up-to-date routes that prioritize safety.

CUSTOMIZABLE SAFETYScore:

Users can input their preferred level of safety by adjusting the SafetyScore parameter in their route configuration.

FRONT-END WEBSITE:

My solution is easily accessible through a user-friendly website that receives requests and delivers customized routes.

BENEFITS

Improved road safety

The algorithm prioritizes safety by avoiding high-risk areas and taking real-time incidents into account.

Efficient routing

A* shortest path algorithm provides the fastest and most efficient route while still ensuring safety.

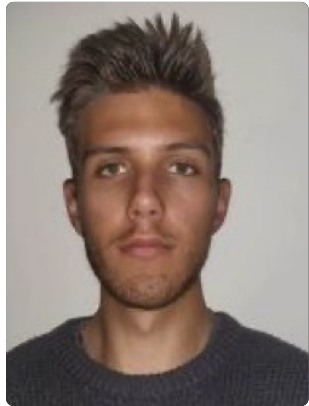
User-friendly interface

My routing algorithm with safety scoring provides a real-time solution to enhance road safety while still ensuring efficient routing.

USV LIR 2.0

TL249 – 43

by Dominik Wawak



The USV LIR 2.0 is an unmanned surface vehicle designed to serve as an open research platform. It is named after the Irish legend Children of Lir. This project showcases engineering to

school students through a mission design competition and is being used for marine research by biologists from Catholic University of Valencia. The unique aspect of this project is the technology underneath. The master controller, Pixhawk 3, controls the boat with the help of GPS and is connected to a laptop through telemetry communication, while QGround Control is the mission planning software tool used to configure the boat. The microbit interface, a small microprocessor programmed with virtual

puzzle blocks, is a standout feature that makes this platform accessible to anyone, regardless of their technical background. My primary focus is maritime search and rescue, using object detection training models and image processing methods to detect and rescue people in risk of drowning. I developed a GUI to provide ease of use for future use. The path planning for the boat is done with common motion planning algorithms like Dijkstra and the communication is done through MQTT.

Technologies:

Python, Tensorflow, Pixhawk, Microbit, MQTT, AWS, Roboflow, OpenCV, QGround



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

USV LIR 2.0
unmanned search and rescue platform
Applied Robotics Lab

The USV LIR 2.0 is an unmanned surface vehicle designed to serve as an open research platform. It is named after the Irish legend Children of Lir. This project showcases engineering to school students through a mission design competition and is being used for marine research by biologists from IMEPMAR - Catholic University of Valencia.

The unique aspect of this project is the technology underneath. The Pixhawk 3 controls the boat with the help of GPS and is connected to a laptop through telemetry communication, while QGround Control is the mission planning software tool used to configure the boat. The microbit interface, a small microprocessor programmed with virtual puzzle blocks, is a standout feature that makes this platform accessible to anyone, regardless of their technical background.

Drowning is the third leading cause of accidental deaths worldwide. The WHO says that drowning deaths are preventable but rely on a quick and organised response. The survival rates drop after a few minutes in the water. With USAR technology (Unmanned Search and rescue) it is possible to prevent these deaths. This is what this project is trying to show case.

My primary focus is maritime search and rescue, using object detection training models and image processing methods to detect and rescue people in risk of drowning. I developed GUI to provide ease of use for future use. The path planning for the boat is done with common motion planning algorithms like Dijkstra and the communication is done through MQTT.

SE TU

Universidad Católica de Valencia San Vicente Mártir

Dominik Wawak - BSc (Hons) Applied Computing (Internet of Things) - South East Technological University - Applied Robotics Lab

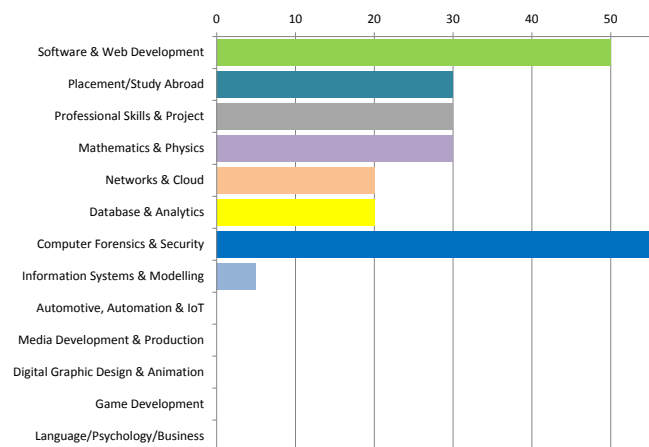
BSc (Hons) in Computer Forensics and Security

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 chart.



Projects

Niall Crowe

EPods: Podman-based eBook Manager 27

Gowriswarup Kailas Perumal

Strengthening Cybersecurity for Smart Homes and Open Networks: A Threat Detection and Portable Exploitation Model 28

Emran Sabbagh

Desktop App Notification System for Scanning Areas for Ships 29

Durgaashini SagaraniDevelopment of a Mobile App for ADHD Users 30



Niall Crowe

Gowriswarup
Kailas Perumal

Emran Sabbagh

Durgaashini
Sagarani

TL249 – 44

by Niall Crowe

EPods: Podman-based eBook Manager



EPods is a React-based web application that allows users to manage the eBook catalogue. The web application landing page lists all the user's eBooks, showing each one's cover, title

and author. Clicking a book takes the user to its detailed page, which includes metadata such as the publication date, genre, word count, and ISBN. From there, users can read the book using a third-party reader component embedded in React. If a user has already started reading, the application will return them to their last read page. The metadata for each book is scanned and gathered by a Golang web API (which utilises the GIN framework) and stores the data in an AWS RDS database for future use. The

Golang web API runs inside a container created by Podman, a daemonless container engine for creating, managing and running OCI Containers. This container will run inside an AWS EC2 instance. The React frontend is deployed on an AWS S3 bucket designed for web hosting. As both of these components are running inside AWS services, the user can read their eBook files from any location at any time. Users can also update or delete books from the web application.

Technologies:

React, Golang, Gin, AWS

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

EPods

Full Stack Web Application Allowing Users To Manage Online eBook Library

Abstract

EPods is a full stack web application that allows users to upload and browse eBook files that they have on their system. The eBooks will be displayed by the web application showing the book's cover, title and author. When a book is clicked on the user will be taken to the book's detailed page where extra details such as the publication date, genre, word count and ISBN number will be displayed. From there, users can choose to read the book using the application. If a user has already started reading, then the application will return them to their last read page.

Key Features

- Create and manage eBook collection from web browser
- Read any eBook from this collection
- Upload eBooks to S3 bucket storage
- Golang Web-API running inside Podman container.
- Podman running on AWS EC2 instance.
- React frontend running on AWS S3 bucket.
- eBook metadata uploaded to AWS RDS database.

System Architecture

Methodology

Agile methodology was used during the development of this application. This was so each feature and component of the application could be worked on in order to see what worked and what needed improvement, while also allowing for feedback and suggestions during development.

Technologies

Niall Crowe - 20089334

BSc (Hons) Computer Forensics and Security

Department of Computing and Mathematics

School of Science and Computing

South East Technological University

Strengthening Cybersecurity for Smart Homes and Open Networks: A Threat Detection and Portable Exploitation Model

by Gowriswarup Kailas Perumal



In the age of digital technology cornering virtually every aspect of human convenience, as reliance on smart devices and home networks continues to grow, so do the risks of cyber threats. In

response, a plug-and-play Threat Detection Model has been developed for home networks. This model is designed to automatically scan the network and connected devices, and alert users via an Android application of any unrecognized intrusion activity or network scans, as well as any new devices connected to the network. The model is easy to configure with the help of an installation manager and includes all required dependencies and automation scripts. To test the model's effectiveness, a Portable Ex-

ploitation Device is also developed. This allowed for a more comprehensive understanding of the model's capabilities and raised awareness of the severity of cyber threats. The project will also be published on GitHub for interested individuals to test on their own networks. Its open-source nature allows for more comprehensive improvements. The primary aim of this model is to enhance cybersecurity in the age of digital transformation and promote safer and more secure use of technology in households

Technologies:

Raspberry Pi 4B, Kali Linux, Python, Kotlin, Github, Android Studio

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

STRENGTHENING CYBERSECURITY FOR SMART HOMES AND OPEN NETWORKS: A Threat Detection and Portable Exploitation Model

ABSTRACT

A PLUG-AND-PLAY THREAT DETECTION MODEL HAS BEEN DEVELOPED FOR HOME NETWORKS. THIS MODEL IS DESIGNED TO AUTOMATICALLY SCAN THE NETWORK AND CONNECTED DEVICES, AND ALERT USERS VIA AN ANDROID APPLICATION OF ANY UNRECOGNIZED INTRUSION ACTIVITY OR NETWORK SCANS, AS WELL AS ANY POTENTIAL SECURITY RISKS TO THE NETWORK. INTERESTED USERS WILL BE ABLE TO RECREATE THE MODEL TO BETTER UNDERSTAND THE IMPORTANCE OF SECURITY IN HOME/OPEN NETWORKS, ESPECIALLY WITH THE GROWING RELIANCE ON SMART HOME DEVICES.

METHODOLOGY

THIS PROJECT UTILIZES AN AGILE+KANBAN APPROACH TO MANAGE THE WORKFLOW AND OPTIMIZE THE PROCESSES. BY COMBINING THE FLEXIBILITY OF AGILE WITH THE VISUAL WORKFLOW MANAGEMENT AND WORK-IN-PROGRESS LIMITS OF KANBAN, WE WERE ABLE TO APPROACH THE PROJECT IN A MORE EFFICIENT AND EFFECTIVE MANNER. WE UTILIZED A KANBAN BOARD TO VISUALIZE OUR WORK, TRACK OUR PROGRESS, AND IDENTIFY AREAS FOR IMPROVEMENT. THIS APPROACH ALLOWED US TO CONTINUOUSLY IMPROVE OUR PROCESSES AND COLLABORATE MORE EFFECTIVELY.

FEATURES

- THREAT DETECTION MODEL THAT CAN BE INSTALLED ON RASPBERRY PI 4B, WITH ACCOMPANYING INSTALLATION SCRIPT FOR EASE.
- ANDROID APPLICATION WHICH IS USED TO RUN COMMANDS REMOTELY AND DISPLAY RESULTS.
- RASPBERRY PI RUNNING KALI LINUX OS WITH PYTHON SCRIPTS TO FACILITATE THE FOLLOWING:
 - DEVICE DISCOVERY
 - OPEN PORT SCANS
 - SECURITY ANALYSIS
 - HONEYPOT INTEGRATION
 - ALERT DELIVERY
- NETWORK ALERTS WILL BE DELIVERED TO THE USER AS APP NOTIFICATIONS.
- REALTIME DATABASE USED FOR STORING AND RELAYING INFORMATION.
- A PORTABLE EXPLOITATION DEVICE IS ALSO DEVELOPED TO FACILITATE A COMPREHENSIVE UNDERSTANDING OF THE MODEL'S CAPABILITIES AND RAISE AWARENESS OF THE SEVERITY OF CYBER THREATS.

KEY TECHNOLOGIES

SE TU
South East Technological University

GOWRISWARUP KAILAS PERUMAL
 BSc (Hons) in Computer Forensics and Security
 Department of Computing and Mathematics
 Supervisor : Nitish Swami

TL249 – 46

by Emran Sabbagh

Desktop App Notification System for Scanning Areas for Ships



Gathering and analyzing open-source information or data has become very popular in the past 10 years. This type of data can be

gathered from multiple sources on the internet including social media and more specialized sites (news, ship tracking, or flight tracking). This desktop app, that features a graphical user interface, seeks to help ship tracking enthusiasts to gather data about ships in a specific area. It is based on Python and JSON, and Marine Traffic website data, and it automates the tracking of ships within a specific area (based on longi-

tude and latitude) and time-frame and alerts the user accordingly, providing more information on relevant ships (e.g. length, draught, width, etc.). The app also provides other useful services such as database storage for the Marine Traffic API key hash value, data analysis report, Twitter scrapped data, and AI/ML generated data which are very useful for users by making data acquisition less expensive.

Technologies:

Python, SQL, JSON, MySQL (PhpMyAdmin), Marine Traffic API, PyCharm IDE

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Desktop App Notification System for Scanning Areas for Ships

Emran Sabbagh
 BSc (Hons) in Computer Forensics and Security
 Department of Computing and Mathematics
 School of Science and Computing
 South East Technological University

Abstract

Gathering and analyzing open-source information or data has become very popular in the past 10 years. This type of data can be gathered from multiple sources on the internet including social media and more specialized sites (news, ship tracking, or flight tracking). This desktop app, that features a graphical user interface, seeks to help ship tracking enthusiasts to gather data about ships in a specific area. It is based on Python and JSON, and Marine Traffic website data, and it automates the tracking of ships within a specific area (based on longitude and latitude) and time frame and alerts the user accordingly providing more information on relevant ships (e.g., length, draught, width, etc.). The app also provides other useful services such as database storage for the Marine Traffic API key hash value, data analysis report, Twitter scrapped data, and AI/ML generated data which are very useful for users by making data acquisition less expensive.

Rationale

I was inspired to do this idea by the global events that are currently taking place such as the conflict in Ukraine. Such events are covered a lot on news channels because they have huge effect on our daily lives which makes people interested to know more about them. This makes some people take advantage of the situation and spread false information and rumours which can mislead people. Since my project focuses on events related to ships and maritime such as the Nord Stream pipeline explosion for example and since it provides neutral open source information to ship tracking enthusiasts it helps them to verify information, avoid bias and spread awareness against rumours.

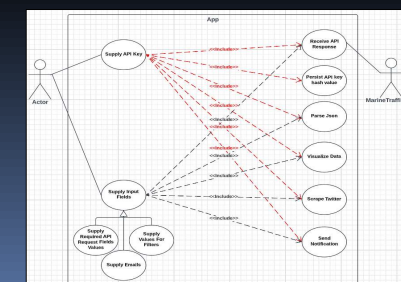
Methodology

The Agile methodology was used for this project as it makes it possible to build and test a project iteratively and incrementally. Prototypes were created at different stages of the development to implement and test new features.

Technologies



Use Case Diagram



TL249 – 47

Development of a Mobile App for ADHD Users

by Durgaashini Sagar



ADHD (Attention Deficit Hyperactivity Disorder) is a neurobiological condition which affects people’s behaviour. Users with ADHD frequently struggle with attention, organisation, and time management, which

can have an impact on their daily functioning. In this project, the aim is to create a mobile application that will assist ADHD users in managing their symptoms and increasing their daily productivity. The app was created through an iterative design process using Agile Methodology, using research from both ADHD users and relevant healthcare professionals. Reminders, time management tools, and task management tools are all included in the app. The most important feature of the app allows users to track the time it

takes to travel from one location to another using the Google API, which can be a useful tool to help users with ADHD better manage their time and plan their daily activities. The mobile application will be developed in Android Studio Code using the Kotlin programming language. Overall, this project makes an important contribution to the development of digital health interventions for ADHD users and has the potential to improve their daily functioning and quality of life.

Technologies:

Kotlin, Android Studio Code, Figma, Firebase

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Development of a Mobile App for ADHD Users

Background
ADHD is a neurobiological condition that affects daily functioning. My project aims to create a mobile application to assist users with ADHD in managing their symptoms and increasing productivity as well as incorporates feedback from both ADHD users and healthcare professionals for this app.

Methodology
I am using Agile methodology (Scrum), an iterative and collaborative approach that breaks down the project into smaller sprints, allowing for quick generation of working application parts and client feedback.

Key Features
The app includes reminders, time management tools, and task management tools. The most important feature is the ability to track travel time using the Google API to better manage time and plan daily activities.

Technologies
Figma, Kotlin, Android Studio Code, GitHub

Application Architecture

Durgaashini Sagar | BSc (Hons) in Computer Forensics and Security | SETU (Waterford Campus) | 20087371

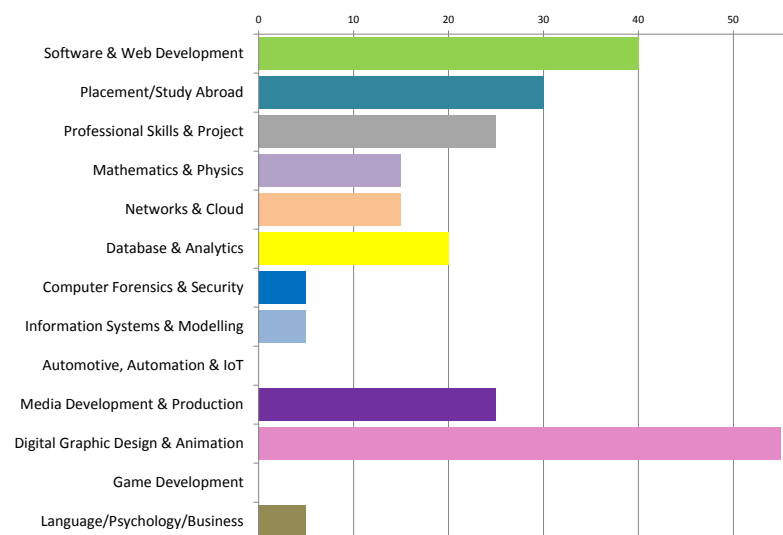
BSc (Hons) in Creative Computing

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.



Projects

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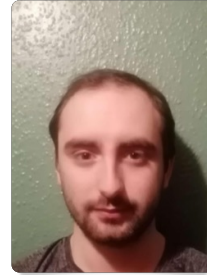
Kia Conaty



Josh Deegan



Michael Hart



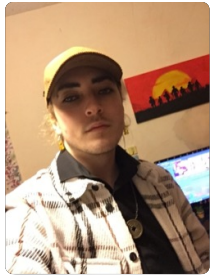
Darren Kidby



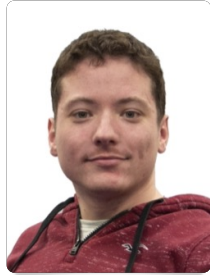
Dariusz Ligas



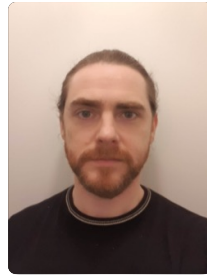
Jack McGrath



Jack Noonan



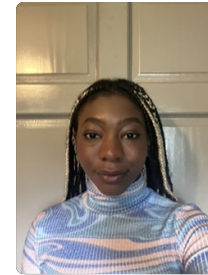
Shane O'Brien



Barry O'Donnell



Kate O'Neill



Oluwasimisola
Popoola



Emma Roche

TL228 – 13

by Kia Conaty

2D Animated Biographical Documentary



A 2D animated short film based on the life and death of Elvis Presley which will be narrated by a voice over actor sourced locally. The

genre of the film will be historical. The type of film will be a documentary. As the type is documentary the information provided will be non fictional and sourced from existing factual information about the singer. It will touch on all the crucial milestones in the singer’s life which spanned across 42 years from childhood to his death. The singers life story will be told in linear order. Other important characters in the singers life will

be portrayed in the documentary also. The idea is novel as there are no animated short films with such high level of detail about the singers life. For this project there is a wide range of potential target audiences. As Elvis Presley is so well known, the film is not limited to one particular age range. The story will be conveyed in an informal but informative manner, which can be understood by any age.

Technologies:

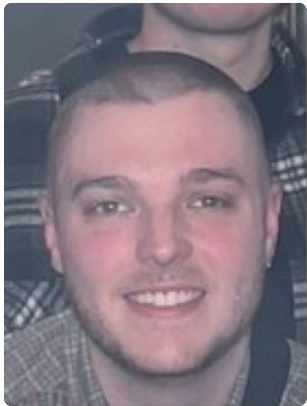
Adobe Character Animator, Illustrator, Premiere Pro, After Effects

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

TL228 – 14

by Josh Deegan

Self-Produced Electronic Music Video - 'The Masked Man'



Electronic Music Video documenting a day in the life of The Masked Man using self-produced music, self-captured footage, editing, and animation software. The masked man is known

around the town for being an absolute nobody. His only life purpose seems to be consuming sugar and listening to techno music. This video will follow the man from when he wakes in the morning to when he passes out at night, showing all the no-good activities that the man gets up to during the day. The music for the video will be self-produced, mixed, and mastered using Ableton 10. The footage will be self-captured and edited using Adobe Premiere Pro and Adobe After Effects. The video will con-

tain some animation created using Adobe Character Animator. The genre of music is techno, which is a passion of the producer who takes inspiration from the late 90's - early 2000's. The theme of the music video is addiction and loneliness. The character has nobody to support him and is addicted to a substance. The director plans to show this very clearly in the video by showing his daily routine and sugar consumption throughout the day, while not straying too far into the world of drugs.

Technologies:

Ableton 10, Adobe Premiere Pro, Adobe After Effects, Adobe Character Animator

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

TL228 – 15

Hybrid 2D/3D Animated Short Film

by Michael Hart



'Ebb & Flow' is a hybrid 2D/3D animated short film. Sometimes referred to as 2.5D or non-photorealistic rendering within the industry. This hybrid style is the combination of 2D and 3D elements in animation. The

marriage of these dimensions has seen increased popularity in recent years in the animation industry and is a style I have found myself drawn to. With 'Ebb & Flow' I wanted to capture the essence of this unique animation style while telling a profound and thought-provoking story. The story revolves around a man journeying along a mysterious beach in solitude. He happens upon a piece of driftwood with magical capabilities that will test both his creativity and psyche. Whatever the man wishes

to draw upon the sand will come to life. However, the drawings are but temporary and with the wash of the waves, his real-life creations vanish along with them. With this concept I wanted to explore the passage of time and what we do to keep ourselves content in our lives; what do we look to surround ourselves with to maintain our happiness, and the inevitable transience of those things. This short film is an abstract and fantastical animation that acts as a driver to convey these ideas.

Technologies:

Photoshop, After Effects, Blender, Ableton Live, Audacity, DaVinci, Resolve

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Hybrid 2D/3D Animated Short Film

Ebb & Flow

METHODOLOGY

Pre-Production

- Generate Ideas
- Write Script
- Create Shot List
- Draw Storyboards
- Produce Animatic

Production

- Record Audio
- Lighting
- Animate Assets
- Create 2D Assets
- Create 3D Models

Post-Production

- Compositing
- 2D VFX
- Colour Correction
- Video Editing
- Sound Editing

ABSTRACT

'Ebb & Flow' is a hybrid 2D/3D animated short film. Sometimes referred to as 2.5D or non-photorealistic rendering within the industry. This hybrid style is the combination of 2D and 3D elements in animation. The marriage of both these dimensions has seen increased popularity in recent years in the animation industry and is a style in which I have found myself drawn to. With 'Ebb & Flow' I wanted to capture the essence of this unique animation style while telling a profound and thought-provoking story. The story revolves around a man journeying along a mysterious beach in solitude. He happens upon a piece of driftwood with magical capabilities that will test both

KEY TECHNOLOGIES

Ableton Live

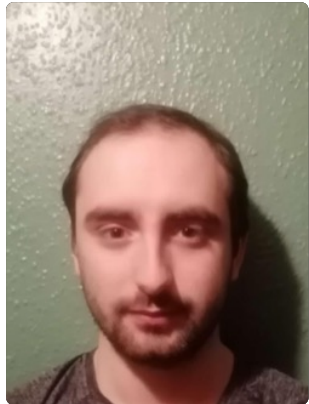
Ollscoil Teicneolaíochta an Oirtheisicirt
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TL228 – 16

by Darren Kidby

3D Third Person Open World Game



For this Final Year Project, the goal was to create a third person open world game that had a variety of different levels to complete. These levels would unlock

after each level is completed. The game has two characters to select from, Jason and Catherine. The game ends when you complete all the levels. The story of the game is that a game company decided to start a competition. They put out multiple different puzzles and challenges around the city. The first sixteen people to complete all these challenges get to advance on to a tournament. The winner of the tournament gets free subscription to their gaming services for a year, with

a healthy cash prize as an award. It was important to research through YouTube and a variety of websites to help understand the software and to get to know all the different ways to create a game. As a student that had no prior experience in game development and in the blueprint style of creating games, this method of learning was really important. Watch multiple videos on a topic, learn from it and then create from what was learnt.

Technologies:

Unreal Engine, Autodesk Maya, Photoshop

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

SE
TU

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Third Person Open World Puzzle Game

Race to the Tournament

ABSTRACT

For this Final Year Project, the goal was to create a third person open world game that had a variety of different levels to complete. These levels would unlock after each level is completed. The game has two characters to select from, Jason and Catherine. The game ends when you complete all the levels.

The story of the game is that a game company decided to start a competition. They put out multiple different puzzles and challenges around the city. The first sixteen people to complete all these challenges get to advance on to a tournament. The winner of the tournament gets free subscription to their gaming services for a year, with a healthy cash prize as an award.

It was important to research through YouTube and a variety of websites to help understand the software and to get to know all the different ways to create a game. As a student that had no prior experience in game development and in the blueprint style of creating games, this method of learning was really important. Watch multiple videos on a topic, learn from it and then create from what was learnt.

System Overview

This game has several menus. These menus have a variety of different functions.

- Any Button Menu - Press any button to go to the main menu screen.
- Main Menu - Allows the player to create game, load game, look at credits or exit the game.
- Create game Menu - Allows the player to create a new save.
- Load game Menu - Allows the player to load one of their saves.
- Loading Menu - A loading screen before entering the game or level.
- Character select Menu - Allows the player to select a character.
- Instruction Menu - Tells the player how to play the level.
- Pause Game Menu - Allows the player to pause the game.
- Save Game Menu - Allows the player to save their progress in the game.
- Credits Menu - Shows the games credits.

Methodology

The methodology chosen is the Agile Methodology. It is an iterative process. The way it works allows you to see it as working on small projects rather than on one big project. The focus allows you to create a more efficient game for your target audience. This is what I wanted to incorporate into my project. I wanted to make it, so each section of the game has its own deadline.

Technologies Used

Adobe Photoshop was there for when I needed to create a material.

Autodesk Maya was used to add to modify any models I needed to change.

Unreal Engine is the software I chose. I wanted a challenge and thought Unreal would be a good challenge for me.

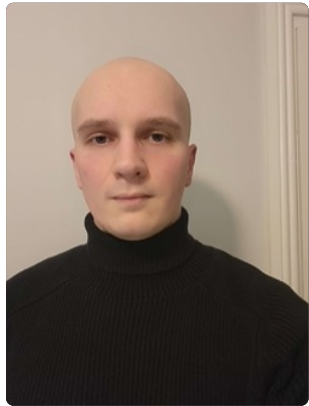
Metahuman allowed me to create realistic looking characters for my game.

Mixamo allowed me to download animations that I could add to my character.

TL228 – 17

by Dariusz Ligas

Azul-Link



Azul-Link is an RPG (Role playing game) and is an open world adventure with various levels and tasks to explore. The goal of the game is to rescue a captured princess. I am devel-

oping the game using the Unreal engine 5. Methods I am learning from YouTube videos and various websites online. I am following a system called the 8 P's. Proof - learn from the tutorial and then do it yourself. Passion - have fun doing it. Patience - it takes time to learn and develop. Purpose - have a goal, see what you want to learn. Presence - accountability, and deadlines. Persistence - do it as often as possible. Prevention - if you get burned out take a break and distract your mind. Perseverance -

learn at your own pace. Results to date is that I have developed the following in my game: Main Menu System, Pause Menu, Options Menu, Death screen, Loading screen, Respawn Ragdoll system, Pick up system, Health and health bar system, Damage system, Stamina and stamina bar system, AI random roam system, AI chase player system, Portal system, and Fall damage system. I also aim to develop a combat system, Talk and quest system, interaction and weather system.

Technologies:

Unreal Engine 5, Autodesk Maya, Adobe Photoshop

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Azul-Link

Unreal Engine 5 RPG Game

BSc(Hons) in Creative Computing
By: Dariusz Ligas

This project is a product of my imagination and my experience growing up. I created a unique fantasy game with inspiration from many popular RPG titles. This is an open world game with plenty to explore. The world offers many interesting quests, and various places to explore such as a labyrinth or a castle. The main objective to complete the game is to rescue a princess called Azul. There will be many challenges and obstacles ahead. Portals will allow you to navigate the open world and rescue the princess because they link the world together.

Game mechanics:
 Menu system: Contains a main menu, pause menu, options menu, credits, loading screen, death screen, load and save game.
 Combat system: The player has light and heavy attacks which let the user string combos.
 Sheathe/Draw weapon system.
 Health system: Allows the player to take damage during certain events such as combat, fall damage or drowning. The player can restore health by drinking elixirs.
 Damage system for both the player and the AI.
 Stamina system: Drains as the player sprints and regenerates when the player stops sprinting.
 Experience and leveling up system: The player will receive exp after killing enemy ai and completing quests. The higher the level the harder it will get to level up. Interaction system: Player can talk to friendly ai, open doors and chests.

Intelligent Ai system:
 Enemy ai roam the world. When the player has been seen, ai will chase the player until they have reached the player, upon which they will attack the player or if the ai has lost sight of the player after a certain time, they will lose interest and continue to roam. The ai will face the player upon taking damage. The ai combo system contains an array which allows for different attack animations to be played as well as hit reactions.

Inventory and loot System:
 A looting inventory system which allows the player to have an internal inventory which they always have access to, and an external inventory which can be accessed upon reaching or finding chests. This system allows the player to pick up and drop items into the world.
Quest system: The player can interact with friendly ai, the player can take and complete quests receiving rewards. A dialogue will be played with audio when talking to the ai.

Swimming system: When the player enters water they switch to the swimming animation. The player has oxygen and will take damage when the oxygen bar reaches zero.

Crouch system: Allows the player to fit into smaller areas but slows down movement.
Dodge roll system: While running the player will dodge roll and while standing still will jump up.

The game was created using the blueprint system that is available in Unreal Engine 5. I chose this system because it is simple to grasp and there is a lot of material available on the web. I learned from YouTube tutorials and from discord communities.

I used Replica Studio for the audio in the game. The software has high-quality ai voice actors and this allows for realistic voices.

I used Mixamo as my source for character meshes and animations. Mixamo offers good quality assets completely for free.

Epic Games store offers high quality texture packs ready to be used for free.

Short 3D Animated Film: "Catch"

TL228 – 18

by Jack McGrath



This final year project is a short 3D animated film where the plot follows the main character, Lyle, a lonely fisherman struggling to do what he does

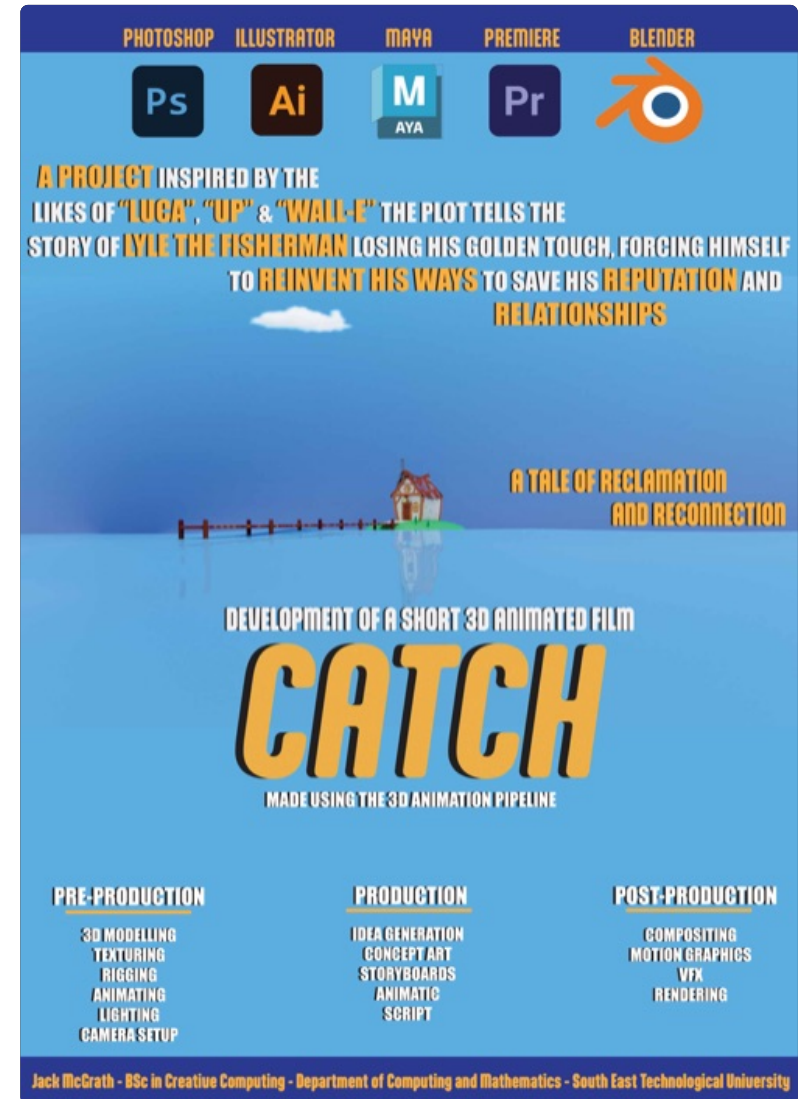
best, catch a fish. The story follows the brute determination of Lyle and his repeated approach, failing to learn anything from his past attempts. The story holds under themes of a complex relationship and reconnection. Lyle must change his ways to get back what he has lost, his relationship with his son, Luke, and his legendary fishing skills, all of this taking place on his remote island home. The short film follows the 3D animation pipeline, it has

been created using various industry standard softwares such as Autodesk MAYA, Adobe Premiere Pro, Adobe Photoshop, Adobe Illustrator and also Blender. The story structure makes use of Pixars "Story Spine" method and is influenced by numerous popular animated movies such as "LUCA", "UP" and "La Luna". This project is created from 3 key areas, primarily Animation with a mixture of Digital Graphic Design and Media Development & Production.

Technologies:

MAYA, Blender, Adobe Premiere Pro, Adobe Photoshop

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



TL228 – 19

by Jack Noonan

History of Viking and Norman Age Waterford



This project is a documentary / video essay detailing the history of Waterford, specifically during

the Viking and Norman occupation. The video illustrates the lifestyle of Waterford inhabitants and significant events during both the hazy history of Waterford Viking past and its more detailed and documented Norman past. The goal of this project is to educate the viewer but more importantly, encourage them to learn about Waterford. It aims to give enough context and history to make

the viewer interested but not overwhelmed, to inspire them to learn more to answer any questions that have arisen for them. Inspired by online content creators such as Jacob Geller from Youtube, this project aims to keep the information provided as entertaining as possible without overwhelming the viewer. This project is made using 3 mediums: 3D animation, 2D animation, and Live footage.

Technologies:

Blender, Adobe Animate, Adobe Premier Pro, Adobe After Effects

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
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VIDEO DOCUMENTARY DETAILING THE HISTORY OF WATERFORD CITY DURING ITS VIKING AND NORMAN OCCUPATION

HISTORY OF VIKING & NORMAN AGE WATERFORD

DESCRIPTION

THIS PROJECT IS A DOCUMENTARY / VIDEO ESSAY STYLED EDUCATIONAL VIDEO DETAILING THE HISTORY OF WATERFORD DURING VIKING AND NORMAN OCCUPATION. THE GOAL OF THIS PROJECT IS TO EDUCATE THE VIEWER BUT MORE IMPORTANTLY, MAKE THEM WANT TO LEARN ABOUT WATERFORD. IT AIMS TO GIVE ENOUGH CONTEXT AND HISTORY SO AS TO MAKE THE VIEWER INTERESTED BUT NOT OVERWHELMED. TO MAKE THEM WANT TO LEARN MORE THEMSELVES TO FILL IN THE GAPS MADE BY ANY QUESTIONS THEY HAVE.

THIS PROJECT WAS MADE USING A COMBINATION OF THREE MEDIUMS:
 3D ANIMATION
 2D ANIMATION
 LIVE FOOTAGE

METHODOLOGY

TECHNOLOGIES USED

Pr

Ae

An

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SOUTH EAST TECHNOLOGICAL UNIVERSITY

Parolympus: A MERN Based Web Application with Phone and Watch Integration

by Shane O'Brien



the MERN (MongoDB, Express, React and Node.js) stack architecture through JavaScript, and with help from the native languages of Apple and Android devices, Swift and Kotlin. The web application is split into different sections, depending on if the user is a trainer or athlete. An athlete can view a breakdown of their schedule, and the events within, for the current week. A trainer is able to add athletes to their team. This in turn will allow trainers to create, edit and delete scheduled events as necessary. The mobile and watch application will allow an athlete to start a workout and log data that is connected to the workout. All of this is also available to view on the web application.

Traditionally, an athlete and trainer working relationship, would have involved different applications for a workout program, dietary schedule and the collection of the connected data from workouts. Parolympus is an ecosystem that brings both trainer and athlete together. This ecosystem consists of a web, mobile and watch application. To do all of this, Parolympus is built using

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Parolympus

A MERN Based Web Application for Athletic Training Management

Key Technologies

System Overview

The images below showcase a sample of what the user interface would look like on different devices.

The Laptop show the dashboard for the Trainer, the Mobile shows the dashboard for the Athlete, and the Tablet shows the Authentication Page

System Architecture

The system shares information, which is populated by the Mongo database. node.js helps to transfer the stored data from MongoDB to the individual devices.

Methodology

One of the most popular ways to manage a project is the Agile method and Scrum framework. At its core, and demonstrated in the accompanying image, Scrum helps to form meetings, tools and roles that work together to allow teams to structure and manage their work efficiently. The constant release cycle allows the development team to identify and implement improvements on a regular basis.

There are three main parts, known as artifacts, to the scrum framework. These artifacts are product backlog, sprint backlog, and a self-defined state of "Done". Along side these artifacts, there are jobs within the workflow to keep the development progressing, these are the Scrum Master, Development Team and Project Owner.

With all that said, Agile and Scrum in particular isn't just limited to team work. An individual, as is my case, can apply these practices to a one person system. I am essentially the Product Owner, Scrum Master, and Development Team all at the same time.

Abstract

Traditionally, an athlete and trainer working relationship, would have involved different applications for a workout program, dietary schedule and the collection of the connected data from workouts.

Parolympus is an ecosystem that brings both trainer and athlete together. This ecosystem consists of a web application. To do this, Parolympus is built using the MERN (MongoDB, Express, React and Node.js) stack architecture through JavaScript, and with help from Bootstrap and React-Bootstrap.

The Web Application is split into different sections, depending on if the user is a Trainer or Athlete. An Athlete can view a breakdown of their schedule, and the events within, for the current week. A Trainer is able to add Athletes to their team. This in turn will allow trainers to create, edit and delete scheduled events as necessary.

Technologies:

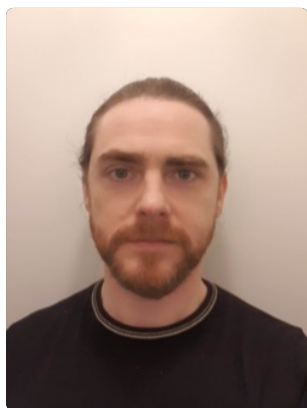
MongoDB, Express, React, Node.js Illustrator Swift, Kotlin

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
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Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Lets Roll

TL228 – 21

by Barry O'Donnell



My plan is to create an app that is used to roll 3D dice for tabletop games such as Dungeons & Dragons or Pathfinder. It will have the ability to roll any number

of 4-, 6-, 8-, 10-, 12- and 20-sided dice. The dice will roll and show the outcome up on screen. I intend to use UNITY to develop most of this app alongside 3D softwares like MAYA and Blender to build 3D assets like dice and backgrounds. Over the lockdown I started playing Dungeons & Dragons as way to escape and to hangout with friends, all be it online. To play the game, we used a website called Roll20.net which allowed us to move tokens and roll dice. After playing for a few

weeks, I discovered they had a 3D dice feature which rolled 3D dice on the screen in front of you, which really helped with the immersion. The app will allow you to roll 3D dice on your phone and will display the number rolled on the screen, as well as in the case of multiple dice add up and display the number. You will also be able to change the colour of the dice to suit your character and the space you are rolling on to suit your in-game surroundings.

Technologies:

C#, Autodesk Maya, UNITY, Blender, Adobe Illustrator, Adobe XD, VisualStudio

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



TL228 – 22

by Kate O'Neill

Responsive CSS Framework for Dark Mode Design



Constellation UI is a CSS Framework that specialises

in dark mode design. It aims to deliver a highly customisable CSS framework providing the capability to apply simple classes to HTML components to have full customisability over each element. It customises a host of commonly used elements without requiring a line of custom CSS. As dark mode design is increasing in popularity, Constellation

UI will provide 3 fleshed-out themes for developers to choose from that all meet colour contrast standards as well as supplying a set of templates for beginners to download and insert their own data into. It is downloadable via nNPM and fitted with extensive documentation for ease of implementation while providing installation guides.

Technologies:

SCSS, JavaScript, node.js, HTML, VS Code, GitHub, Gulp



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Responsive CSS Framework for Dark Mode Design
CONSTELLATION UI

Overview
 Constellation UI is a CSS Framework that specialises in dark mode design. Developers gravitate toward CSS frameworks as they allow for faster and more consistent web development. Constellation UI aims to deliver a highly customisable CSS framework providing the capability to apply simple classes to HTML components to have full customisability over each element. Constellation UI provides opportunities to customise padding, margin, border radius and more on a host of commonly used elements without requiring a line of custom CSS. It provides a fully functional grid system for a mobile first approach to development.

Core Features
Mobile First
 Constellation UI is a mobile first responsive framework. This enables all elements built using Constellation UI to react to different device sizes.
Elements
 Constellation UI provides classes to customise a variety of commonly used HTML elements. For example, tables, buttons and images all have pre-written CSS classes for optimal customisation.
Components
 A website is a sum of its components. Elements such as alerts, dropdowns and cards add to the convenience of every website. Constellation UI provides pre-written style classes for the above components.

Methodology
 Constellation UI is built using Agile Methodology, enforcing Sprints for incremental development. To monitor progress and flow of development, Kanban boards will be utilised. Kanban is a more visual way to organise tasks. It communicates clearly priorities and where each task is along the pipeline. It is easy to identify where tasks are being held up. Kanban will work best for this project to ensure all sprints are completed on time, within given time constraints. On smaller projects, Kanban is ideal for implementation. Outlining tasks specifically and defining work-in-progress are key parts of Kanban.

Interface
 Constellation UI offers a variety of pre-written classes and styles for text using things like letter spacing, text decoration, text weights and text decoration.

Technologies
 Constellation UI is created with customisability in mind. This means some elements and classes can get specific. To give potential users regular updates and information on when there are further updates, they can be notified by sign-ups and provided with their own data or used as inspiration or a guide on how to implement some features.

Technologies
 Sass, GitHub, NodeJS, GulpJS, VSCode, Trello

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 Department of Computing and Mathematics, South East Technological University Waterford Campus

TL228 – 23

Augmented-Reality Social Media Game

by Oluwasimisola Popoola



This project is focused on creating an immersive Augmented Reality experience for social media applications that promotes sustainable forestry through simple gameplay.

Deforestation is one of the most important issues of our time, and this game will shine a light on it in a more easily digestible way. Filter games differ from the traditional augmented reality game as they are playable within a social media application, with the end goal being that the user posts the clips of their gameplay to their feed for others to see. This game will be created using in Meta Spark Augmented Reality Studio, with original assets, sound effects and patches created specifically for this game using other technologies such as Maya, Illustrator and Digital Audio Workspaces.

Deforestation is one of the most important issues of our time, and this game will shine a light on it. Filter games differ from the traditional augmented reality game as they are playable within a social media application, with the end goal being that the user posts the clips of their gameplay to their feed for others to see. This game will be created using in Meta Spark Augmented Reality Studio, with original assets, sound effects and patches created specifically for this game using other technologies such as Maya, Illustrator and Ableton, a Digital Audio Workspace.

Technologies:

Meta Spark AR, Maya, Illustrator, Ableton, JavaScript

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Augmented Reality Social Media

Woodland Wanderer

Abstract

Augmented Reality is the way in which we merge the physical world with digital visual elements by stimulating the senses to create an immersive digital experience.

This project is focused on creating an immersive Augmented Reality experience for social media applications such as Facebook and Instagram, that promotes the idea of sustainable forestry through simple gameplay.

Deforestation is one of the most important issues of our time, and this game will shine a light on it.

Filter games differ from the traditional augmented reality game as they are playable within a social media application, with the end goal being that the user posts the clips of their gameplay to their feed for others to see.

This game is created using in Meta Spark Augmented Reality Studio, with original assets, sound effects and patches created specifically for this game using other technologies such as Maya, Illustrator and Ableton, a Digital Audio Workspace.

Technology

Screen Flow Chart

Features

The user can utilise their mobile phone camera and social media account to access, play and share the game.

The tree assets fall down the screen and the users aim is to slash them in a sustainable fashion. The special assets are worth a lot more points than the original assets and so getting the high score is made easier when the user plays the game slowly.

The game is played using a range of motions such as eyebrow raises to control the way the trees are slashed.

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iOS-based Career Guidance Assistant Application

TL228 – 24

by Emma Roche



The Careers Guidance App

is designed to aid people searching for third level undergraduate courses. In order to help provide users with the necessary information and support during their course search, the Careers Guidance App includes a course matching questionnaire. This questionnaire asks the user questions related to their inter-

ests and skills, both personal and academic. Once the user completes the questionnaire, course suggestions are generated that best match their personality traits, skills and interests.

Technologies:

Swift, SwiftUI, Xcode, GitHub, Firebase



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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iOS-based Career Guidance Assistant Application

The Careers Guidance App

Overview

The Careers Guidance App is a mobile application designed and developed for Apple iOS devices. It is designed to serve as a career guidance assistant for people in search of a third level undergraduate course in the Republic of Ireland. In order to help provide the user with the necessary information and support during their course search, the app includes a course matching questionnaire.

Similar to a personality test, this questionnaire asks the user questions related to their interests and skills, both personal and academic. Once the user completes the questionnaire, course suggestions are generated that best match to their personality traits, skills and interests. The suggested courses are analysed based on the responses the user provided throughout the questionnaire.

Key Features / Functionality

- Option to log in as an existing user, register as a new user or continue as a guest
- Course Matching Questionnaire
- Option to save questionnaire results to the Results Dashboard to view again at a later time
- In the Results Dashboard, users can view an analysis of their results (This feature is not available to guests)

The complete app design can be viewed in the media portion of the Projects GitHub Repository by scanning the QR code above.

Key Technologies

XCode
 Swift
 SwiftUI
 GitHub
 Firebase

System Diagram

Agile Methodology

Agile Methodology divides the development process into manageable incremental tasks via sprints.

Sprint planning is conducted on GitHub via the issues section, which can be accessed by scanning the QR code at the top of the poster. In each issue, there is information regarding the tasks that are to be accomplished in each sprint.

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Department of Computing and Mathematics | SETU

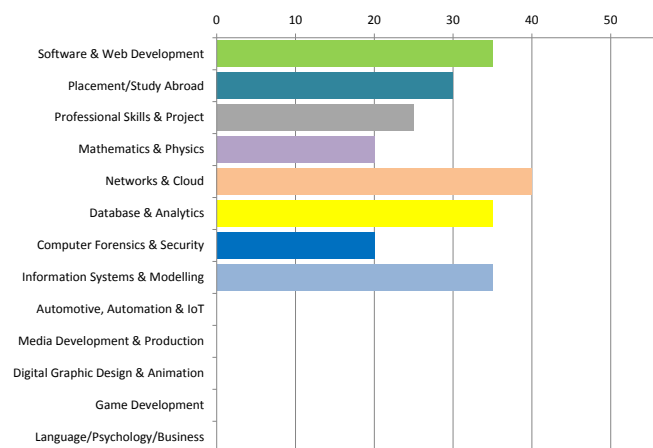
BSc (Hons) in Information Technology Management

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.

Projects

Ian Carpendale

What Impact Can the Adoption of Blockchain and Cryptocurrency Have on Developing Countries? 48

Kieron Dalton

Enhancing Student Retention in Higher Education: A WordPress Website Development Approach 49

Karen Ogiugo

How the HSE Cyber Attack Changed the Way They Protect Private Data 50



Ian Carpendale



Kieron Dalton



Karen Ogiugo

TL252 – 1

What Impact Can the Adoption of Blockchain and Cryptocurrency Have on Developing Countries?

by Ian Carpendale



Technology is ever growing and evolving in different ways, if we wish to utilize any opportunities to improve the standard of technology in many dif-

ferent sectors it is important to stay informed on emerging ideologies and projects. There has been an ever growing attraction and adoption to the use of cryptocurrency and blockchain technology within a wide array of sectors worldwide, ranging from government, healthcare, education, financial and many more sectors. This research work seeks to investigate the impact the adoption of cryptocurrency blockchain technology on developing countries and provides evidence of

use cases of this adoption within a chosen few developing countries, of which includes El Salvador, Central African Republic, Nigeria, Brazil, Malaysia, Philippines. The research style and methodologies adopted to successfully answer this research question is primarily quantitative methodology techniques, with the majority of the data being taken from extensive literature reviewing from various sources such as research work, reports, and academic journals.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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THE ADOPTION OF BLOCKCHAIN TECHNOLOGY AND CRYPTOCURRENCY IN DEVELOPING COUNTRIES

INTRODUCTION
The adoption of blockchain and cryptocurrency can be viewed in many different sectors worldwide, specifically by developing countries attempting to utilize this technology to better their infrastructure and the state of their countries. There are many use cases apparent for example in El Salvador adopting Bitcoin as an official Legal Tender, in The Central African Republic they have developed a digital currency named Sango Coin as their digital legal tender in a bid to minimize transactional fees sending money back home. In Nigeria the healthcare sector is very underdeveloped, for this reason they are utilizing blockchain to track their healthcare records. These are only some of the ways that developing countries are currently using blockchain technology

COUNTRIES RESEARCHED THAT ARE CURRENTLY ADOPTING BLOCKCHAIN
El Salvador, Brazil, Malaysia, Philippines, Nigeria, Central African Republic

RESEARCH QUESTION
What impacts can the adoption of blockchain & cryptocurrency have on developing countries?

RESEARCH METHODOLOGY
The research methods used adopt a qualitative style, gathering insights from academic journals, papers and posing a question to be answered by gathering information and attempting to understand new concepts, the below diagram shows my workflow

OBJECTIVES
The Objectives of this research project is to educate the reader on the current adoption and acceptance of blockchain and cryptocurrency in developing countries, making reference to a select amount of countries' use cases in which are improving their operations and current situation by doing so

THE POSITIVES & NEGATIVES
These countries in question are actively digitizing their operations by utilizing blockchain technology in sectors from healthcare to finance to governance, being able to improve operations drastically although adoption is ongoing there are attempts that have failed or are proving ineffective in its use case

CONCLUSION
The research project in question provides evidence of these countries roadmap in adopting blockchain technology, highlighting the failures and successes

IAN CARPENDALE
BSC HONS IN INFORMATION TECHNOLOGY
DEPARTMENT COMPUTING & MATHEMATICS
SOUTH EAST TECHNOLOGICAL UNIVERSITY WATERFORD

Enhancing Student Retention in Higher Education: A WordPress Website Development Approach

by Kieron Dalton



This project aims to develop a WordPress website to improve student retention in college courses. The website will promote altruistic, extrinsic, and intrinsic moti-

vation, and utilize the goal setting theory, achievement theory, expectancy value theory, Atkinsons theory, Weiners attributional theory, and colour psychology. The website will offer engaging content, personalized goal setting, self-assessment tools, confidence-building resources, and positive colours. By providing students with the necessary support and motivation, the website can foster a culture of learning and growth, and ultimately improve student retention in college

courses. All of these aspects will be covered by the functionality across the website. This functionality contains a to-do list page that allows users create specific and measure goals. A learning & Q&A section allows users to interact with engaging content. A quiz section acts as both a self assessment tool and a confidence building resource. Finally, the whole website will be designed with a colour scheme specifically catered towards positivity and motivation.

Technologies:

WordPress, cPanel, Inkscape, Figma, HTML, CSS, JavaScript, Hosting Ireland

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Enhancing Student Retention in Higher Education A WordPress Website Development Approach

Background

This project involves the creation of a WordPress website with the aim of increasing student motivation and retention. The website provides various features such as daily motivational quotes, a to-do list tailored to students, a quiz section to test people's knowledge of motivation, and a Q&A forum for discussing various motivational topics. The objective is to promote student engagement, foster positive attitudes towards learning, and ultimately improve academic outcomes.

Abstract

The creation of this WordPress website was a response to the concerning issue of low levels of student completion rates and high numbers of students dropping out of courses. Research has shown that lack of motivation is a significant contributing factor to this problem. Therefore, this website was developed to address this issue by providing a platform that promotes motivation and engagement among students. The website will be fully responsive ensuring it's accessible whenever students need it.

Technologies Used

Research

Atkinson's theory suggests that motivation is driven by the desire for achievement and the fear of failure. Goal setting theory emphasizes the importance of setting specific, challenging goals in order to increase motivation and performance. Expectancy value theory posits that motivation is influenced by both the perceived likelihood of success and the value placed on the outcome. Finally, achievement theory suggests that people are motivated by the desire for competence and mastery. By incorporating these theories into the website's design and content, users will be able to better understand and overcome common barriers to achieving their goals, and increase their motivation and likelihood of success.

Goal

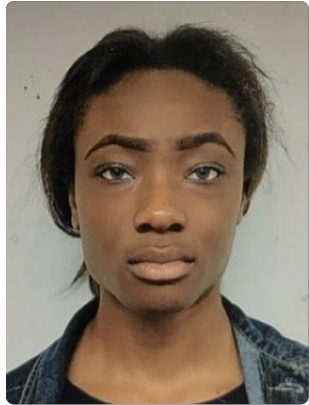
The goal is to address the root cause of low completion rates and dropout rates by increasing motivation, which will in turn lead to greater persistence and achievement of academic goals. The website is being designed to be user-friendly and accessible, making it an ideal platform for students of all levels to engage with and benefit from. With its motivational research-based approach and community-building focus, the website has the potential to not only help individual students, but also contribute to increased student retention and improved academic outcomes on a broader scale. Students will be able to reach their full potential and contribute to society in meaningful ways.

Kieron Dalton
Year 4
Information Technology Management

TL252 – 3

How the HSE Cyber Attack Changed the Way They Protect Private Data

by Karen Ogiugo



This project dives into everything that happened to the HSE during the ransomware attack in 2021. The Health Service Executive (HSE) is responsible for delivering health and social care services in Ire-

land. The purpose of this project is to discover how hackers effected approximately 130,000 workers of the HSE, their patients and clients. Healthcare services in Ireland faced disruption, immediately impacting patients who needed regular assistance, especially during the pandemic. This project documents the timeline, in detail of what exactly happened on each date as this was not a one day incident. It was an ongoing attack that lasted months. When the hacker successfully gained unauthorised

access to the HSEs, they continued to operate for a duration of eight weeks. These two months consisted of abusing and disrupting as many accounts as possible. During this time, servers were compromised and data was exfiltrated. The timeline will include how things were before the attack, during the attack and after the attack. Stolen information became encrypted, yet not all information could be retrieved back. Furthermore, I will investigate how this actually impacted staff in different ways.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
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How to HSE Ransomware Attack Changed the way they Protect Private Data

Abstract

This project will research the timeline event of the HSE cyber attack, detailing all the occurrences and the impact it had on the health sector. Furthermore, to investigate what the HSE has done to improve their security in order to prevent potential cyber-attacks in the future.
'The cost of the Health Service Executive of dealing with last year's cyberattacks on its IT systems has risen to almost €50 million' - Paul Cullen, Sep 7 2022

Literature Review

Policies & HSE's Culture with Technology

What happened?

Conti Ransomware

Strategic recommendations

Who did this and why during the pandemic?

Timeline before, during and after the attack

Methodology

The data collected will be qualitative. Due to the nature of the interview questions, the answers given will be descriptive. When the data is collected, possible patterns or differences in the results can be found and analysed.

Research Questions

1. How did the HSE Ransomware effect people's privacy?
2. What steps has the HSE taken to strengthen its cybersecurity?
3. Are members of the HSE confident that an incident like this won't happen again?

Karen Ogiugo—20090650
 BSc(Hons) in Information Technology Management
 Department of Computing and Mathematics of Science and Computing.
 South East Technological University

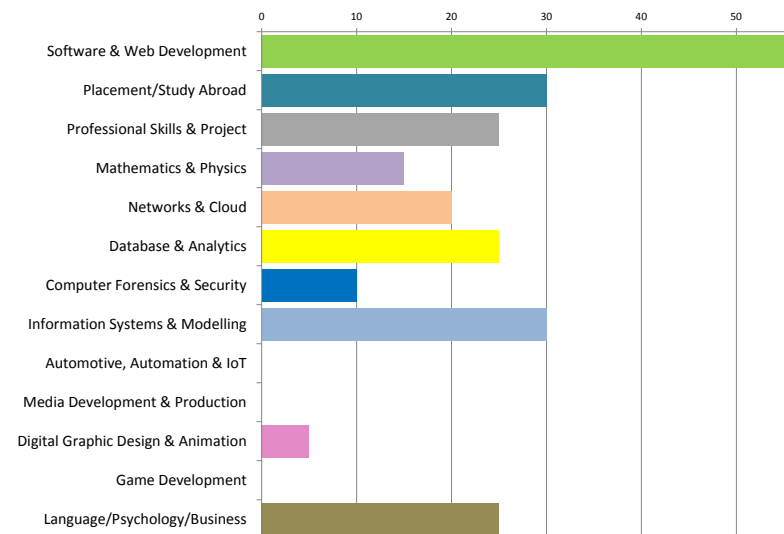
BSc (Hons) in Software Systems Development

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

The aim of the BSc (Hons) in Software Systems Development is

to produce a well-rounded software developer who can develop secure software with the most modern methods of software technology for all areas of application, and to analyse, select, and utilise appropriate emerging technologies for the development of a software solution in an organization context. It also addresses the ICT national skills shortages by providing graduates with the necessary skills to work effectively in a variety of software development roles, particularly in multi-disciplinary or intercultural contexts.

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

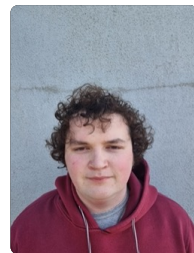


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Adrian Bernacki



Mark Campbell



Ben Capper



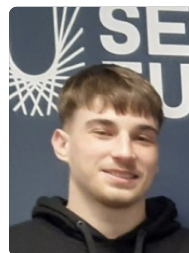
Evan Casey



Robert Fox



Caoilin Kavanagh



Daniel Marko



Rebecca Troy

Anti-Spam: Mobile Real-Time Fraud Prevention Shield for Android

TL252 – 4

by Adrian Bernacki



Anti-Spam is a mobile app designed to protect Android users from fraudulent ac-

tivities in real-time. Developed using Kotlin in Android Studio, the app automatically blocks unwanted phone calls and displays warning overlays when malicious SMS messages are detected. It also allows users to manually blacklist numbers or keywords and customize their security settings. What sets Anti-Spam apart is its extensive and updated database of black-

listed numbers, ensuring users are protected from the latest threats. Unlike other spam-blocking apps, Anti-Spam does not require users to modify their default dialer app, making it more convenient to use. The app also allows users to report suspicious numbers to create a community-driven security network that can efficiently block scammers and fraudulent activity.

Technologies:

Android Studio, Screaming Frog, Kotlin, Java, Python

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Real-Time Blocking / Warning

Methodology

I opted for Agile methodology due to its flexibility. The methodology empowered me to adhere to strict timelines while effortlessly accommodating changes in the project scope. Additionally, Agile's iterative approach enabled me to break down complex tasks into smaller and more manageable chunks to achieve my end-goal.

Key Technologies

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Automated IOT Plant Watering System

TL252 – 5

by Mark Campbell



The Automated IOT Plant Watering System is a watering system powered by a Raspberry Pi that is capable of watering plants

without human intervention and is capable of being controlled by an Amazon Alexa. It is equipped with humidity, temperature and moisture sensors along with a submersible water pump. A plant has its own profile hosted on Mongo Atlas which has its name, watering type and last watering date. A user can alter the plant profile using a web app that is linked to the watering system. Real-time graphs of the rooms humid-

ity and temperature can be seen from the web app. The web app is containerized and hosted on Kubernetes. The watering system can be set to different watering types consisting of moisture-based watering, weekly watering, bi-weekly watering and manual watering. Using the watering system Alexa skill a user can ask it questions like “When did the plant get watered last” or “Change the watering type to weekly”.

Technologies:

Raspberry Pi, Python, Kubernetes, Docker, Mongo, Apache Kafka, HTML

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

The Automated IoT Plant Watering System
Mark Campbell BSc(Hons) in Software Systems Development

The diagram shows the following components and their interactions:

- Alexa Skill**: Reads from/makes changes to **Mongo Atlas**.
- Plant Profile Hosted on Mongo Atlas**: Reads from/makes changes to **Web App Hosted on Kubernetes**.
- Web App Hosted on Kubernetes**: Reads temperature/humidity data from the **Watering System**.
- Watering System**: Produces/consumes data to/from the **Plant**.
- Plant**: Waters the plant.

Abstract

The Automated IOT Plant Watering System is a watering system powered by a Raspberry Pi that is capable of watering plants without human intervention and is capable of being controlled by an Amazon Alexa. It is equipped with humidity, temperature and moisture sensors along with a water pump.

A plant has its own profile hosted on **Mongo Atlas** which has its name, watering type, room temperature and humidity as well as the last watering date. A user can alter the plant profile using a web app that is linked to the watering system. Real-time graphs of the room's humidity and temperature can be seen from the web app. The web app is containerized and hosted on **Kubernetes**.

The watering system can be set to different watering types consisting of moisture-based watering, weekly watering, bi-weekly watering and manual watering.

New Technologies

- **Apache Kafka** – Is used for the communication between the web app and watering system.
- **Docker** – Used in containerising the web app.
- **Kubernetes** – Used in creating a deployment of the containerised web app.
- **Python** – Web app, watering system and Alexa Skill.
- **Raspberry Pi** – The brain of the watering system.

Alexa Skill

The Alexa skill is capable of handling a variety of requests and receiving a response from the system. Here are examples of the requests you can make. Start by saying "Alexa ask the water bot" and follow up with...

- "When was the last watering date".
- "What the current room temperature is".
- "What is the current watering type".

Logos for technologies used: Docker, Python, Kubernetes, Flask, and Raspberry Pi.

TL252 – 6

Android and React News Aggregation Applications

by Ben Capper



This project presents a news aggregator Android app and a React web-based app,

both of which provide an in-depth overview of Western news from a diverse range of political viewpoints. Firebase serves as the backend, offering a range of services such as authentication, analytics, storage, and a real-time database, while python scripts ensure the news is constantly updated as they are run hourly on a Raspberry Pi. The applications offer a range of features: Users can save articles to

access later, share articles, view a history of articles they have read, and filter articles based on political leaning. The “Leans Left” and “Leans Right” features allow users to see news sources that align with their political views and the “See Both Sides” feature offers a unique perspective by presenting two articles on the same topic from opposing political viewpoints.

Technologies:

Android Studio, Kotlin React, JavaScript, Python, Firebase, Raspberry Pi



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Ben Capper · BSc (Hons) Software Systems Development · Dept. Computing and Mathematics · SETU

News Aggregation

This project presents a news aggregator Android app and a React web-based app, both of which provide an in-depth overview of Western news from a diverse range of political viewpoints.

Firestore serves as the backend, offering a range of services such as authentication, analytics, storage, and a real-time database, while python scripts ensure the news is constantly updated as they are run hourly on a Raspberry Pi.

Features:

- View by Political Leaning
- Dark / Light Theme
- Share Articles
- Save Articles
- View History
- Google Ads

The “See Both Sides” feature offers a unique perspective by presenting two articles on the same topic from opposing political viewpoints.

The poster includes a circular diagram with 6 segments (01-06) labeled: 01. Requirements, 02. Plan, 03. Design, 04. Develop, 05. Release, 06. Track & Monitor. It also features a flow diagram: Raspberry Pi (Scrape Articles) → Save & Delete → Retrieve & Manipulate → Send & Retrieve → React/Android (View).

TL252 – 7

Community Driven Progressive Gaming Web Application

by Evan Casey



Daemon is a progressive web application that seeks to attract and support users with a heavy interest in

gaming. Daemon seeks to contain relevant functionality implemented in a design focused manner with emphasis on the user experience of the application. Research was conducted on existing web applications related to movies, books etc., where it was found that no single application exists to support gaming with relevant and usable functionality. This application provides functionality related to gaming through use of

the RAWG API to retrieve game data, functionality includes personal game lists, searching, filtering, pagination, user support with Firebase and a forum to allow for community collaboration. Current trends in UI/UX such as accessible and motion design, modern minimalism, responsiveness, micro interactions and the hover effect were implemented to create a modern application.

Technologies:

ReactJS, Firebase, Cypress, NextUI, RAWG API, JavaScript, ReactQuery, Mocha



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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TL252 – 8

A Mobile App for Facilitating Direct-to-Consumer Sales of Local Produce: Supporting Sustainable Agriculture in Ireland

by Robert Fox



The proposed project aims to develop a user-friendly app that connects consumers with local food producers and facilitates the purchase of fresh produce

directly from the source. The project seeks to capitalize on the increasing popularity of farmer’s markets in Ireland, where people are eager to reconnect with locally sourced food, and there is a growing demand for sustainable food options. The app will function as an extension of a farmers market stall, allowing users to browse and select from a range of food products, view details such as price and harvest date, and make a request to producers. The

target audience for the app includes food connoisseurs, health professionals, and individuals seeking higher-quality food options. The project also aims to support small-scale businesses and help farmers establish a more personal connection with their customers. While there are existing organizations operating in the same space, the proposed project aims to provide a unique and convenient user experience through a simple and intuitive interface.

Technologies:

Java/Kotlin, Firebase Auth/Storage Real-time Database, Git, Canva, Trello



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
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Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

HomeGrown
An Android App to Connect Consumers with Local Food Producers

Abstract
A mobile app connecting local food producers with consumers, supporting sustainability and local economies. Amid Ireland's growing interest in locally sourced produce, this app offers an easy-to-use platform displaying food sources, producer information, and contact details. Catering to diverse user groups, it appeals to food aficionados, wellness-focused individuals, local agriculturalists, and hobby gardeners. The app provides a personalized, eco-friendly supermarket alternative, tapping into a niche market that fosters sustainable practices and community development.

Key Technologies
Kotlin, GitHub, Firebase, Android Studio, Google Maps, Trello, mailchimp

Methodology
The Agile Methodology, employed in the development of this mobile application, emphasizes an iterative approach that allows continuous improvement and flexibility. This approach breaks work down into sprints, ensuring each feature is developed, assessed, and refined in a timely manner for optimal results.

Robert Fox
BSc (hons) in Software Systems Development
Department of Computing and Mathematics,
School of Science and Computing
South East Technological University

Angular and Python Based Carpool Student Matching System

by Caoilin Kavanagh



formation, home address, and interests. They are then presented with suggested routes to their destination using Google Maps API, and they can choose their preferred route. The application stores this information and uses location-based grouping to match students with carpool buddies within a set radius chosen by the student of their route. This method uses Google Cloud Build with Python to complete and initiates a time-based release. Test-driven development was essential to the development process. Testing each feature before development ensured the applications reliability and functionality. The app also helps reduce traffic congestion, easing the stress of housing shortages and promoting sustainability in the community.

Driving Buddy is an application designed specifically for students of SETU Waterford Campus. It helps students find carpool buddies with whom they share common interests while prioritising location. Built using Angular Framework in Typescript. Angular is a component-based architecture that facilitates reusability and maintainability. Firebase Database and Authentication in the application allow students to log in and submit a form that includes their personal in-

Web Application to Match Carpool

Caoilin Kavanagh

Abstract

Carpooling app exclusively for SETU Waterford Campus students. Built with Angular Framework and Firebase Database, this app offers a dependable solution to finding reliable carpool buddies. Powered by Google Maps API, it suggests routes and utilizes location-based grouping to match students with carpool buddies. Test-driven development ensures the app's reliability and functionality, with a user-friendly interface for seamless use. Driving Buddy also reduces traffic congestion and promotes sustainability. Join the community today and start your carpooling journey with ease!

Key features

- User-friendly interface for seamless use
- Key features
- Utilizes Firebase Database and Authentication for secure login and submission of information
- Accessible Interface
- Developed with test-driven development for reliability and functionality
- Carpool application for SETU

Statistics

In the State overall, 61.4 per cent of working commuters drove to work in 2016. Car drivers increased from 402,878 in 1986 to 1,152,631 in 2016, an increase of 749,753 drivers or 186 per cent. The number of commuting car passengers reduced over the same period, from 89,831 in 1986 to 77,335 in 2016, a reduction of almost 14 per cent or 12,496 car passengers. Source: CSO Ireland

User Journey

- User Logins
- User Fills in their route and interests
- Users are grouped based on location and interests
- Users are notified if they have a match through a database time release

Benefits

- Reduce Traffic Congestion
- Decreases the emission of harmful pollutants
- Solution to High Renting Cost
- Socialising

Methodology

Technologies

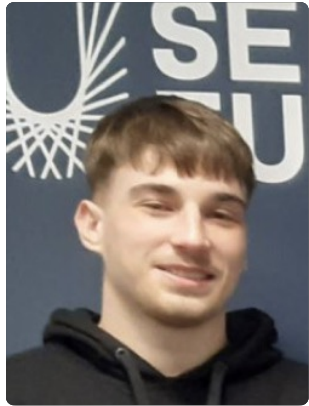
Technologies:
Angular, Firebase, Cloud Build, Node Js, GitHub, Python, Typescript

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

TL252 – 10

by Daniel Marko

Career Progressive Web Application



The website is a platform for students to apply for internships and access re-

sources to prepare for the application process. It offers tools to help students build their resumes and provides tips and guidance on how to succeed in interviews. Through this website, students can easily search and apply for internships that align with their career goals and interests. The site also provides a range of resources to help students succeed in the competitive internship market, including information on how to stand out in their applications and how to effectively communicate their qualifications and experiences.

Overall, the website serves as a valuable resource for students looking to gain valuable work experience and build their professional skills through internships. The web application also has its own configured REST API, and data is stored using a MongoDB.

Technologies:

ReactJS, JavaScript, MongoDB, TypeScript, Axios, Redux, CSS, MongoDB



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
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Overall, the website serves as a valuable resource for students looking to gain valuable work experience and build their professional skills through internships. The web application also has its own configured REST API, and data is stored on MongoDB.

UCD Methodology

User-Centered Design (UCD) is a methodology that focuses on designing products and services with the user in mind, and involves involving users in the design process.

- Understand the user: The first step in UCD is to understand the needs and goals of the users who will be using the web app. This involves conducting user research, which can include interviews, surveys, and user testing.
- Define the problem: Based on the user research, define the problem that the web app feature will address. This can involve creating user personas, user stories, and user needs.
- Ideate: The next step is to generate ideas for the web app feature. This can involve brainstorming sessions, design workshops, and sketching exercises.
- Prototype: Once the ideas have been generated, create a prototype of the web app. This can be a low-fidelity prototype created with paper and pencils, or a high-fidelity prototype created with design software.
- Test: Test the prototype with users to get feedback on the design and usability of the web app. This can involve usability testing, A/B testing, and other types of user testing.
- Iterate: Based on the feedback from users, make changes and iterate on the design of the web app feature. This can involve going back to the ideation or prototyping stage to generate new ideas.
- Implement: Once the design of the web app feature is finalized, implement it in the web app. This can involve working with developers to code and deploy the feature.

Technologies

System Architecture

This system architecture involves a web application that communicates with a Node.js and Express.js API using Axios and Think middleware. The API in turn interacts with a MongoDB server to perform various database operations.

When a user interacts with the web application, Axios is used to send asynchronous HTTP requests to the Node.js API. Think middleware is used to handle asynchronous actions in a synchronous way, making it easier to manage complex state in the application.

The Node.js and Express.js API receives these requests and processes them, performing necessary business logic and communicating with the MongoDB server to store and retrieve data as needed. The MongoDB server is a NoSQL database that is designed to handle large amounts of unstructured data, making it an ideal choice for storing data for this type of web application.

Daniel Marko
BSc(H) Software Systems Development
Department of Computing and Maths
South East Technology University

TL252 – 11

SETUSU Vote: A Secure E-Vote Management System with Facial Recognition

by Rebecca Troy



This project aims to design and implement a secure e-vote management system, targeted specifically towards SETU's Student Union. The web application will stream-

line the voting process by handling voter registration, candidate promotion, voting, and counting of the votes. The system emphasises voter privacy and security throughout and offers an advanced authentication mechanism that requires users to upload a valid photo of their student ID card upon registration and undergo facial recognition before casting their vote to ensure the person attempting to vote matches the registered student. This system also offers more free-

dom to candidates, who can manage their public profiles and campaigns conveniently. The application is designed for three types of users: admins, candidates, and voters, each with specific functionalities. The primary goal is to eliminate manual counting and minimise human error, making the process efficient, accurate, and secure. The proposed e-vote management system will revolutionise the traditional voting process at SETU with its advanced security features.

Technologies:

Node.js, Express JS, MySQL, AWS Rekognition SDK



Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
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Secure E-Vote Management System with Facial Recognition

1. Abstract

SETUSU Vote is a secure e-vote management system, targeted specifically towards SETU's Student Union. The responsive web application streamlines the voting process by handling voter registration, candidate promotion, voting, and counting of the votes. The system is designed to be used by admins, candidates, and voters to eliminate manual counting and minimise human error, making the process efficient, accurate, and secure.

✓

2. Security

Advanced Voter Authentication Mechanism

Users must undergo facial recognition and liveness authentication testing before being allowed to cast their vote.

Step 1: Upload student card containing valid photo ID when registering to vote

Step 2: Using live camera feed, follow instructions to pass system's facial recognition tests

Step 3: Cast your vote!

Emphasis on voter privacy and security throughout

With security measures such as encryption/salting, strict access control, and more. The system is designed in accordance with The Council of Europe's Recommendation for e-voting.

✓

3. Agile Methodology

Phase 1: Initial Planning (Sprints 1-3)
Phase 2: Database (Sprints 4-5)
Phase 3: Admin Functionality (Sprints 6-8)
Phase 4: Front-end Design (Sprints 9-10)
Phase 5: Candidate Functionality (Sprints 11-12)
Phase 6: Vote Functionality (Sprints 13-16)
Phase 7: Final Enhancements (Sprints 17-20)

4. System Architecture

Sprint Format:

Rebecca Troy
20088744

BSc (Hons) Software Systems Development
Dept. of Computing and Mathematics

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BSc (Hons) in Software Systems Practice (NUIST)

The aim of the BSc (Hons) in Software Systems Practice (NUIST) is

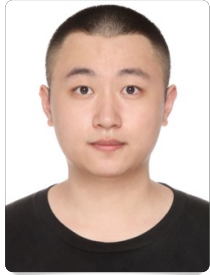
to provide overarching and theoretical frameworks so that graduates will have knowledge of advanced concepts in software development methodologies and disciplines. They will be able to select appropriate paths in designing complex software or in developing computer-based systems. As individuals, they will work effectively independently, but will also experience team work, with the challenges and benefits this can offer. At the heart of the programme is an emphasis on practical development of computing skills, underpinned by a strong theoretical reasoning.

The programme aims to provide an opportunity for students who pursue three years successful education on the NUIST BSc in Software Engineering, the opportunity to complete their fourth year of education in a dedicated one-year add-on degree in SETU (Waterford). On successful completion of this fourth year in SETU, the student would be awarded a BSc (Honours) in Software Systems Practice from SETU as well as a BSc in Software Engineering from NUIST.



Projects

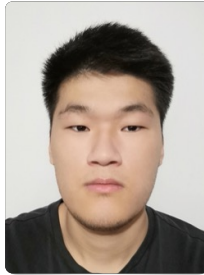
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Kaiyu Chen



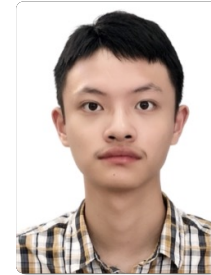
Shu Chen



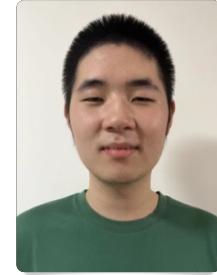
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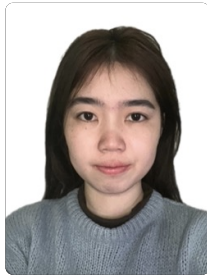
Ling Feng



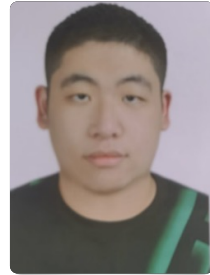
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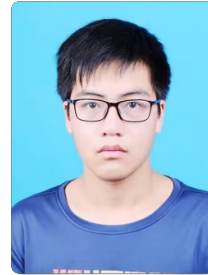
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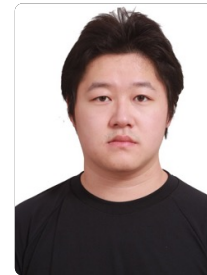
Yifei Ma



Chenghao Xie



Shunyi Xu



Luo Yang

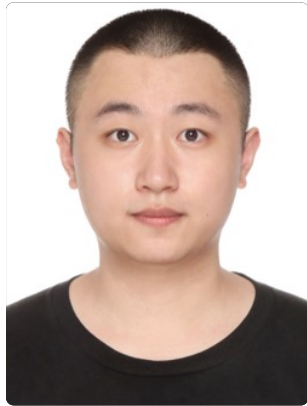


Zihan Zhang

(Not Presenting)

Full Stack Food Delivery Platform

by Kaiyu Chen



FooDelivery (FD) is a web-based food delivery platform that leverages the most up-to-date technologies, including NestJS, GraphQL, WebSockets, Typescript, and React, to provide a sophisticated developer experi-

ence and engaging user experience. Similar to popular food delivery platforms like Just Eat and Deliveroo, FD caters to multiple user types, including customers, owners, and couriers, each with a personalized dashboard displaying content tailored to their specific needs. For example, customers can easily place a food order, make payments, and receive notification of its status. On the other hand, owners can manage their food orders, analyze sales data, and make informed decisions based on the data

analysis tools provided by FD. Additionally, FD integrates with Paddle for secure online payment processing and Mailgun for efficient email communication, offering users convenient payment and communication options. To enhance the delivery experience, FD allows customers to view the planned delivery route on Google Maps and receive updates on its status. With its advanced technology and user-friendly features, FD aims to provide a seamless and efficient food delivery experience.

Technologies:

TypeScript, Node.js, React, GraphQL, Tailwind CSS, NestJS, TypeORM, PostgreSQL

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Contact 20100199@mail.wit.ie

Domain fd.focky.com

About this project...
This project is hosted on **Heroku** and **Netlify**. Besides, the version control management of this project is done through **GitHub**. The CDN service is provided by **Cloudflare**.

Key Features

- Real-Time Order Status Update
- Unique Dashboard for Different Kind of End User
- Route Planning with Google Maps
- Promote Your Favorite Store
- API Auth Guard Protection
- Get Latest Restaurant Report Graphs

Abstract

FooDelivery (FD) is a web-based food delivery platform that leverages the most up-to-date technologies. FD caters to multiple user types, including customers, owners, and couriers, each with a personalized dashboard displaying content tailored to their specific needs. Additionally, FD integrates with **Paddle** for secure online payment processing and **Mailgun** for efficient email communication, offering users convenient payment and communication options.

Functionalities

- User Management
- Store Management
- Order Management
- Report System
- Authentication
- Etc.

Full Stack Food Delivery Platform

FooDelivery

Kaiyu Chen

Using Agile Methodology

First implement **basic** features
Then **add-on** features
such as route planning, promotion, reports, etc.

System Diagram

```

graph TD
    User --> WebBrowser
    WebBrowser --> ReactApp[React App]
    ReactApp -- Query / Mutation --> GraphQL
    GraphQL --> BackendServer[Backend Server]
    BackendServer --> PostgresDB[(Postgres Database)]
    BackendServer --> AuthService[Auth Guard]
    BackendServer --> UserRes[User Resolver]
    BackendServer --> RestaurantRes[Restaurant Resolver]
    BackendServer --> OrderRes[Order Resolver]
    BackendServer --> Etc[etc.]
    UserRes --> UserService[User Service]
    RestaurantRes --> RestaurantService[Restaurant Service]
    OrderRes --> OrderService[Order Service]
    Etc --> EtcService[etc.]
    EtcService -- Host Services call their related Repositories... --> PostgresDB
                    
```

School of Science and Computing
Department of Computing and Mathematics
SE TU
Shanghai Eastern
Technological University

Built by Kaiyu Chen with

Bachelor of Science (Honours) in Software Systems Practice

(Not Presenting)

A 2D Platform-adventure Metroidvania Game on Windows Computers

by Shu Chen



This game is a 2d platform-adventure Metroidvania game on windows computers and is played with a keyboard and mouse by a single player. The player

will operate a black elf to take adventures in the dark forest to save the forest and bring the light back to it. Players need to defeat the enemies, defuse the pollution of the forest, and escape the chase of the boss. The enemies will appear in a fixed range and attack the player when the player is close to them. As the game goes on, players can collect props to restore health point (HP) and magic point (MP), increase MAX HP and MP, and acquire new skills, such as energy saving

jump, ground smashing, rebound jump and three-level jump. When the game enters a specific level, players need to escape from the level killing mechanism. Players can gain experience by killing monsters or acquiring ability items. When the experience reaches a certain amount, they can gain skill points. Players can purchase skills through skill points. The game is developed based on Unity Engine and C # programming language.

Technologies:

C#, Unity Engine

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

A platform-adventure Metroidvania 2D Game

Bright Soul

Abstract
Bright Soul is a 2d action adventure game running on a Windows computer system. Players can move like Mario. The enemy will appear within a fixed range and attack the player. As the game progresses, players can collect items to restore health and magic, increase maximum health and magic, and gain new skills. Players can gain skill points by killing monsters or acquiring ability items. Players can purchase skills through skill points. Players can save the game at any time by consuming magic points during the game.

The game includes three scenarios: teaching level, exploring and fighting level, and parkour escape level. Teaching levels will guide players on how to operate characters. In exploration and combat levels, players can freely explore the map, find the boss, and defeat it. After defeating the boss, the game will be automatically saved. Finally, the player will enter a parkour escape level that cannot be saved, and the player needs to escape the danger behind him within a limited time. The final game will come to an end.

Methodology

Agile Methodology is used in my project. First I implement one skill in the script, then make the animate for this skill, at last test whether it can work in the scene. If all go well, I commit it to Plastic SCM to save the progress.

Background

in the forest, there is a divine tree guarding the forest. But after an attack, the divine tree lost its bright core. So the forest lost its protection, the river stopped flowing and became turbid, and monsters born in darkness began to attack life. Dark creatures in the forest can be harmed by light, but darkness does not mean evil. What on earth makes them start attacking others? The player is a unique dark life who yearns for light and hopes to save this forest. How can he protect himself while calling back the light of the forest?

Technology

- Photoshop is used to process images of characters, such as making images of attack and injury actions.
- Unity engine is a very stable and powerful game engine with a mature development system and freedom.
- C# is the only scripting language supported by Unity
- Plastic SCM is a version control platform supported by Unity, built into the Unity engine, similar to but more convenient than Github

Game Play

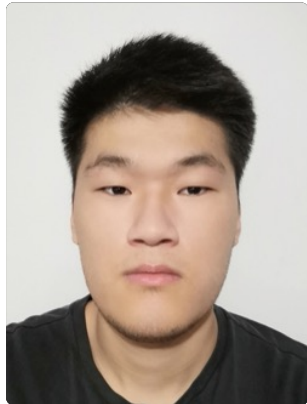
Players will explore a dying forest and find ways to revitalize it. Players use the mouse to attack and determine the direction of skill release, and the keyboard to control actions such as movement, jumping, gliding, and sprinting. Players need to kill enemies to gain experience points to strengthen their skills, and search for supply points in the map to learn new skills, such as double jump and glide. Players can discover and reach areas that they could not reach before by learning new skills, and gain game props. Player can attack obstacles on the map to discover new areas. At the final level, players need to use the skills they are already familiar with to escape the disaster within a limited time. Player use MP to save progress.

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(Not Presenting)

Store Operation Auxiliary System

by Yikun Fan



The system will be a management auxiliary system for small-scale retail store owners to manage store operations. Using this system,

store owners can manage some operations of offline physical stores and master some data on store operations. Store owners can also manage their online business. Therefore, the system will also implement an online ordering platform for customers to use. The technology used in this system is one of the most popular technologies currently: spring + vue + mysql. The system is developed in an agile development manner.

The development stage will be roughly divided into five sprints. It is expected that the implementation of the background management system will be completed in the first three sprints. The implementation of the online shopping system for customers is going to be completed in the fourth sprint, and the addition of some additional functions or the reconstruction of existing functions is going to be completed in the last sprint.

Technologies:

Vue.js, Springboot, Hibernate, MySQL

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Web app helps to manage store's operation: ShopEase

Why the need for such an app
 For those self-employed retail store owners who often play multiple roles in their daily work. This application is made to meet the needs of improving store management, and having their own online shopping delivery service.

System diagram

The above is the structure of the application and the flow of the application operation

Features

- Highly customizable
- Highly extensible
- Fit user scenarios

Main function

For store owner

- Online transactions
- process online orders
- manage delivery matters
- dealing return application

Offline transactions

- view product information
- manage shelves

For customer

- view commodities
- place orders
- apply to return goods

Technology and tools used

Methodology

DevOps, a methodology that is strongly complementary to agile development, I use this methodology to continuously deliver code and improve the quality and reliability of ShopEase.

Yikun Fan, Software Systems Practice, Department of Computing and Mathematics, School of Science and Computing, South East Technological University

(Not Presenting)

Adaptive Wireless Sensor Network Energy Monitoring Platform

by Ling Feng



This final year project is about the development of a sensor energy display platform that utilizes JS-based 3D surface diagram display libraries and Python Django-

based back-end framework technology. The platform provides current and past energy displays, future energy predictions, warning value settings, and an alarm system for sensors below the warning value. These features allow for efficient and effective energy management and help to promote sustainable energy usage. The platform's capabilities can be utilized in various settings. It enables users to identify and predict future energy demands. The

alarm system alerts users to sensor readings below the warning value and through Email, enabling proactive maintenance and reducing the risk of equipment failures. Overall, this sensor energy display platform offers a comprehensive solution for energy monitoring and management. Its potential for scalability and customization make it a valuable tool for promoting sustainable energy usage and contributing to a more efficient energy culture.

Technologies:

JS, Python

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Sensor Network Energy Monitoring and Management Software

Abstract

Agricultural sensors are widely used in today's agricultural industry. However, most sensors face problems with battery capacity, which can affect their operating performance and data reliability. Therefore, this project has designed software to monitor and manage the energy values of the sensors. The software allows the user to view the current energy values and historical energy data. Furthermore, it has the capability to predict the energy of the sensor network. The software notifies by email when the predicted energy level is below the alarm value set by the user. In addition, the user can update the energy prediction algorithm to improve the performance of the prediction.

Methodology

Since the program's main functional requirements are quite clear, I developed the software using the waterfall method, which I planned and implemented from the beginning.

Waterfall Model

Feature

- Drag-and-zoom 3D view
- Mail notification
- Upload algorithm attachments
- Future value prediction

Diagrams

System Diagram 3D surface diagram in UI

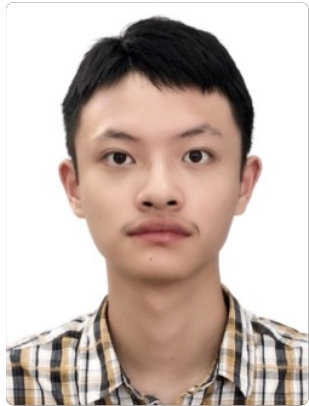
KEY TECHNOLOGES

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(Not Presenting)

Ranking and Review Web Application

by Guanlan Ji



This project aims to bring a new level of convenience and sophistication to the world of entertainment media ranking and reviewing. The website, called “I

Love It” (ILI), is designed to be fashionable, secure, easy-to-use, and packed with features to enhance the user experience. The front-end of ILI is developed using React.js, a leading technology in web development, while the back-end is powered by Spring Boot framework. MySQL database is used to store user data and media information. ILI user-friendly interface makes it accessible to people of all ages and technical backgrounds. It offers several key features,

including the ability to rate and rank media using a proprietary ranking algorithm, accurate media recommendations through a recommendation algorithm, and payment options for advanced features. In summary, this project represents a full-stack solution to the problem of discovering and engaging with entertainment media. It is designed to bring a new level of convenience to users who love movies, video games, music, and more.

Technologies:

Java, JavaScript, MySQL, Spring Boot, React.js, node.js

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Ranking and Review Web Application

Abstract

"I Love It" (ILI) is a website that aims to revolutionize entertainment media ranking and reviewing. It boasts a fashionable, secure, and easy-to-use interface designed to enhance the user experience. ILI's front-end is developed using React.js, while the back-end is powered by Spring Boot framework, with MySQL database used to store user data and media information. Key features include a proprietary ranking algorithm, accurate media recommendations, and payment options for advanced features. ILI provides a full-stack solution for discovering and engaging with entertainment media, bringing a new level of convenience to users who love movies, video games, music, and more.

Methodology

The project has adopted the agile software development method, which emphasizes close collaboration between programmer teams and business experts, face-to-face communication over written documents, frequent software releases, self-organizing teams, coding practices that accommodate changing requirements, and a focus on people's roles throughout the software development cycle.

Kanban board is a popular tool in agile development used for recording and planning team development processes. In this project, I used Trello as my Kanban software and divided the board into three sections - To Do, Doing, and Done - to efficiently plan and manage the project.

Algorithm

Ranking Algorithm:
It is adapted from IMDb's previous ranking algorithm. The movie's ranking is influenced by each user's rating, with varying weights assigned to different users based on their ratings.

Recommendation Algorithm:
As a critical component of the project, the accuracy of the recommendation system will play a determining role. The recommendation algorithm utilized in this project consists of three sub-modules:

- **Real-time recommendation module** - It leverages the users' recent rankings and browsing history to determine which media should be recommended to the user.
- **Offline recommendation module** - It facilitates the calculation of similarity between media and users, enabling the system to recommend similar media to users with similar preferences.
- **Statistical recommendation module** - It lists the media based on the overall historical data.

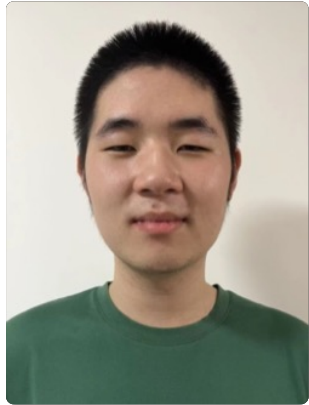
Technology

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(Not Presenting)

A Media Website with Simple Deployment

by Yuanhao Luo



It is a website deployment method to build a website in several simple phrases. The website is to share and watch media resources like video or music. If some-

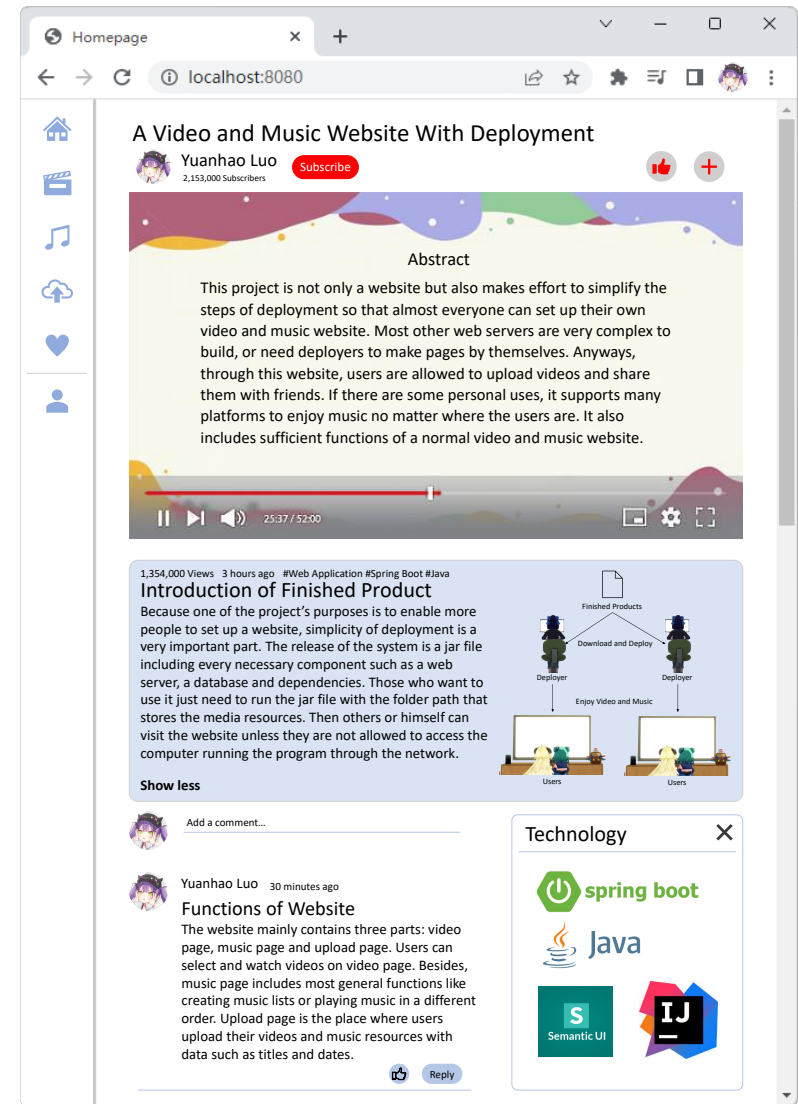
one want to setup the website, he needs to download some files, and deploy on the web server with some simple instructions. Then, he can share the URL to his friends. Every user can upload videos and watch all of the videos on the website. With this website there is one person required to build the website and when you want to recommend a video, you just need to upload it. Others are unnecessary to download the video again, they can watch it di-

rectly on the website. The files in the final version can be divided into two parts: main program and media resources. Main program are the codes to execute the whole system including back-end, front-end and the connection to other parts. Database is also a part of main program. The function of the database is to store the information like username, video title and so on. Media resources are the place required for storing all of the video and music.

Technologies:

Java, Spring Boot, Thymeleaf, MySQL

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End



(Not Presenting)

UUget: SpringBoot-based Web Application for Second-hand Trading on Campus

by Yifei Ma



This project aims to provide a campus second-hand trading platform for students at SETU, using Vue, Spring-Boot, and MySQL as the main development tools for

front-end, back-end, and database. The background of this project is that international students need to buy a large number of daily necessities during their studies, but it is difficult to find the second-hand goods they need due to lack of information channels and resource wasting. Therefore, this project aims to provide a convenient second-hand trading platform for students, to improve the utilization efficiency of campus resources. Through this platform, users can view

personal information, publish and browse second-hand goods, communicate with sellers or buyers, etc. Compared to traditional second-hand trading platforms, this project adds image recognition functionality to help users quickly find the items they want. The goal of this project is to solve the existing problems and deficiencies of second-hand trading platforms, improve user experience and efficiency, and ultimately achieve the rational use of campus resources.

Technologies:

Vue.js, JavaScript, Java, MYSQL, JPA

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Web Application for Second-hand Trading on Campus UUget

Introduction

This project aims to create a user-friendly second-hand trading platform for students, enhancing the efficiency of campus resources. It enables users to view personal information, post and browse second-hand goods, and communicate with sellers or buyers. Unlike traditional platforms, it incorporates image recognition technology to facilitate item searches. By addressing current issues and shortcomings of such platforms, like too many steps when adding new item and need to roll back to top for searching, the project aims to enhance user experience and promote the effective utilization of campus resources.

Main Features

- User register/login
- Edit personal information
- Browse item and add item to favorite list
- Talk with seller through email
- fix searchBar on the top of screen
- Search item by insert, select, or image recognition
- Post, edit, or delete item easily
- use image recognition for recommending label of item when adding new ones
- Face-to-face trading on campus

AGILE

REQUIREMENTS, DESIGN, IMPLEMENT, TEST & FIX, RELEASE, CODE, FINAL RELEASE

Logos: Spring Boot, JavaScript, MySQL, Vue.js

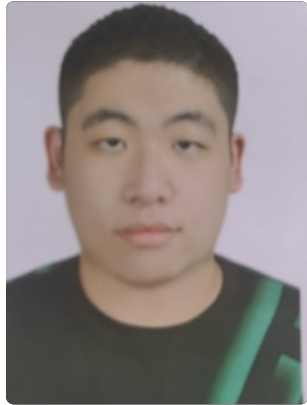
SE TU Official Technostudents at DUBLINCAST South East Technological University

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Water and Electricity Management System

(Not Presenting)

by Chenghao Xie



Water and electricity management system is an information management system, and its development mainly includes front-end web applications and back-end databases. The water

and electricity management system is designed to solve the problem of difficulty in collecting water and electricity bills. There are many dormitory buildings in the school. I hope to develop a convenient information system for managing water and electricity charges in student dormitories to facilitate dormitory managers systematic management of the school dormitories. In this system, first, you can authenticate in the login interface, administrators can add, delete, and modify information (including administrator infor-

mation, user information, water bill information, electricity bill information) in the database, there are also management functions such as data backup, account preservation and data export, and relevant users can query the usage information and make payments. All in all, this system can reduce the pressure on pertinent staff and users, allowing users to understand and pay water and electricity bills, making our lives more convenient and making dormitory management more orderly and efficient.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Water and electricity management system

Chenghao Xie - KSOFP_B_Y4BSc(H) Software System Practice Year 4

South-East Technology University

Abstract

Water and electricity management system is an information management system, and its development mainly includes front-end web applications and back-end databases. The water and electricity management system is designed to solve the problem of difficulty in collecting water and electricity bills and is advantageous. In this system, administrators can add, delete, and modify information in the database, there are also management functions such as data backup, account preservation and data export, and relevant users can query the usage information and make payments. All in all, this system can reduce the pressure on pertinent staff and users, allowing users to understand and pay water and electricity bills, making our lives more convenient and making dormitory management more orderly, efficient and precise.

Functions

The main functions of the system are divided into the following three parts.

Login and register

admin

1. User authentication
2. Multiple login methods
3. Username and password encryption

user

1. query relevant information
2. Pay utility bills
3. Records of information operations

Methodology

Agile model: Agile development takes user requirements as the core and adopts iterative and step-by-step methods for software development. It emphasizes adaptability over predictability and emphasizes people-centricity rather than process-centricity.

I choose the agile development model; the reasons are as follows.

1. It can deliver measurable software early and continuously to satisfy customers.
2. It can change requirements even late in software development.
3. Concise, minimize unnecessary work. Reduce time and labor consumption.
4. Requires a lot of face-to-face communication within the team, which I think is also satisfying
5. Easy to manage and flexible.

Tools

Technologies

The framework of the whole project adopts the multi-framework integration of SSH2 (spring+struts2+hibernate)

Chenghao Xie - 20100118@mail.wit.ie

Page 71

A 2D Ruguelike Game in Pixel Style



My project is a 2D game and the main picture materials are all in pixel style, with the roguelike type is adopted in the game mechanism. Roguelike is a general term for a game that follows the gameplay of

the 1980s game Rogue, developed by two software engineers, Michael Toy and Glenn Wichman, on the UNIX system and running on the mainframe. The original purpose of the game is to reproduce the “DND” game experience on the computer, and strictly follow the “DND” game rules of the single turn role-playing game. The features with high frequency of Roguelike include: 1. Generate randomness. Every new start will randomly generate game scenes, enemies, treasures and other different things. Every ad-

venture of the player will be unique and cannot be copied. This greatly improves the replayability of the game. 2. Non-linear. Rigorous yet flexible game rules give Roguelike a very high degree of freedom. In the game, players can use their imagination to solve problems encountered in the game through different methods and combinations of props. 3. System complexity. Roguelike games may include an incalculable number of elements in one game, and in some games may include hundreds

Technologies:

C#

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Abstract

The whole game is a 2D roguelike game in pixel style. Players can move through adjacent grids on a map consisting of 30 grids, 5 rows and 6 columns. Various events are randomly generated on the map, including fighting enemies, passing tests, and more.

Player will obtain equipment and props by going through different events, and be able to upgrade and improve attributes and acquire new skills by gaining experience.

Thanks to its roguelike mechanism, the enemies and drops encountered each time are different and full of randomness. This makes the game richer and more rereadable.

Methodology

The project will use agile development methodology, which are useful as an iterative approach to software development projects, ensuring that feedback can be acted on quickly to make responsive changes. Compared to the waterfall model, agile development divides the development process into short iterative increments.

Initial planning, Requirements Analysis, Design & Coding, Testing, Deployment, Evaluation

Github, Unity, Visual Studio, Windows 11

Shunyi Xu 201002021
Software Development SETU (South East Technological University)

(Not Presenting)

Unity Top-down Roguelike Bullet Hell Shooter Game

by Luo Yang



Infinite Dungeoner is a top-down bullet hell shooter game with roguelike elements, developed based on the Unity engine. Players can control one of several characters, general, thief, scientist, etc., who will explore in this dungeon full of terrifying monsters. Those who reach the bottom of the dungeon and get the highest score will be recorded on the leaderboard. In the game, players can shoot, overturn tables or dodge rolling to avoid bullets, and obtain supplies and more powerful weapons from the chests generated in the dungeon. The dungeon is made up of multiple levels, each having many randomly generated rooms. The layout and rewards are procedurally generated from a number of pre-created rooms.

In order to defeat the monsters, the player must use a wide variety of guns or even staffs. Each level ends with a random boss that must be slain to advance to the next floor. However, reaching the bottom is not the only goal. You are not the only one who reaches the deepest area of the dungeon, but can you be the one with the most scores? In addition, the game contains a variety of weapons, it is possible that your next round will get more powerful and more interesting guns!

Technologies:

C#, Unity Engine, Git, Visual Studio

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

INFINITE DUNGEONER
A Rogue-like Bullet-hell Top-down Shooter Game

Abstract
Infinite Dungeoner is a top-down bullet hell shooter game with roguelike elements, developed based on the Unity engine. Players can control one of several characters, general, thief, scientist, etc., who will explore in this dungeon full of terrifying monsters. Those who reach the bottom of the dungeon and get the highest score will be recorded on the leaderboard. In the game, players can shoot, overturn tables or dodge rolling to avoid bullets, and obtain supplies and more powerful weapons from the chests generated in the dungeon. The dungeon is made up of multiple levels, each having many randomly generated rooms. The layout and rewards are procedurally generated from a number of pre-created rooms. In order to defeat the monsters, the player must use a wide variety of guns or even staffs. Each level ends with a random boss that must be slain to advance to the next floor. However, reaching the bottom is not the only goal. You are not the only one who reaches the deepest area of the dungeon, but can you be the one with the most scores? In addition, the game contains a variety of weapons, it is possible that your next round will get more powerful and more interesting guns!

PROCEDURAL GENERATION:
The levels, weapons, and enemies of the game are randomly generated by the program, aiming to create freshness for every experience of the player.

ARTIFICIAL INTELLIGENCE:
Artificial intelligence is used in the game, which is used to control the movement and weapon usage of the enemies. Based on the enemy type, there are currently two movement modes and two attack modes.

TEAMWORK ORIENTED:
In the project, I simulated the scene of teamwork as much as possible, including but not limited to making a custom editing window on the map design, and making a parameterized adjustment interface for weapon production.

GamePlay
Players can gain extra points by dodging enemy bullets and killing enemies continuously. And there is a scoreboard scene for players to view their rankings. In addition, the game also contains a large number of interesting weapons, including modern firearms, magic wands, laser guns, mauls that launch envelopes, and more. Due to the rogue-like nature of the game, players can experience new weapons every time. The game's treasure chest generation adopts the concept of dynamic difficulty adjustment. If the player's health is too low or the weapon used is too weak, the probability of getting more supplies and powerful weapons will be increased. Players can also teleport to rooms they have explored by clicking on the map. Spending too much time on the road is often something players hate.

Methodology
In this project I used the Agile development method. Each sprint defined based on the features to be implemented, and most of them took 1-2 weeks. Usually, a prototype was provided after each sprint.

Unity Visual Studio Git PhotoShop
Game Engine IDE Version Control Asset Production

Screenshot

Luo Yang - 20099902@mail.wit.ie
BSc(Hons) in Software System Practice
Department of Computing and Mathematics School of Science and Computing,
South East Technological University

SpringCloud-Based Digital Currency Exchange Platform

(Not Presenting)

by Zihan Zhang



Digital currencies such as Bitcoin and Ethereum are currently trending around the world, and an increasing number of people are investing in them. These users require a reliable trading

platform that is easy to use and provides detailed analysis. CoinHub, my final year project, is a digital currency exchange platform based on SpringCloud. Its frontend will be developed using React.js, and its business services will primarily be implemented in Java. Python will also be used to enforce certain machine-learning functions. As many primary trading services as possible are provided in this project, the order-matching system is crucial for all electronic exchanges because it exe-

cutes orders in each transaction. Compared to traditional order-matching systems that rely on databases, this system has a faster response time because it uses in-memory data to improve order processing speed. Another achievement of this project is providing a trading strategy using the Deep Reinforcement Learning (DRL) method. The trained AI model performs well on historical data. Based on its daily trading strategy provided, it would help users to benefit.

Technologies:

SpringCloud, React.js, Python, Redis, MongoDB, Blockchain

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics
Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things
Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

DIGITAL CURRENCY EXCHANGE PLATFORM

CoinHub - a website of cryptocurrency exchange

Zihan Zhang

ABSTRACT

Recently Digital currencies such as Bitcoin and Ethereum have become very popular. CoinHub is a digital currency exchange platform based on SpringCloud. Its front end is developed using React.js, and its back end is implemented in Java. Python is used to provide machine-learning functions.

TECHNOLOGIES

SpringCloud

Python

React

MySQL

Docker

MetaMask

GitHub

FEATURES

- Uses in-memory to improve order-matching engine with faster processing speed.
- Provides trading strategies using the Deep Reinforcement Learning method.
- Connects with MetaMask.

METHODOLOGY

Deep Reinforcement Learning

The Markov property is the foundation of reinforcement learning. Meanwhile, in the financial market, the price is a sequence that fluctuates with time. Creating a trading strategy to maximize benefit in a market can be seen as a challenge of solving Markov Decision Process (MDP).

State

Balance
Price
Cash
5-Day Average

Agent

Deep Q Network
Experience Replay

Environment

Actions

0: Do Nothing
1: Buy Currency
2: Sell Currency

State s_t Reward r_{t+1} Action a_t State s_{t+1}

Website Development

Agile is an iterative approach to project management and software development. GitHub is used to manage the code version and Docker is used to build and configure the environment quickly.

Zihan Zhang
20099870

BSc.(Hons) Software Systems Practice
South East Technological University

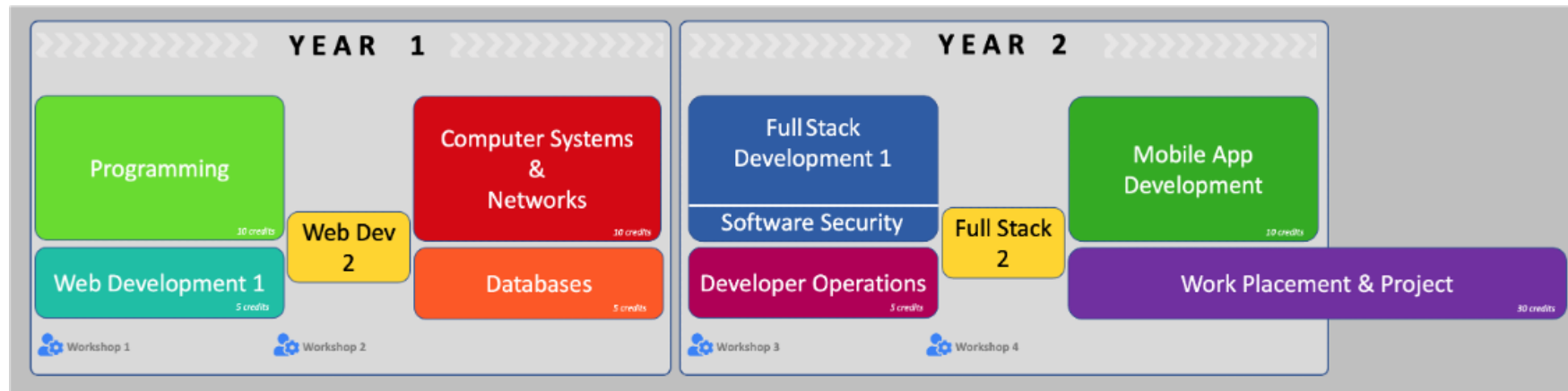
SECTION 2

Higher Diploma in Science - HDip

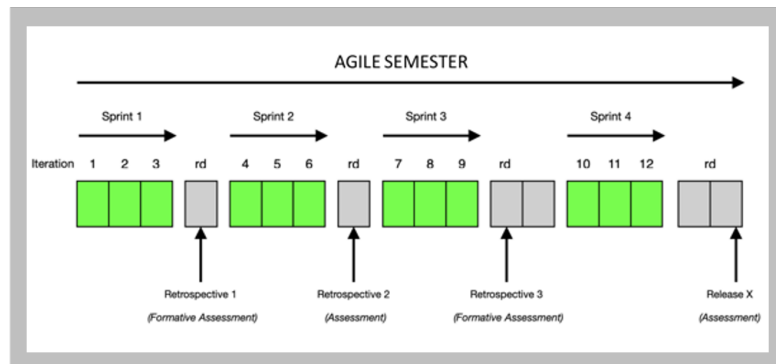


Higher Diploma in Computer Science (Online)

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](#).

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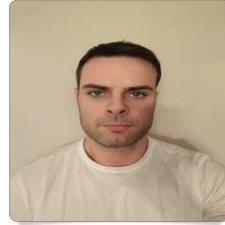
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Projects by Type

CI/CD (Pipeline), Testing, Ops



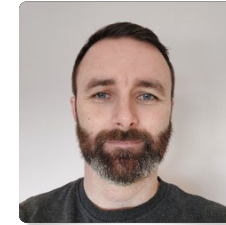
Owen Corrigan



Cathal Duffy



Brian Kinsella

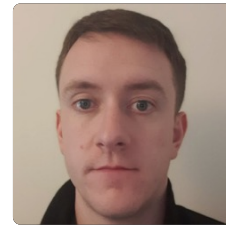


Patrick Marnane

Hybrid/Progressive App



Andrew Cameron



Jason Grant



Fiona Waters

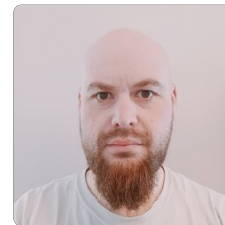
NDA - Workplace Project



Caroline Conway



Bozhena Demus



Declan O' Donovan

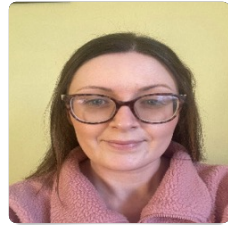


Tom Tobin

Native Android app



Conor Brennan



Nora Hackett



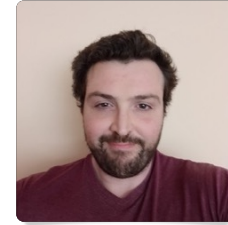
Dale Healy Egan



Colm O Keefe



Níle O'Hagan



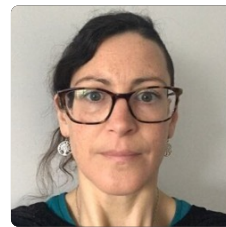
Ahmad Sabehe-
Murphy

Physical computing (IOT)



Harry Kelly

Testing



Margaret McCarthy

Web App



Bernard Cattigan



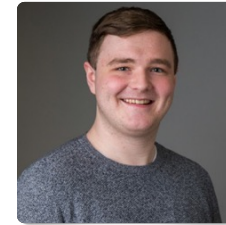
Grace Doyle



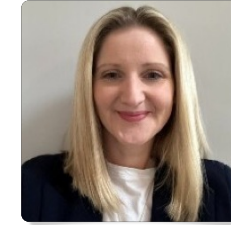
David Fagan



Craig Grehan



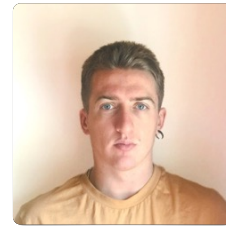
Jordan Harrison



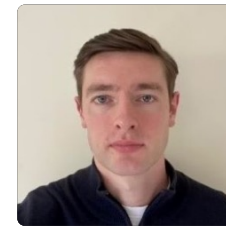
Sheila Kirwan



Sophia McGee

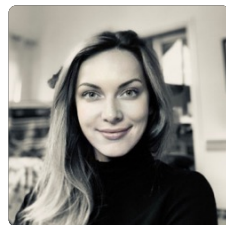


Tomas O Dalaigh

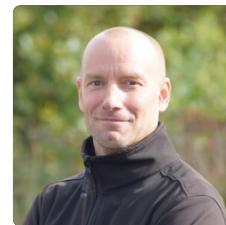


Owen O'Donnell

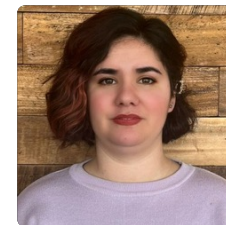
Workplace Project



Egle Budinaviciute



Anders Ingelsten



Claudia Marques

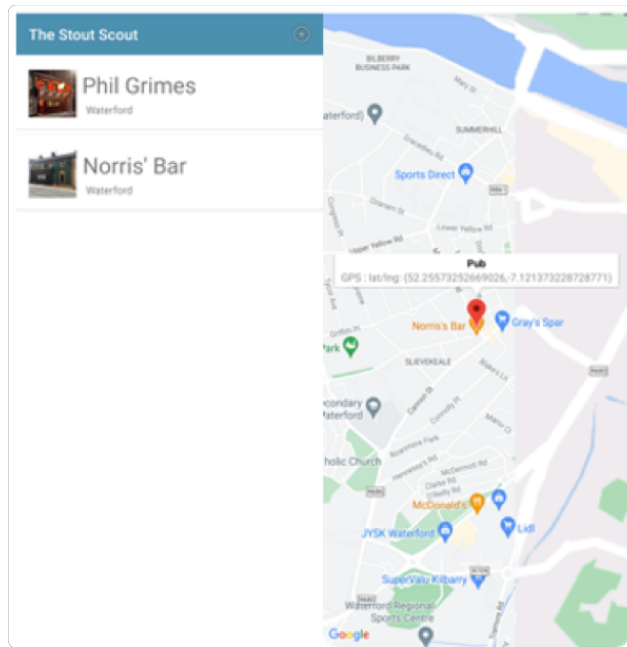


The Stout Scout

Native Android Application

by **Conor Brennan**

LOCATION
TL238 – 71



Originally planned to build a stout review app. However, due to unforeseen circumstances and time constraints this could not be. The Minimum Viable Product of that could only be built. A simple pub-rater app where the user can add pubs and their locations, upload an image and rate it.

Project Type: Native Android app

Technologies: Android Studio, IntelliJ IDEA, Kotlin, Java, XML



<https://thestoutscout.my.canva.site/>



Cloud SysOps

Cloud Systems Operations (SysOps)

by Egle Budinaviciute

LOCATION

TL245 – 95



A work based project directly aligned with my work placement role. Exploring Cloud Systems Operations (SysOps) roles and responsibilities and showcasing completed tasks while performing my role as cloud engineer. I will be presenting a conference style report including: background, objectives, requirements, planning & testing, outcomes of service requests completed. In this report I expand on 5 larger service requests I've completed while performing my role. Service requests include a variety of topics within the cloud: data migration, automated patching, encryption, monitoring and security.

Project Type: Workplace Project

Technologies: Amazon Web Services (AWS), Data-dog, Terraform, Azure Cloud



<https://reader.tutors.dev/course/cloud-sys-ops>



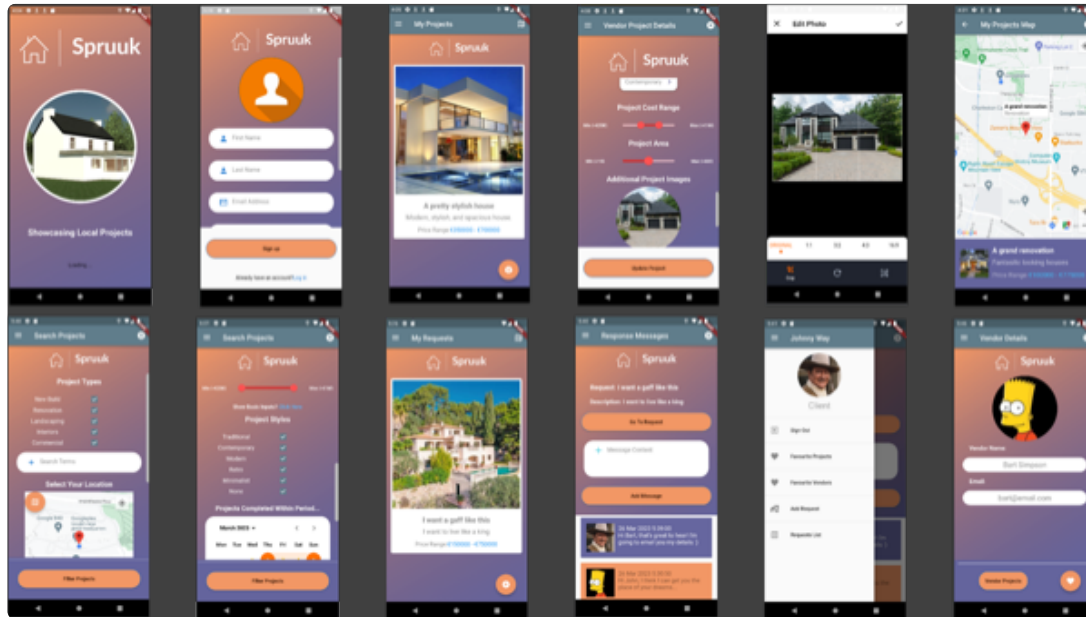
Spruuk

A mobile and web app developed on Flutter SDK for promoting local projects

by Andrew Cameron

LOCATION

TL238 – 75



Spruuk is a hybrid mobile and web application platform for companies in the construction, architecture, and landscaping industries to showcase their portfolios of work to the general public as a form of marketing. Clients are able to search existing projects based on selected criteria, or they can use maps to identify vendors behind the projects they view in real-life. Once logged in, clients can create lists of favourite projects or favourite vendors. There is also an option for clients to post requests for projects to be completed, including an inbuilt messaging capability for dialogue with vendors.

Project Type: Hybrid Mobile App

Technologies: Flutter SDK, Android Studio, Dart, Firebase, Figma, Trello



<https://spruuk.glitch.me/>



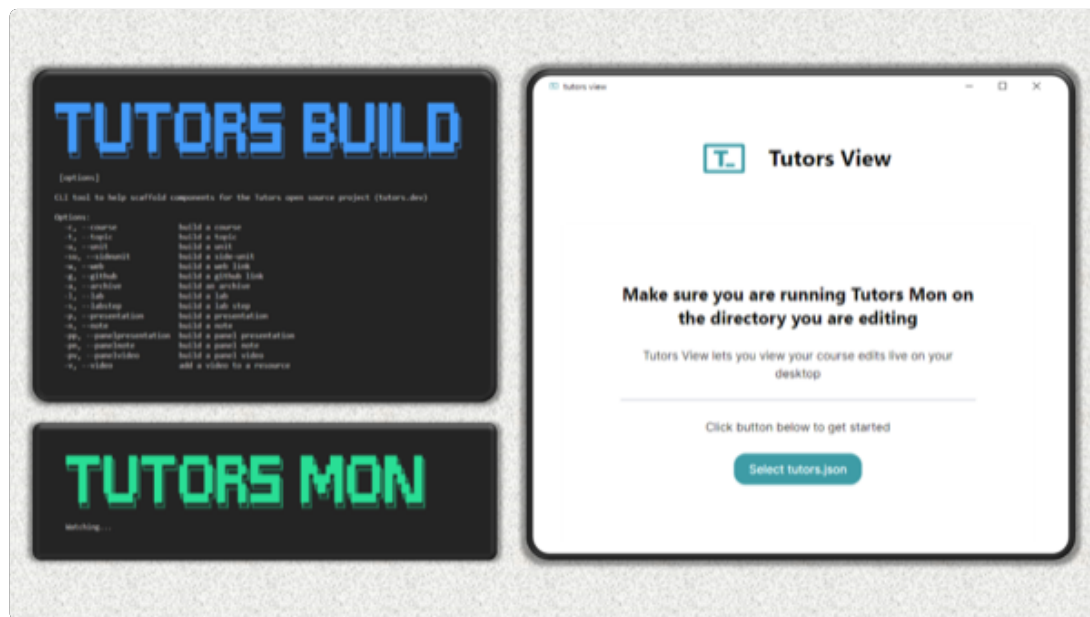
Tutors: The Educators Experience

A collection of open source components (Build, Monitor and View) to simplify course creation using the tutors platform

by **Bernard Cattigan**

LOCATION

TL235 – 82



Tutors is a collection of open-source components and services supporting the creation of transformative learning experiences. Creating courses for Tutors can be somewhat difficult and time-consuming. My project aims to simplify the course creation process and improve the overall experience for educators through the development of three applications. *Tutors_Build*: Help educators to scaffold the different components that make up a course. *Tutors_Mon*: Monitor the course folders for changes so that the course generation process runs automatically when a change is detected. *Tutors_View*: Provides a local version of the Tutors platform so educators can preview their changes before deployment.

Project Type: Web App, Open Source, CLI, Tauri Desktop Application

Technologies: Nodejs, Sveltekit, Tauri



<https://bit.ly/tutors-the-educators-experience>

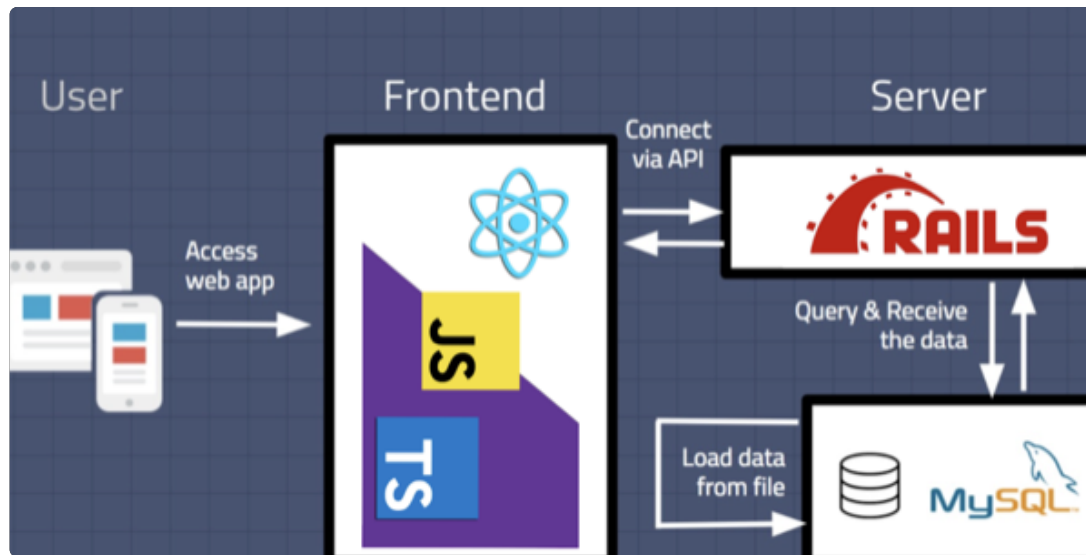


Vulnerability Show Page UX Upgrade

UX Front End Angular to React Upgrade

LOCATION

NDA – 97

by **Caroline Conway**

A number of projects on the HDip in Computer Science are subject to NDA. Such projects are supervised and graded as normal while honouring the term of the NDA.

Project Type: NDA, Workplace Project, Web App, UX / Front End

Technologies:



StrimziPythonClient.com

Written Python Client for Strimzi Client-Examples Repository

by Owen Corrigan

LOCATION

TL235 – 90

- Create a Python Client to
- Run a Kafka Cluster in
- Kubernetes Minikube
- Deployed with Strimzi
- Containerized with Docker
- Hosted on GitHub and
- Documented with Trello

An ever-expanding amount of data is streamed in real-time, as modern applications need to act on up-to-the-millisecond data before the data becomes stale. Apache Kafka is a real-time event streaming system that can handle trillions of messages per day. An open-source project called Strimzi reduces complexity in creating instances of Apache Kafka in a Kubernetes cluster. This project developed a Python client for the Strimzi Client-Examples repo hosted on GitHub. A Kafka Consumer and Kafka Producer with Dependencies and Configuration files was written in the Python language to compliment the current clients.

Project Type: DevOps, Open Source, Workplace Project - Public

Technologies: Python, Java, Strimzi, Apache Kafka, Kubernetes, Minikube, Docker



<https://owencorrigan76.github.io/>



Subject to NDA

Project Details are Subject to NDA

by **Bozhena Demus**

LOCATION

NDA – 98

A number of projects on the HDip in Computer Science are subject to NDA. Such projects are supervised and graded as normal while honouring the term of the NDA.

Project Type: NDA, Workplace Project, Web App,
UX / Front End

Technologies:

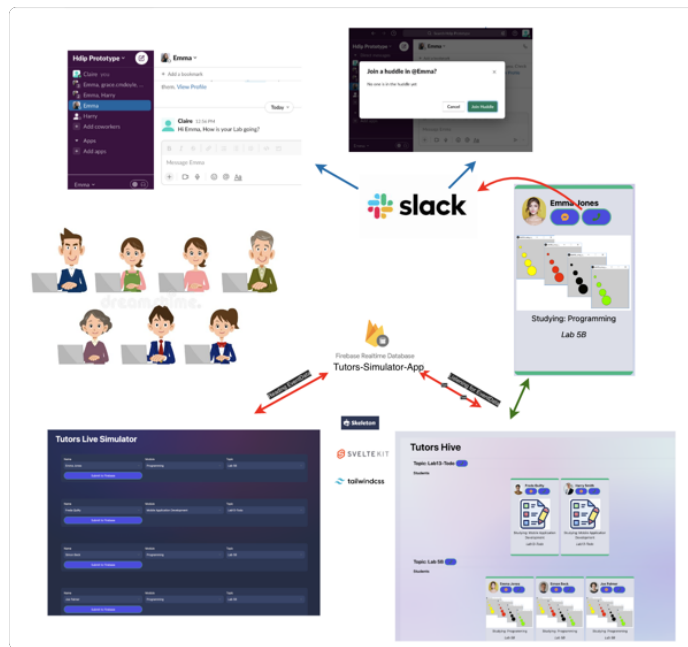


Tutors Hive

Sorting and Social for Tutors Live

by Grace Doyle

LOCATION
TL235 – 84



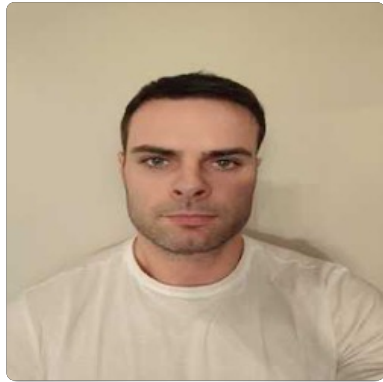
Tutors Hive is based around the current SETU TutorsLive software. It is a prototype of the current Tutors Live software, with two apps, one for simulation of data, which writes to Firebase Realtime database, and secondly, a front-end prototype” (Tutors Hive) app, which builds features around online presence, to enhance the user experience. The two main features showcased are sorting the students by topic/lab in which they are studying, and also the slack communication feature, whereby each student card has individual message and call (huddle) buttons, with an additional group huddle button per topic.

Project Type: Web App, UX / Front End, Open Source

Technologies: Javascript, Slack, Github, typescript, sveltekit, tailwind, Git and GitHub



<http://bit.ly/3TMHxHM>



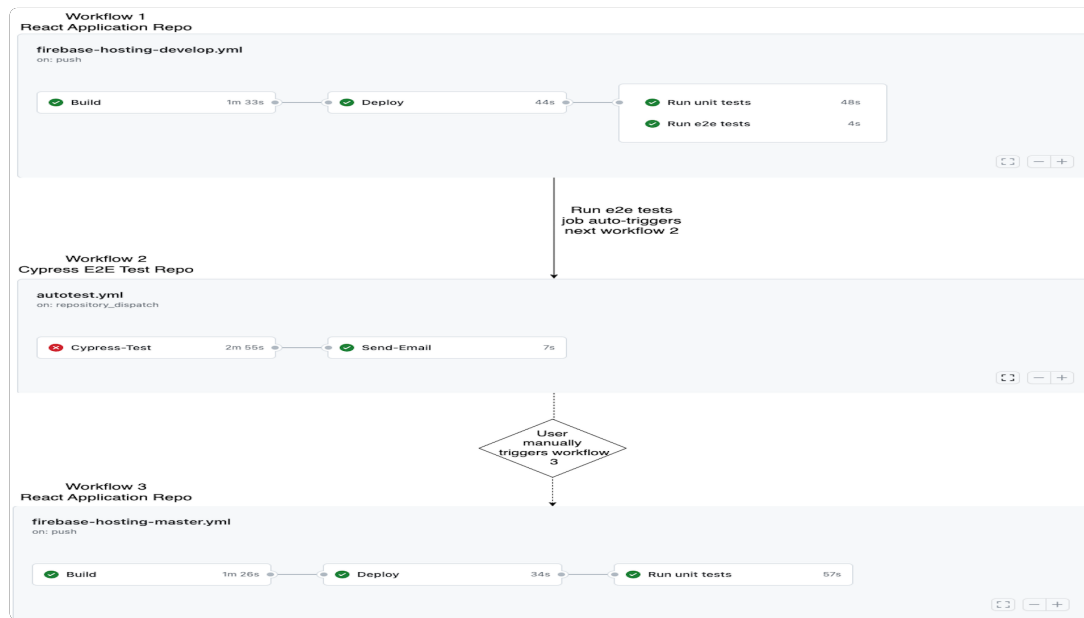
CI/CD framework for automated deployment

CI/CD framework for automated deployment and UI/API tests with test automation

by Cathal Duffy

LOCATION

TL235 – 88



There are three key elements to this project. The first, an application that was built in a previous module using React.js. The web application will be hosted on Firebase and use the web application's GitHub repository as part of the pipeline. The second area focuses on automated testing. Automated tests are built using the Cypress framework. The third and final area of the project focuses on building a CI/CD pipeline. When a build is triggered for the web application, this will trigger automated tests to run, thus ensuring that when code is updated, full functionality remains.

Project Type: CI/CD (Pipeline), Testing

Technologies: React, nodejs, Cypress, GitHub Actions



<https://project-page-host.web.app/>



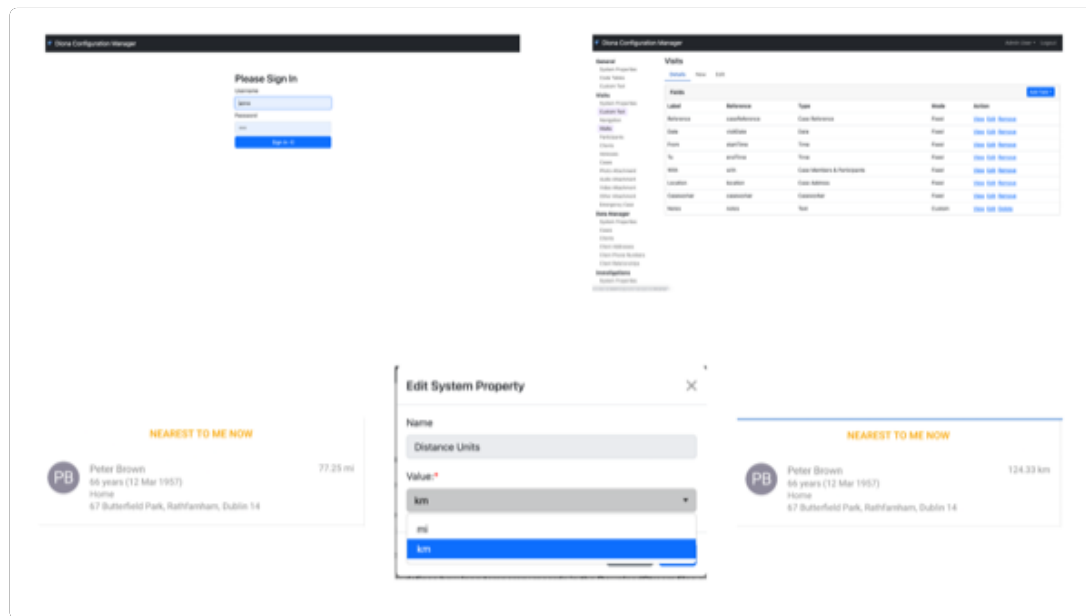
Diona Configuration Manager

Replace Existing Configuration Manager Application for Diona Solutions

by David Fagan

LOCATION

TL235 – 86



The Diona Configuration Manager is a web based configuration tool. All solutions created by Diona are highly configurable. The app can be used to configure a comprehensive range of applications and system level properties, including but not limited to: Business configurations such as types of documents that can be uploaded, assessment and form definitions, dynamic screens. Technical configurations such as session timeout, security, auditing and system logs. The aim of the project is to replace the existing config manager which was built on older technologies with a newer web application that is more extensible and easier to manage.

Project Type: Web App, Workplace Project - Public

Technologies: NodeJS, MongoDB, JavaScript, ExpressJS, PUG HTML, Bootstrap CSS



<http://bit.ly/3n5V693>



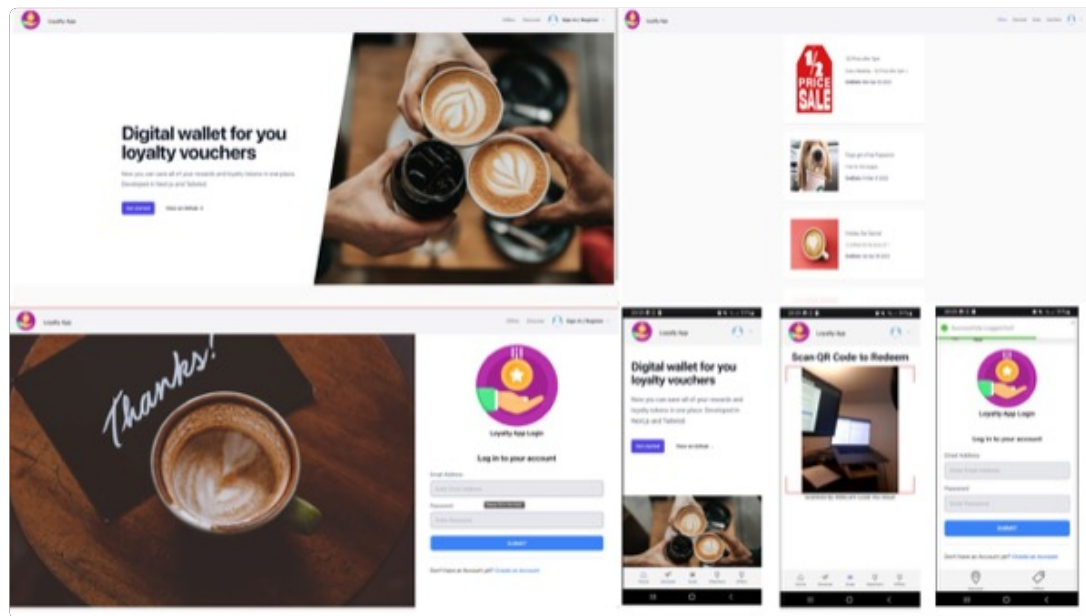
Loyalty App

Development of a PWA (Progressive Web App) with Next.js, Tailwind and Strapi CMS

by Jason Grant

LOCATION

TL238 – 77



Full-stack prototype of a customer loyalty web application. Aims to encourage customer loyalty and drives business success with the ability to track engagement and push offers to the consumers.



<https://loyalty-app-final-project.my.canva.site/>

Project Type: Hybrid Mobile App, Combined Web & Mobile, Web App

Technologies: Next.js, Strapi, React, JavaScript, Tailwind, Toast, Vercel, Heroku



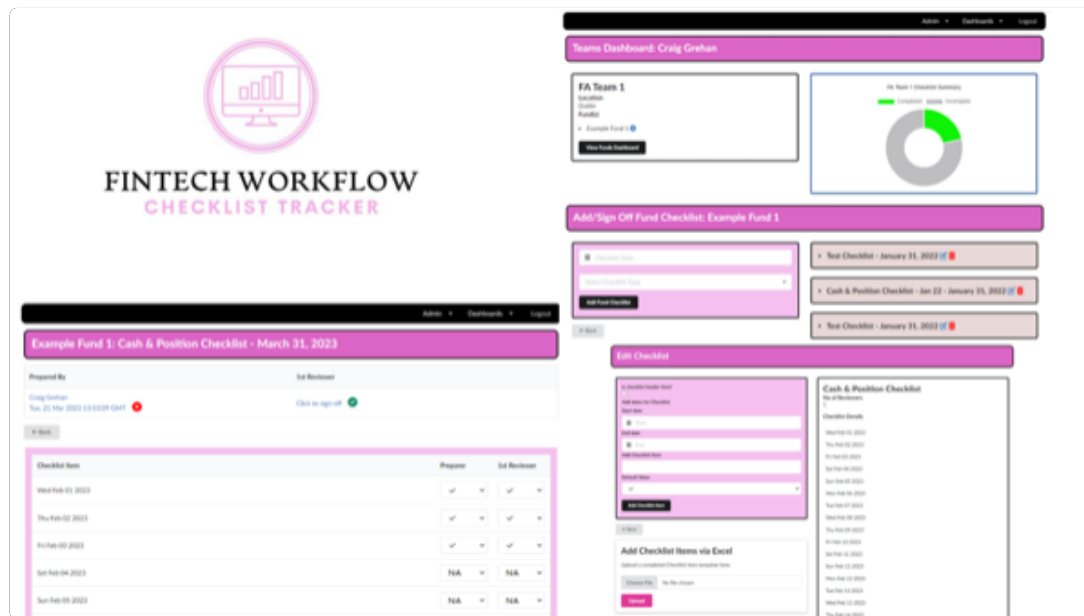
Fintech Workflow Checklist Tracker

An application to monitor the status of company checklists

by Craig Grehan

LOCATION

TL238 – 78



Currently the business I work in is very focused on process controls. This means there are several process checklists to be prepared and reviewed across teams in the company at various intervals. These checklists cover several different tasks. The current process is very disjointed and often checklists are left incomplete or not fully signed off by preparers/reviewers. This creates a lot of additional work in rechecking the status of checklists. The Fintech Workflow – Checklist Tracker, aims to centralise this process and offer a visual dashboard of completed and incomplete checklists, reducing workload and improving efficiency in this business area.

Project Type: Web App

Technologies: NodeJS, JavaScript, MongoDB, Semantic UI, Cloundinary



<https://bit.ly/3JAv19G>



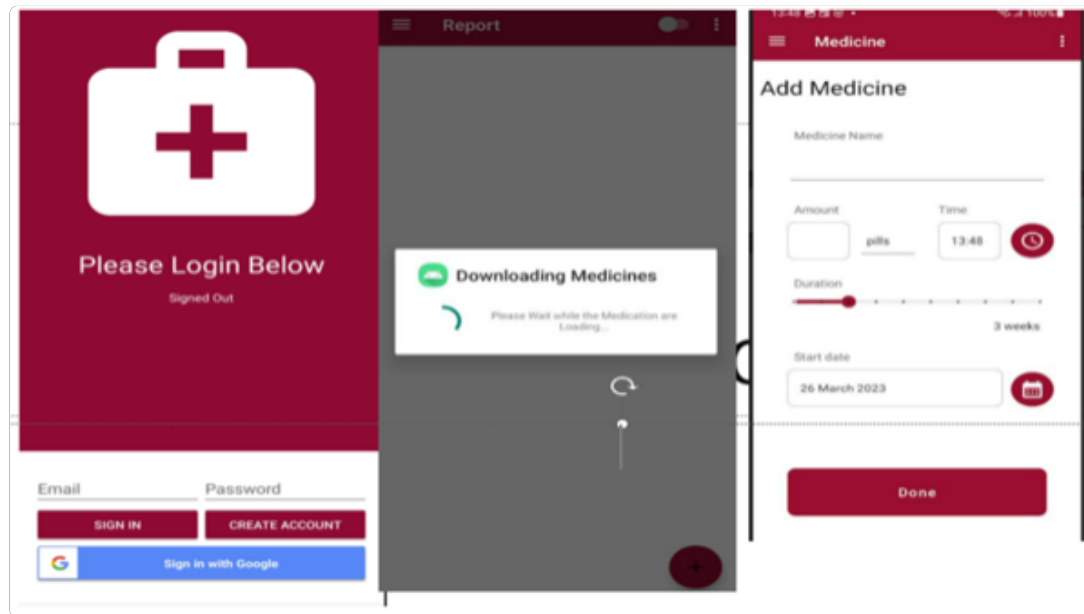
Carer/Patient App

Carer/Patient App

by **Nora Hackett**

LOCATION

TL238 – 74



The Carer/Patient app is an android native mobile app that allows users to track their medicine and schedule reminders. Users input their medication that they want to track with details such as Medicine Name, Medicine Quantity, Time, Duration and Start Date. Key technologies used: Kotlin Firebase, Agile methodology, GitHub

Project Type: Native Android app

Technologies: Kotlin, Andriod Studio, Firebase, Github



<https://carerpatient.my.canva.site/>

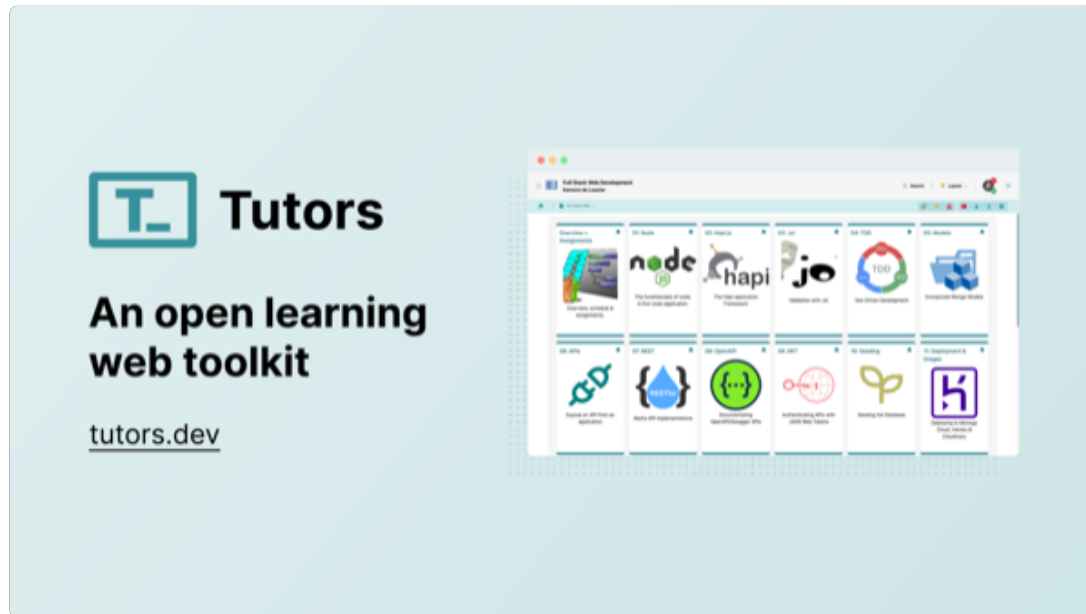


Tutors

An Open Learning Web Toolkit

by **Jordan Harrison**

LOCATION
TL235 – 85



A collection of open source components & services supporting the creation of transformative learning experiences using open web standards.



<https://tutors-final-project.netlify.app/>

Project Type: Web App, UX / Front End, Open Source

Technologies: NodeJS, TypeScript, Svelte, SvelteKit, TailwindCSS, Netlify, GitHub



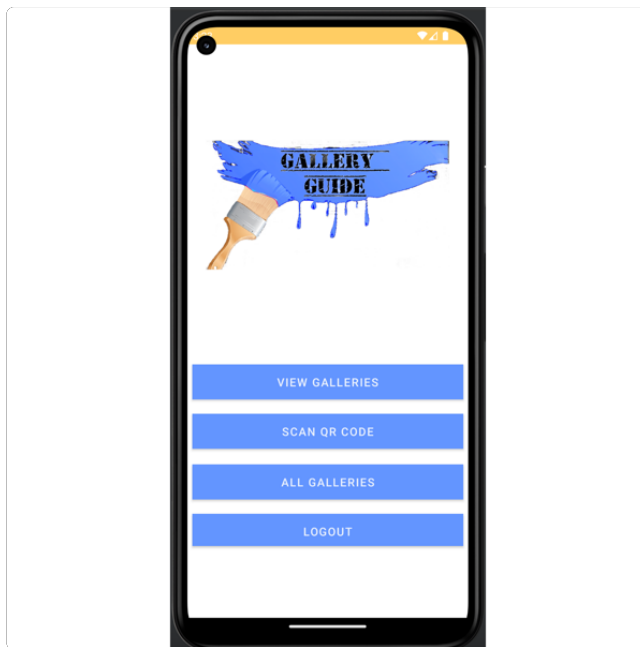
Waterford Gallery Guide

Native android application for Waterford City art attractions

by Dale Healy Egan

LOCATION

TL238 – 72



The Waterford Gallery Guide is a comprehensive and user-friendly native Android application, developed using the Kotlin programming language. It is designed to enhance the experience of visiting local art attractions in Waterford city. The application offers a range of features, including the ability to scan QR codes, add preferred attractions to a personal list, and view current attractions. Its compact design and intuitive interface provide users with a delightful and convenient experience

Project Type: Native Android app

Technologies: Kotlin



<https://linktr.ee/dalehealy1609>



KPI with POWERBI

Streamlining report building with PowerBI and PowerShell

by Anders Ingelsten

LOCATION
TL245 – 94



Previously data for reports was pulled manually from local and cloud-based systems and then processed by staff into report visuals. This project streamlined and automated this process. By pulling data via system APIs and then making it available to PowerBI by storing it as CSV Data in SharePoint Online. PowerBI was then utilised as the visualisation tool, to display the stored data, as interactive KPI reporting diagrams on the company's intranet. PowerShell was used as the scripting language to facilitate the data pull and storage. Automation was then applied to the data pull and the PowerBI data refresh.

Project Type: Workplace Project

Technologies: PowerShell, SharePoint, PowerBI, DAX, CSV



<https://bit.ly/3yWckDB>

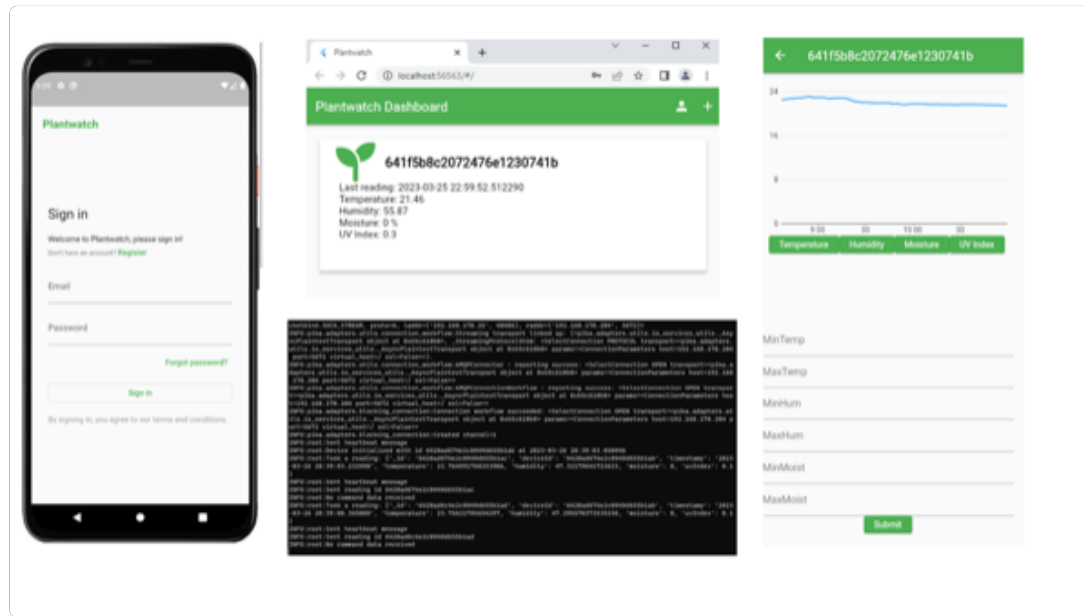


Plantwatch

IoT Plant Health Monitoring System

by Harry Kelly

LOCATION
TL245 – 91



Plantwatch is an IoT plant health monitoring and care system that utilises electronic sensors and a Raspberry Pi to collect data on soil moisture, temperature, humidity, and light intensity. A backend service communicates with the Raspberry Pi via RabbitMQ, logs sensor data to a MongoDB database, and sends control data back to the Raspberry Pi, which can also operate actuators for environmental control. A web and mobile application allows the end user to add devices to their account, view sensor data, and set desired parameters. Flutter provides the frontend and interfaces with MongoDB via a REST API implemented in Dart.

Project Type: Physical computing (IOT), Combined Web & Mobile, Web App

Technologies: Raspberry Pi, Python, Dart, RabbitMQ, MongoDB, Flutter, Firebase



<https://bit.ly/3THRnuk>



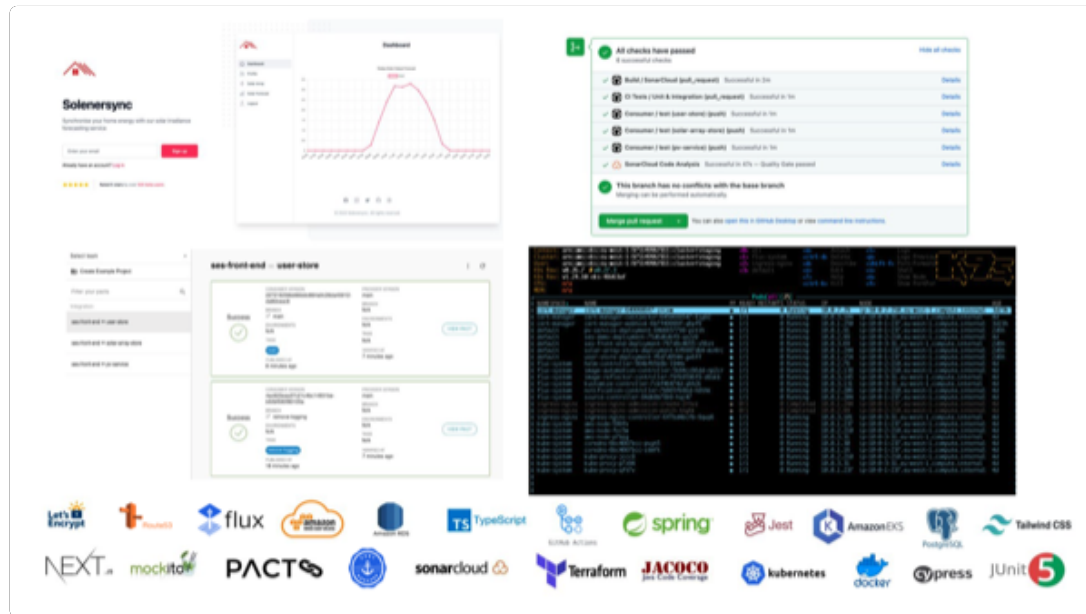
solenersync.net

A test strategy for microservices

by **Brian Kinsella**

LOCATION

TL235 – 89



This project showcases a scalable automated testing strategy that integrates with modern microservice architectures and promotes continuous integration and continuous deployment (CI/CD), without impacting on delivery. To illustrate the various types of testing, the project also features a solar forecasting web application, which includes the development and provision of application infrastructure, CI/CD pipelines, back-end and front-end microservices, as well as the implementation of various test frameworks. The project not only highlights the layers of testing embedded within the microservices, but also demonstrates end-to-end application development and deployment.

Project Type: CI/CD (Pipeline), Testing, DevOps

Technologies: Kubernetes, Flux, Pact, Junit5, Jest, Spring, Java, Next.js, Typescript



<https://bit.ly/bkses>



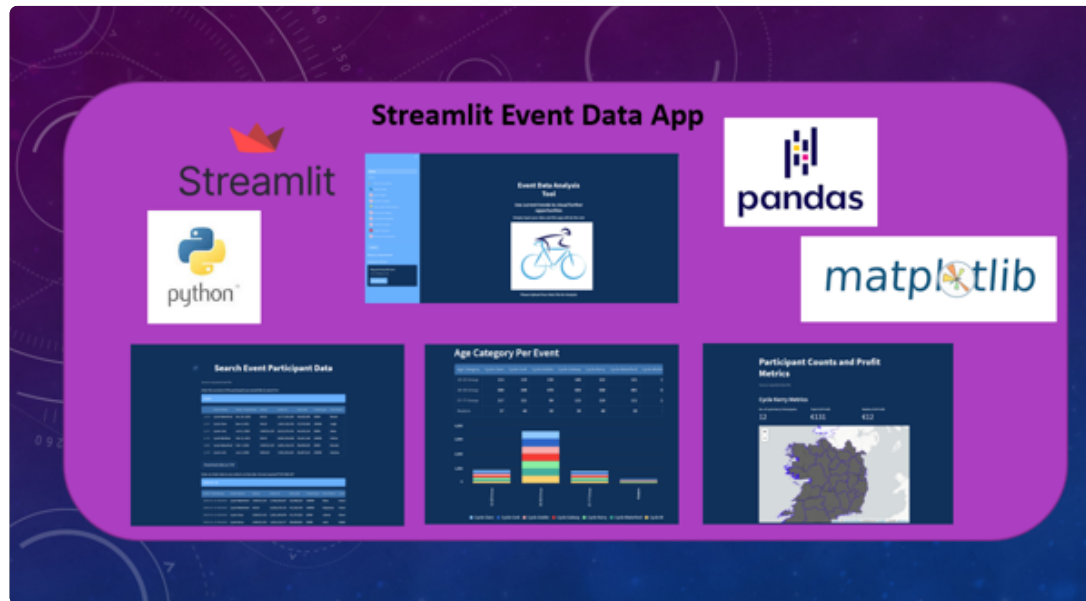
www.MyEventInsights.com

Streamlit Sports Event Data Analysis Application

by Sheila Kirwan

LOCATION

TL235 – 81



This project is an interactive streamlit data analysis application. The purpose of this application is to provide a sports event company with a means of analyzing participant data in order to capture useful marketing insights. A user logs in to the app and uploads a .csv data file to the application. Using Python, Pandas, Matplotlib and various other python libraries, the application filters the data in order to present the findings in a visually interesting and logical manner. The outputted visualizations are displayed using tabular, graphical, interactive, and animated formats.

Project Type: Web App, Data Analytics

Technologies: Streamlit, Python, Pandas, AWS EC2 and many more



<https://skirwan.surge.sh/>

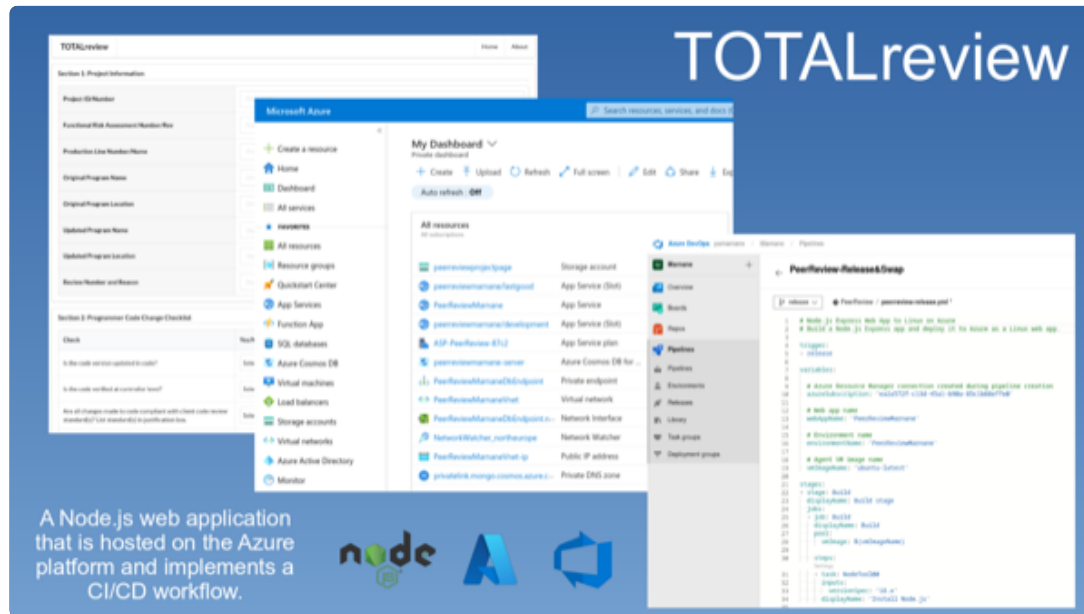


TOTALreview

Azure Hosted Peer Review System

by Patrick Marnane

LOCATION
TL235 – 87



TOTALreview is a Node.js application that is hosted on Microsoft's Azure platform and utilises a number of its services including App Service, CosmosDB and Active Directory. Application development also implements a CI/CD workflow using Azure DevOps. The web application's function is to be used by Manufacturing Equipment developers to record changes and track the peer review process.

Project Type: CI/CD (Pipeline), DevOps, Workplace Project - Private Code Repo (NDA not required)

Technologies: Node.js, Microsoft Azure platform, Microsoft DevOps platform



<http://bit.ly/31B0uk5>



Ariba Issue Resolution

Ariba Issue Resolution Power App

LOCATION
TL245 – 96

by **Claudia Marques**



This is a Power Application (used in Microsoft) that is used to search an issue that a user is experiencing in purchasing process and then providing the solution to this issue. This app also would have training material, a calendar and contact information to make the application as beneficial as possible for the user during the purchasing process.

Project Type: Web App, MS Power Platform

Technologies: Power Fx



<https://airpowerapp.my.canva.site/>



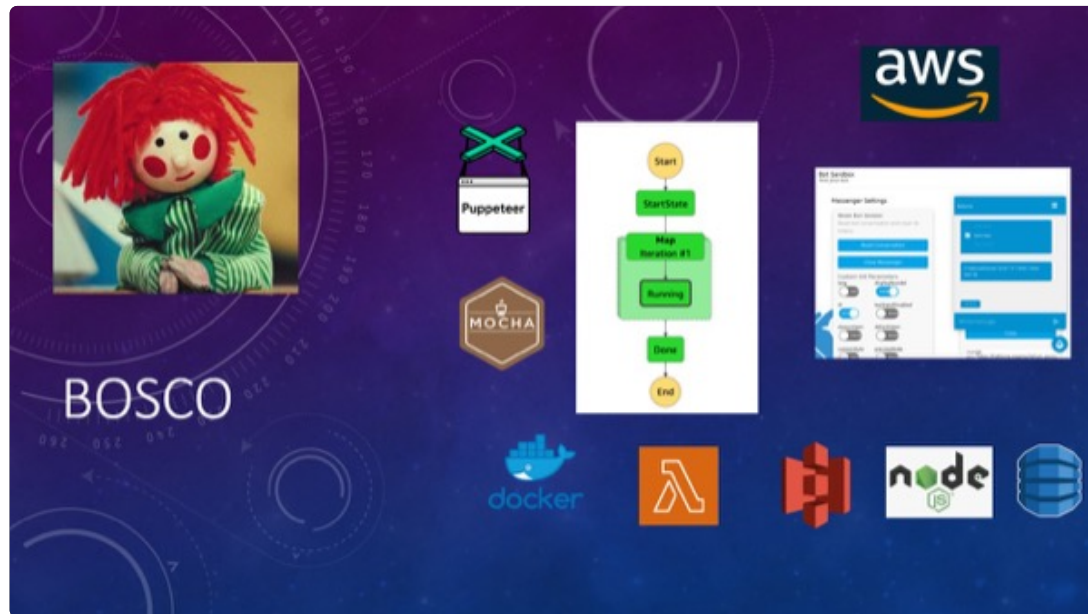
Bosco

Optimising Test Runner Performance through Serverless Computing

by Margaret McCarthy

LOCATION

TL245 – 92



This project involves building a serverless test runner for a chatbot-based company, using AWS Lambda Step Functions, Mocha, and Puppeteer. The test runner executes end-to-end unit tests on two adapters and stores results in DynamoDB and failed screenshots in S3. CloudWatch is used to log results. The test runner is deployed across multiple AWS regions using CloudFormation, making it highly scalable and fault-tolerant, while also eliminating the need for managing and scaling EC2 instances, resulting in significant cost savings. The project was written in NodeJS using Javascript, a Docker container and multiple AWS services.

Project Type: Testing, Serverless, CI/CD (Pipeline)

Technologies: NodeJS, AWS Lambda Step Function, Docker, Puppeteer, Mocha



<https://bosco.surge.sh/>



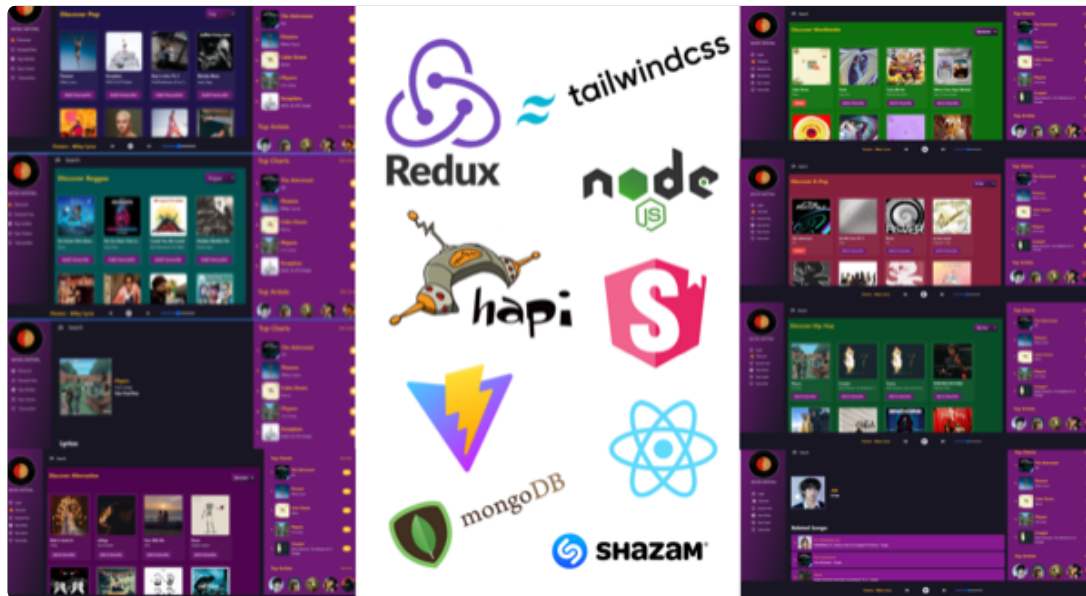
Retro Revival

Ux Exploration of Music-Playing Progressive Web Application

by **Sophia McGee**

LOCATION

TL235 – 83



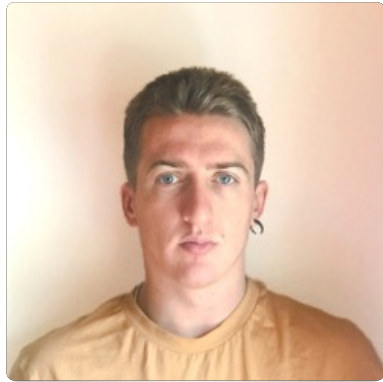
Retro Revival is a music app that uses React and Redux, along with Tailwind CSS and the Shazam API, to offer a seamless experience for exploring and discovering new music. With Redux, it provides state management for smooth interactions. The retro aesthetic, with a purple, orange, and black color scheme, adds to the vintage feel, while intuitive UX design enables easy navigation between genres and chart-toppers. Combining local streaming and API integration, Retro Revival delivers a secure and reliable platform for all music enthusiasts. Relive the past and discover new favorites with Retro Revival! .

Project Type: Web App, UX / Front End

Technologies: React 18, Vite, Redux, Storybook, Hapi, MongoDB, Shazam, , Javascript, Tailwind



<https://adobe.ly/3FR9gBb>



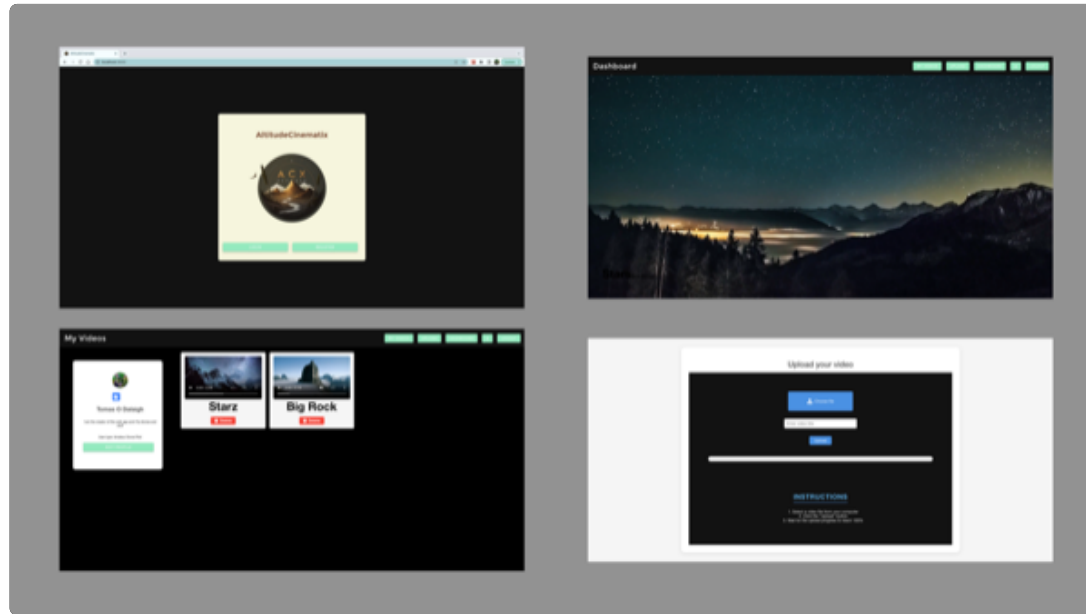
AltitudeCinematix

A web app for viewing and uploading aesthetic long form video

by **Tomas O Dalaigh**

LOCATION

TL235 – 80



AltitudeCinematix is a video platform focused on aesthetically pleasing content. Users can view and upload videos, creating a community that values visual artistry. The app encourages engagement with features like video ratings and weekly charts, fostering a dynamic and enjoyable experience for creators and viewers alike.

Project Type: Web App

Technologies: React, nodejs, JavaScript, Ionic, Fire-base and TypeScript



<https://hdipfinalbytomas.com>

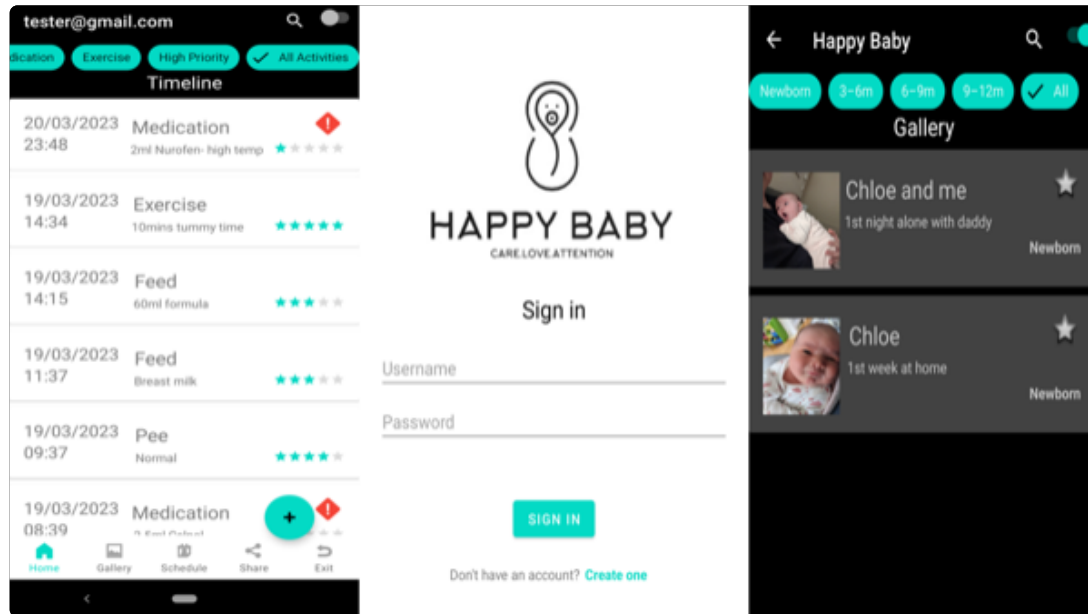


Happy Baby

An Android Baby Tracker App

by **Colm O Keffe**

LOCATION
TL238 – 70



Happy Baby is a Native Android Application built in Android Studio using the Kotlin programming language. This is an app for parents/caregivers to track the activities of their baby in their early critical development period. These activities, such as their feeds, sleep, nappy change, medication and exercise are logged so that the general welfare of their baby or babies is tracked. Reminders for related events can be set within the app and a gallery of milestones can be created. The purpose of this app is to achieve these objectives using a simple, intuitive and effective app.

Project Type: Native Android app

Technologies: Android Studio, Agile methodology, Kotlin, Firebase, Picasso



<https://sites.google.com/mail.wit.ie/happybaby/home>



Subject to NDA

Project Details are Subject to NDA

by **Declan O' Donovan**

LOCATION

NDA – 99

A number of projects on the HDip in Computer Science are subject to NDA. Such projects are supervised and graded as normal while honouring the term of the NDA.

Project Type: NDA, Workplace Project, Web App

Technologies:



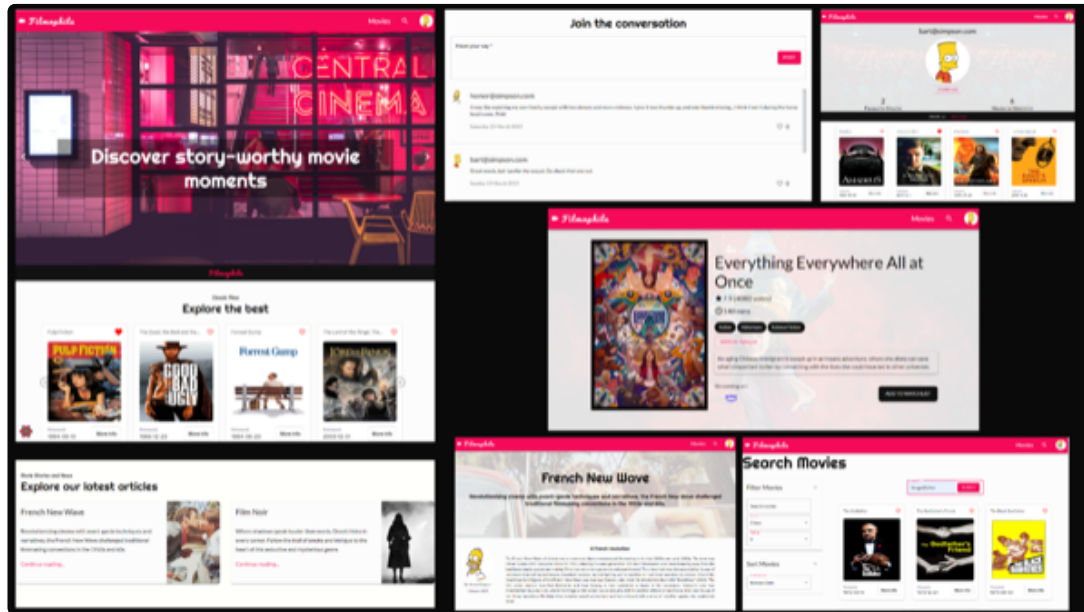
Filmophile

A front-end focused full stack web application

by Owen O'Donnell

LOCATION

TL238 – 79



Inspired by a love of cinema, Filmophile is a web application for movie fans. With an emphasis on community, it offers tools for managing personal viewing, sharing opinions, discovering new titles and learning about film through curated editorial content and recommendations. Filmophile merges functionality, social interaction, and educational aspects, providing a comprehensive movie experience to users. Built with React.js and Material UI, the application is fully responsive. Firebase powers authentication and data storage, while the Movie Database API serves as the source of data on movies. The application is deployed using AWS Amplify.

Project Type: Web App

Technologies: React, Material UI, Joy UI, Firebase, AWS, JavaScript, HTML, CSS, TMBI



<https://sites.google.com/view/filmophile>



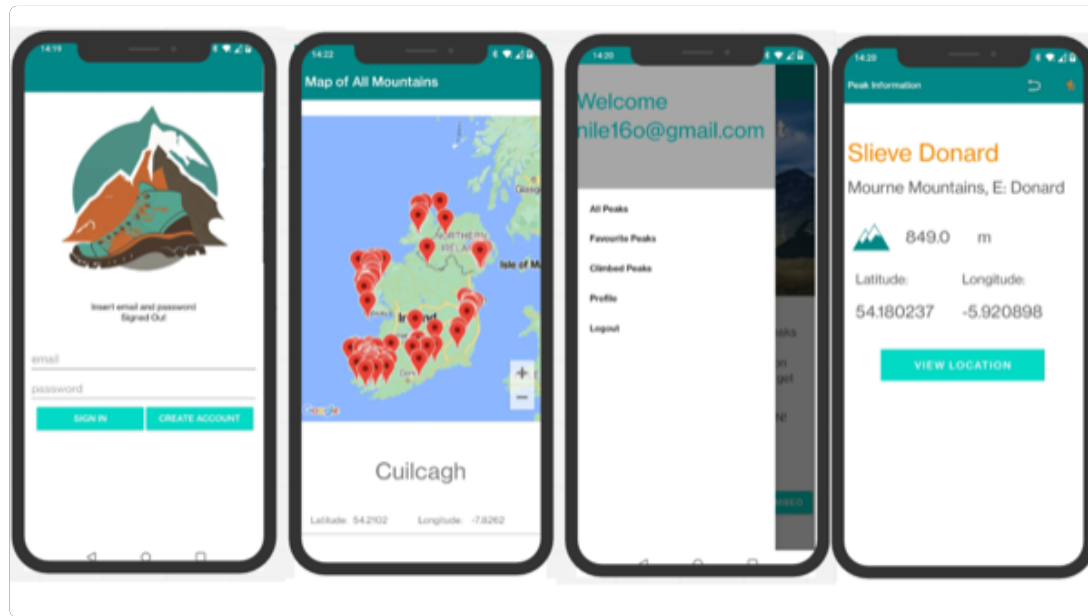
Trek It

A Mountain Trekking and Tracking App for Android

LOCATION

TL238 – 73

by Níle O'Hagan



TrekIt, a mobile application that helps you plan your mountain trekking adventures. This Native Android mobile application provides users with information on each of the 100 highest peaks in Ireland, including their height and location. Users can track their progress as they complete each peak, with the app recording their completion times and providing a record of their achievements. The application was developed using Kotlin in Android Studio. Firebase Authentication and Firebase Realtime Database were utilized to reduce back end development requirements.

Project Type: Native Android app

Technologies: Kotlin, Firebase Authentication, Firebase Realtime Database, GoogleMaps



https://bit.ly/TrekIt_20095361

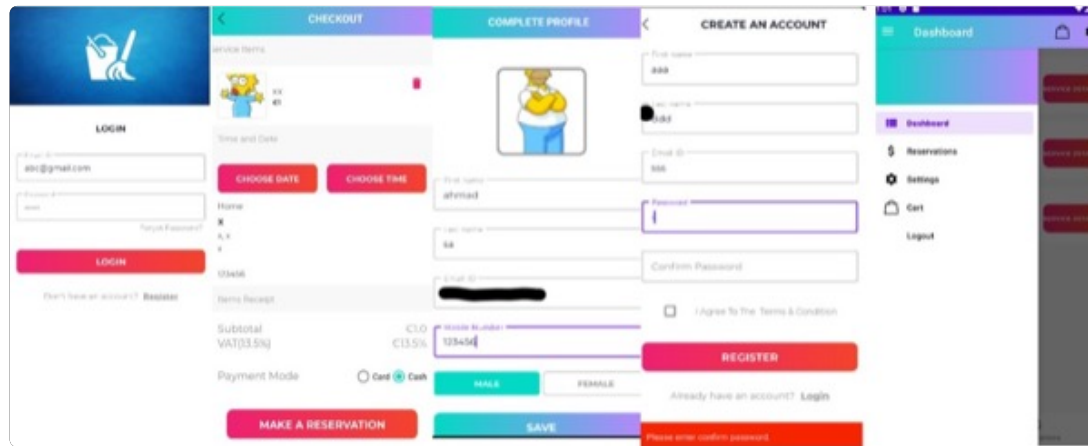


SuperCleaner

Android app to make reservations for services

by Ahmad Sabeh-Murphy

LOCATION
TL238 – 69



SuperCleaner is a mobile application designed to simplify the process of booking cleaning services for a small enterprise. The app offers an easy-to-use platform for users to reserve services in their local area and provides an intuitive dashboard for the enterprise to manage and administer the services they offer, a shopping cart, where users can select and purchase multiple services, as well as a payment gateway to complete transactions. The app also provides a user-friendly interface to view reservation history.

Project Type: Native Android app

Technologies: Kotlin



<https://bit.ly/3JMM0pd>



Subject to NDA

Project Details are Subject to NDA

by **Tom Tobin**

LOCATION

NDA – 100

A number of projects on the HDip in Computer Science are subject to NDA. Such projects are supervised and graded as normal while honouring the term of the NDA.

Project Type: NDA, Workplace Project

Technologies:



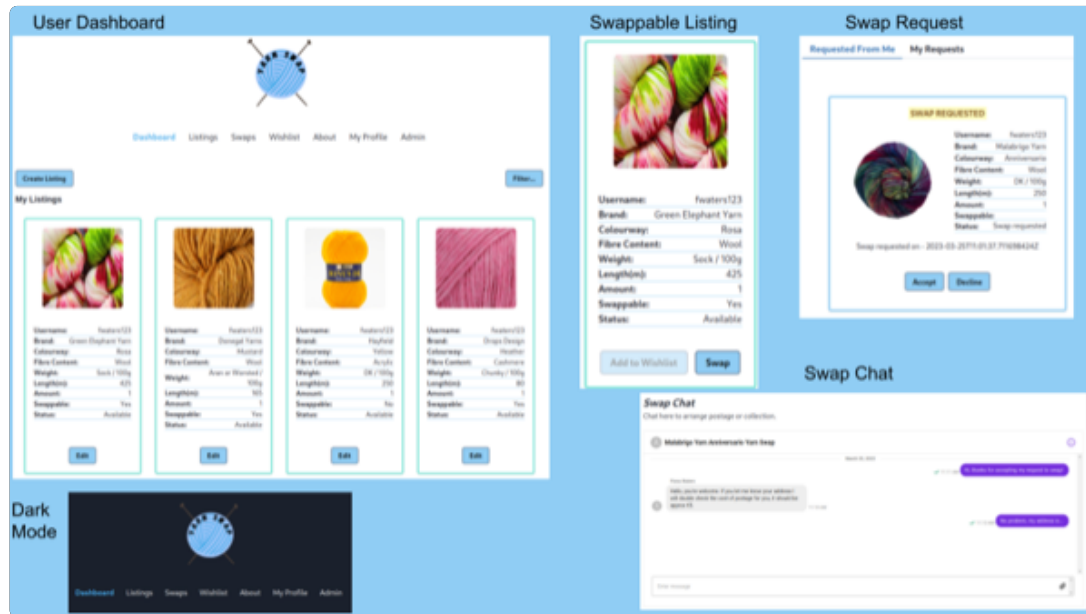
Yarn Swap

Progressive Web App Community Swap Platform

by Fiona Waters

LOCATION

TL238 – 76



Yarn Swap is a Progressive Web App that allows community members to share items with each other that may have otherwise been left unused. This serves to reduce waste while also fostering a sharing community that can contribute to a circular economy. Yarn Swap focuses on the exchange of Yarn in the Craft Community but use of the application could be transferred to many other areas including clothing, books etc. Yarn Swap has been created with a React.js, Vite.js, ChakraUI frontend, a Golang, Gin backend and employs Firebase Realtime Database for data storage.

Project Type: Web App - Progressive, CI/CD (Pipeline), Testing

Technologies: React.js, Vite.js, ChakraUI, Golang, Gin



<https://bit.ly/3nbPHx0>

SECTION 3

Master of Science - MSc



MSc in Computing

The MSc in Computing currently has two cohorts:

- MSc in Computing (Enterprise Software Systems)
- MSc in Computing (Information Systems Processes)

The aim of the MSc in Computing (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.

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.

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MSc in Computing (Enterprise Software Systems)



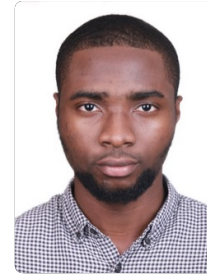
Arbaz Ahmed



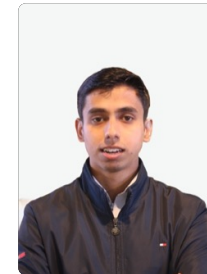
Rukmangathan
Annadurai



Warren Byron



Ikechukwu
Festus-Ihedioha



Muaz Hassan



Yiming Hu



Matul Jain



Christos Koutsiaris



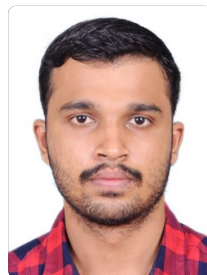
Darren Leniston



Hari Venkata
Sai Ganesh Lolla



Alka Nixon



Aaron Pinto



Puttaswamy Har-
sha Puttaswamy



Qi Zeng

Identifying Cancer Mediating Biomarkers Using a Gene Selection Approach Based on Clustering

by **Arbaz Ahmed**



Cancer is a complex disease that affects millions of people world-

wide, and the identification of cancer biomarkers is crucial for early diagnosis and effective treatment. In recent years, gene expression data analysis has become an essential tool for identifying cancer biomarkers. In this dissertation, we propose a gene selection approach based on clustering using the k-means algorithm to identify cancer mediating biomarkers. The proposed

approach involves four main steps: data preprocessing, clustering, feature selection, and classification. First, the gene expression data will be preprocessed to remove noise and normalize the data. Then, the k-means algorithm will be used to cluster the genes based on their expression levels. Next, feature selection will be performed to select the genes that are most relevant

to cancer. The effectiveness of the proposed approach will be evaluated using publicly available gene expression datasets. The results of the proposed approach will be compared with existing approaches to demonstrate its effectiveness in identifying cancer mediating biomarkers.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Study of Attribute Based Access Control with Ontologies

by **Rukmangathan Annadurai**



One of the most widely used types of access control systems is attribute-

based access control (ABAC). Systems for access controls are used to safeguard resources against unwanted access or use, such as network devices or IT resources. Extensible Access Control Markup Language (XACML) is a policy language built on Extensible Markup Language (XML) that is used to define security policies and information access requests. XACML can

be difficult sometimes. This is because of a variety of factors, including how challenging it can be to understand XACML principles and the difficulties in maintaining XACML-expressed policies. The purpose of this project is to study a human pleasant way to configure and administer ABAC policies using ontologies. Every physical or digital entity with attributes that

can also represent a relationship between the entities can be described using an ontology. An ontology can be developed and described in a variety of ways. The goal of this project is to make use of the OWL framework and the Protege tool for creating, designing, and using ontologies.

Technologies:
Python, OWL, Protege

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Blockchain Business Applications in Irish Tourism: Developing a Proof of Concept Business Case for an NFT

by Warren Byron



This research project examines how NFTs and blockchain technology may be used to improve a digital business

process. It contributes to the National Development Policy and Professional Practice through a technological and architecture survey; and to the role of blockchain technology in strategic industrial policy through an engagement with the BCI EWG. Among the contributions and implications for scholarship are addressing gaps in the literature pertaining to blockchain business models beyond cryptocurrency

and ICOs that are currently not well understood, as well as blockchain development engineering methods that are underdeveloped for national-level proof of concept projects. Using well-architected principles, the prototype stack consists of a react.js frontend, a scalable serverless AWS API backend, and interactions with the Flow Blockchain smart contracts through Cadence queries and transactions.

The proof of concept system allows tourists to collect minted NFTs via QR codes posted at key attractions. It also demonstrates how data analytics and integration with third-party partner organisations may offer additional value to the tourism sector through the use of NFTs.

Technologies:
React.js, Frontend, AWS Backend, Flow Blockchain, Python, JS, Cadence

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

<http://ireland.nftpassport.travel/>

Exploring the Usability of Low-Code Platforms: A Study of Common Challenges and Successes

by Ikechukwu Festus-Ihedioha



The increasing trend towards higher

levels of abstraction in software development has led to the emergence of Low-Code Development Platforms (LCDPs), which are gaining popularity in software development, due to their promises of increased speed and efficiency. LCDPs offer a simplified approach to software development through the use of graphical interfaces

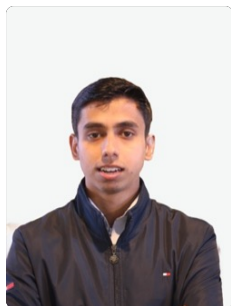
to provide a more streamlined and intuitive development experience. They significantly improve the speed and efficiency of the development process, and bridge the knowledge gap hindering broader participation in software and software process creation. However, adoption of LCDPs has been low due to both platform- and user-specific

factors. As a result, this study explores the aforementioned factors in a view to address and increase the adoption of LCDPs.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

A Mobile Application to Detect Potato Diseases Using Machine Learning Techniques

by **Muaz Hassan**



Globally, potato is considered as the third most important food in terms of

consumption and the most important crop in the non-cereal domain. Potatoes need a lower portion of resources compared to cereals as it is a water-efficient crop. It also yields fourfold more than a grain crop for the same area. Potatoes are utilized as human food, animal feed, and seed tuber. Circumstances like waterlogging, temperature drops, and climate change act as a

catalyst for destructive potato diseases like late blight and early blight. These diseases can reduce the yield to 0%. To minimize the loss, one must timely detect the disease. A manual checkup requires expertise, human efforts, and frequent checkups across the life cycle of a crop. Automating disease management will be of substantial aid to the farmers. In the agriculture sector,

deep learning has decent traction in distinguishing plant diseases. Existing potato disease detection models are trained on small and outdated datasets. When training on a small dataset, it is difficult to train for complex features while avoiding the risk of overfitting and providing a robust output.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Deep Gait Analysis for Healthcare Applications

by **Yiming Hu**



The main objective of this research is

to develop a convolutional neural network algorithm that can be used to assist in gait analysis in healthcare by simply inputting data from an IMU (Low-cost MEMS inertial measurement unit) device, and ultimately to determine, for example, the health of the person from whom the data originates, the degree of recovery of the patient

after surgery, or to Parkinsons disease monitoring and the prevention of accidental falls in the elderly. Once the algorithm has been designed, I will also compare it with the most popular deep learning algorithms such as Vgg16, ResNet50 and Googlenet. It is therefore hoped that this research will have the opportunity to improve

the detection process in the healthcare field, as there is a need to find and solve problems by using only IMU data rather than images or even videos, thus significantly reducing the complexity of the multivariate time series process.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

A Comparative Study Between the Selection Criteria Used When Choosing the Waterfall or the Scrum SDLC Approaches

by **Matul Jain**



This research aims to investigate the

decision-making process behind software development companies in Ireland choosing the Waterfall or Scrum SDLC approach for their software projects. The study also aims to identify the criteria considered by these companies in selecting between these two approaches and any challenges that may arise in the implementation

process. A questionnaire will be used to gather data from software development companies in Ireland. The results of this research will provide guidelines for organisations considering implementing either the Waterfall or Scrum approach for their software development projects and help mitigate potential challenges. The findings

will contribute to refining the SDLC selection process between these two approaches based on the actual practices of software development companies in Ireland.

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

A Contextual Help Browser Extension to Assist Digital Illiterate Internet Users

by **Christos Koutsiaris**



The study examines the implemen-

tation of a browser extension that provides contextual help to users when they hover over technological acronyms and abbreviations on websites. It includes exploring the potential application of Artificial Intelligence (AI) technologies, specifically Natural Language Processing (NLP), for categorising web pages based on their

technological content and determining whether OpenAI services can provide relevant definitions in tandem with a static dictionary. Lastly, one of the research objectives is to evaluate the impact of contextual help assistance on the understanding and comprehension of technical text and changes in reading rate in a group of digitally illiterate

or minimally technology-exposed users. The research uses a mixed-method approach that combines qualitative and quantitative methods to get the most comprehensive and accurate data.

Technologies:
 ReactJS, TypeScript, NodeJS, Plasmio, Google Cloud NLP, OpenAI

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

A Distributed Edge FLISR Solution & Network Simulation Test Platform



by **Darren Leniston**

The energy sector is facing wide-scale changes with the rapid introduction of

disruptive distributed energy sources, renewables, electric vehicles and the changing relationship between the consumer and the utility. This has resulted in the need to leverage the capability of modern ICT and IoT technologies to meet the challenges presented by such changes. Of key concern is the resilience of the energy grid and the growing dependency on a

stable supply to support business as usual activities and daily life for society at large. This project proposes a novel implementation of the concept of Fault Identification, Isolation and Service Restoration in a distributed fashion, enabled by Edge Computing techniques, to mitigate the effects of service loss to the end consumer and utility. The project focuses on the Irish

energy grid in particular, and how such a solution can be leveraged to reduce the impact of fault events, particularly those resulting from inclement weather events which are increasing in frequency and severity as a result of climate change.

Technologies:

GoLang, Python, JavaScript, KubeEdge, Kubernetes, Docker, Neo4j, Postgres

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
Cloud Computing	Computer Networks	Automotive and Automation	Internet of Things	Digital Graphic Design	Animation	Software Dev: Front End	Software Dev: Back End

Technology Adoption and E-Readiness in Developing Regions - Supporting Socio-Economic Development Through Digitalization



by **Hari Venkata Sai Ganesh Lolla**

Given the effects of climate change and expanding populations, sustainable agriculture is becoming more

and more critical. Climate change, the desire to end hunger caused by poverty, and the objective of enhancing human wellness all contribute to an ever-growing consideration about the sustainable development of agriculture. The capacity to cultivate responsibly while addressing rising food needs remain one of the major difficulties confronting agriculture in the twenty-first century. Digitalization of agriculture

can contribute to socioeconomic development in several ways. For example, it can improve efficiency and productivity in the agricultural sector, which can lead to increased incomes and improved food security. It can also help to connect small-scale farmers to markets, which can expand economic opportunities and reduce poverty. One of the main specific barriers to technology adoption in agriculture is the lack of

understanding about the technology by the farmers. This study will try to use current technologies like machine learning and data analysis to improve current agricultural practices in order to lead to a more sustainable future and lucrative agriculture.

Technologies:

Python, Machine Learning, Data Analysis, React JS, Node JS, Express JS

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
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Performance Comparison of Equivalent Cloud Services



by Alka Nixon

The cloud industry has become popular due to its flexibility, security and other key characteristics which suit

an enterprise environment. Still, each organization has unique needs and choosing proper cloud services that suit them is a difficult task. Making it simpler to choose cloud service providers is the main objective of this research. We can say that cloud providers are all similar in the essence of the services they are providing. So, it is a hectic task to choose a specific use case. For instance, it can be

challenging to determine which cloud provider gives the best performance, especially due to the lack of extensive, in-depth performance comparisons between cloud providers. The development of an application that performs the comparison of various public cloud services and displays the analysis results to the end user to help select a provider which suits them the best, is the goal of this research. This pa-

per examines Amazon Web Services and Microsoft Azure, two of the most well-liked open source architectures. Comparison is done based on performance. The various metrics are I/O performance, memory usage, cost, CPU and network performance, elasticity, scalability and consistency.

Technologies:
AWS, Azure

Database and Analytics	Information Systems and Modelling	Computer Security	Computer Forensics	Game Development	Media Development and Production	Software Dev: Core	Software Dev: Mobile
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3-Dimensional Object Reconstruction of Forensic Image Using Deep Learning



by Aaron Pinto

The “3D Object Reconstruction of Forensic Images Using Deep Learn-

ing” project aims to simplify the reconstruction of multiple objects from 2D images using deep learning techniques. An advanced neural network model will be developed with three technical enhancements, including convolutional neural network-based image denoising, saliency map-based object segmentation, and generative adversarial network-based 3D shape completion.

The effectiveness of the model will be evaluated across various scenarios to assess its ability to handle multi-object scenes. The model will be deployed on Amazon Web Services with a user interface for easy access. This project has significant potential to aid forensic investigations by producing precise and accurate 3D models of objects recovered from crime scenes. Furthermore,

the research outcome will contribute to the development of advanced deep learning models capable of handling complex scenarios and improving the accuracy of 3D object reconstruction from 2D images.

Technologies:
React, Js, Python(Keras, TensorFlow, PyTorch), AWS, Google Colab, Linux

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The Impact of Chatbots on Learning Outcomes and Engagement for E-Learning

by **Puttaswamy Harsha Puttaswamy**



The purpose of this dissertation is to investigate whether chatbots can have a positive impact on learning outcomes

in e-learning. This study will focus on creating two chatbots, one that is friendly and another that is formal, and compare their impact on user engagement and learning outcomes. The study will be conducted in two phases: the development of the chatbots and the evaluation of their impact on learning outcomes. In the development phase, two chatbots will be created using natural language processing tech-

niques. The friendly chatbot will be designed to use informal language and a conversational tone, while the formal chatbot will use more professional language and a serious tone. Once the chatbots have been developed and deployed Participants will be randomly assigned to one of the two chatbots and will be encouraged to interact with the chatbot and learn about a particular topic taught by the chatbot. To

evaluate the impact of the chatbots on learning outcomes, participants will be assessed using a pre- and post-quiz to measure knowledge gain. In addition, participants will be asked to complete a survey to provide feedback on their experience using the chatbot.

Technologies:

Angular 14, Nodejs 16, AWS Dynamo DB, AWS S3, AWS ec2 instance, Dialogflow

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Comparative Evaluation of Code Quality Generated by GitHub Copilot and ChatGPT

by **Qi Zeng**



The main purpose of this study is to

evaluate which tool, between GitHub Copilot and ChatGPT, can generate higher quality code. The algorithms being tested will come from the LeetCode question bank, including easy, medium, and hard difficulty levels. To test each algorithm, the code will be tested in three different programming languages, which are Java, JavaScript,

and Python. For each algorithm, code will be generated using both GitHub Copilot and ChatGPT by entering the same comments, including the algorithm question name, description, function name, and question example. The generated code will be measured by correctness rate, Big O Notation, Cyclo-matic Complexity, and Cognitive Com-

plexity metrics. Finally, I will create a comparison table based on the measurement results to determine which tool generates higher quality code in the three languages, or which tool generates higher quality code in a certain language.

Technologies:

GitHub Copilot, ChatGPT, GitHub

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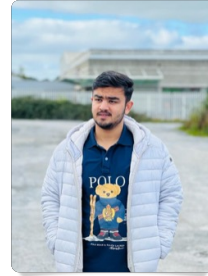
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Aown Abbas



Funso Aringbangba



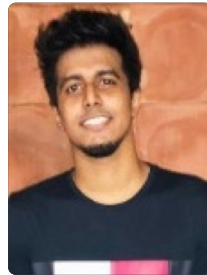
Abdullah Butt



Ammad Sarwar Cheema



Muhammad Usman Chughtai



Karan Gaikwad



Kiran Manwar

IoT Enabled System in Smart Cities for Green Energy for Developing Countries

by Aown Abbas



The development of smart cities in de-

veloping countries presents both challenges and opportunities for the implementation of IoT-enabled green energy technologies. These technologies have the potential to significantly enhance energy efficiency and sustainability, but face various obstacles such as inadequate infrastructure, insufficient funding, and lack of skilled manpower.

This paper explores the key challenges and opportunities associated with the implementation of IoT-enabled green energy technologies in smart cities in developing countries, and proposes solutions to increase adoption and energy efficiency. Additionally, this paper examines the impact of smart grid technologies and real-time monitoring

systems on energy consumption and renewable energy adoption in smart cities in developing countries, and offers recommendations for integrating these technologies into existing urban infrastructure to enhance sustainability and energy efficiency.

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Requirements Engineering Complexity in Customer-Facing Banking Services in Nigerian Application Support Teams

by Funso Aringbangba



Requirements engineering (RE) is a critical process in the development

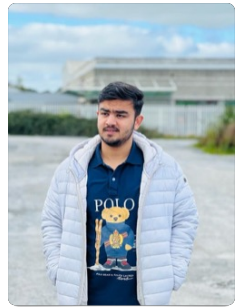
of software systems, particularly in customer-facing banking services. The complexity of requirements engineering in such applications is influenced by a range of factors, including the dynamic nature of the banking industry, changing customer needs, and the need to comply with regulatory standards. Requirements engineering is a very important phase in develop-

ing and enhancing some of the channels used to deliver digital banking services, online and mobile banking applications fall into this category. It has been observed over time that to enhance or develop these digital channels, it is often required to carry out requirements engineering to know what enhancements to add or new features to build. However, it is not always

easy to carry out this phase as there are issues inherent in it that tend to make the process a complex task. In view of the foregoing, an attempt is being made to look at the interplay of factors that introduce complexity into this phase of development of digital applications and to what extent these factors affect the process.

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Building an Industrial Digital Twin on IoT Using MQTT



by **Abdullah Butt**

This survey of the literature looks at the use of digital clones in industrial

contexts. Digital twins are real-time virtual copies of physical systems that imitate their behavior and performance. The study investigates the advantages of using digital twins in the setting of the industrial Internet of Things, such as increasing productivity, reducing downtime, and optimizing processes. It also examines the MQTT communication protocols usefulness as well

as the use of digital twins in energy storage systems for real-time tracking, prediction, and optimization of energy flow. The study also investigates the use of digital twins for predictive maintenance and the merging of industrial IoT systems with blockchain technology. The review suggests a model that links the obstacles and enablers to effective digital twin adoption in the

process industry. Lastly, the review recommends several research directions for future digital twin research, such as examining key technologies needed for execution and evaluating digital twin industrial uses at each stage of the lifespan.

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To Investigate the Use of Information Technology in the Hospitality Sector: A Case Study of Hotels in County Waterford



by **Ammad Sarwar Cheema**

Hotels are essential to providing lodg-

ing and services to visitors and business travelers, and the hospitality sector is a significant one for the Irish economy. Information technology (IT) solutions have become more widely used in hotels in recent years, and many of them have begun to deploy cutting-edge systems to improve operations and the quality of their services.

In order to better understand how IT systems are used in hotels in Ireland's South-East and how they affect the hospitality sector, this research project will look at how they are used. The study's research questions focus on the South East's hotels' current IT adoption, the kinds of IT systems and software being used, the quality of

training being given to hotel workers, and the standards upheld to ensure dependable technology. During each stage of the study, a cutting-edge analysis will be conducted using a mix of four bibliographic methodologies in an effort to provide answers to these issues.

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Waste Management Disposal



by **Muhammad Usman Chughtai**

Waste management and disposal is a major issue in Pakistan, where inefficient and inadequate systems have

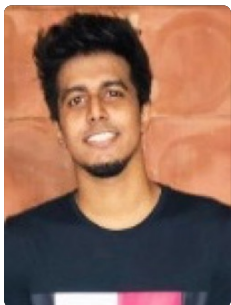
resulted in severe environmental, social, and economic implications. The purpose of this research is to investigate how to enhance garbage disposal in a Pakistani town Lahore. The research objectives are to identify the towns current waste management practices, analyze the issues faced by the existing system, and offer methods to improve waste management practices that will provide real benefit to

the towns citizens. It is important to keep the human at the center of any improvements. This research employs a mixed-methods approach, which includes both quantitative and qualitative techniques. The data collection methods include a questionnaire survey and semi-structured interviews with relevant stakeholders, such as municipal authorities, waste collectors, and resi-

dents. The sampling strategy involves purposive sampling of key informants and stratified random sampling of the residents. The data analysis techniques used in this research include descriptive statistics, thematic analysis, and content analysis.

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Federated Learning for Smart Health Care System in Developing Countries



by **Karan Gaikwad**

To discuss the potential of smart healthcare systems in developing coun-

tries and how federated learning can improve their quality and accessibility. Federated learning is a decentralized approach to training machine learning models on data without centralizing the data itself, thus preserving the privacy of individual patients. The research cites examples of successful federated learning applications, such as predicting hospital readmis-

sion rates and early detection of sepsis. The research proposes a study to examine the potential of federated learning as a solution for improving the performance and effectiveness of smart healthcare systems in developing countries. The study will identify the challenges faced by these systems, evaluate the potential of federated learning to ad-

dress these challenges, and propose a federated learning framework to improve the performance and effectiveness of these systems. The feasibility and potential impact of the proposed framework will be assessed, and recommendations for future research and implementation will be made.

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Framework for Integration System of Information System for Manufacturing Industries

by Kiran Manwar



Information system of manufacturing industries is very complex and consists of multiple systems like PLM, Supply

chain, ERP, etc. There are heavily customised integrations between multiple applications/systems which makes application complex and impacts application performance and user experience. These systems can be in any manufacturing industries such as Automobile, Lighting, Home appliances, etc. These systems need to have the updated information related to product, hence, there is a pressing need of having the

most efficient integration system which will ensure the data integrity and provide more efficiency. This project emphasises the technical challenges PLM and other systems face for data transfer and integration and proposes the framework for most efficient data transfer. The integration system of manufacturing industries have many challenges right from its implementation to data transfer between the

systems. For instance, data mismatch in downstream systems, improper data transfer due to improper implementation, data loss due to special characters, etc. This research aims at proposing the framework of centralized integration system which helps data transfer via integration servers.

Technologies:
Java, JSON, XML, Python

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