1

Project Title	An Investigation into Steam Turbine Design for Power Generation & its Position in the Future Energy Sector
Name	Conor Meyler
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Programme	Mechatronic Engineering – ME4
Supervisor	James Carton

Steam turbines are at the backbone of power generation with over 80% of all electricity generation in the world is supplied by steam turbines. Even with the decline of large-scale thermal power plants due to the increasing uptake of renewable energies such as wind and solar. There will always be a need for steam turbines to provide maximum efficiency from sources like nuclear, geothermal or natural gas. This Project takes an in depth look at the steam turbine and its future potential.

Project Area	Electric Generation, Energy Conservation, Renewable Energy Technology, Thermodynamics
Project Technology	Solidworks, Labview

2

Project Title	Finite Element Analysis of Fracture Fixation
Name	Arón Floody
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Programme	Biomedical Engineering – BMED4
Supervisor	Bryan MacDonald

This project examines the effects of varying several parameters of a fracture fixation plate implant on the inter-fragmentary strain experienced at the site of a traverse femoral fracture. Inter-fragmentary is a very important aspect of the fracture healing process as it has been found to directly relate to the level of callus formation which determines the rate of healing in the bone. A series of 3D finite element models were created using ANSYS Workbench to produce computational results.

Project Area	3-D Modelling, Biomedical Engineering, Finite Element Analysis
Project Technology	ANSYS Workbench

3

Project Title	Password Manager with P2P Synchronization
Name	Dean Lynch
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Programme	Computer Applications – CASE4
Supervisor	Brian Stone

This is a unique application that combines password database management and synchronisation into a unified application. The application reads from a locally stored password database file, which can then be synchronised across a users devices using a peer-to-peer connection. This eliminates the need to expose the password database to third-party servers or cloud storage services, as well as saving the user the need to manually synchronise the database or manage their own self-hosted solution.

Project Area	Cryptography, Network Applications, Security
Project Technology	Groovy, Java

4

Project Title	When2Buy: A price comparison web application
Name	David O'Brien
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Programme	Computer Applications – CASE4
Supervisor	Cathal Gurrin

When2Buy is a price comparison web application which enables users to become informed on Graphics cards to have the best information before buying. The project focuses on analysis that gives advice on the best time to buy whether in general or per product. It will also give a visualisation on different aspects of the market. The project examines how the market changes and passes it to the user for them to get the best deal when purchasing a graphics card.

Project Area	Data Analytics, E-Commerce, Web Application
Project Technology	CSS, HTML5, Python

5

Project Title	Testing of a Nicotine Replacement Therapy Devices
Name	Shauna Murphy
Email	shauna.murphy325@mail.dcu.ie
Programme	Biomedical Engineering – BMED4
Supervisor	Lorna Fitzsimon

This project was conducted in collaboration with Nypro Healthcare, Waterford to assist in the validation of an assembly line producing a nicotine replacement therapy device. The project aims to develop a method to determine a range of parameters which will produce weld joints possessing optimal weld strength. The process incorporates the use of visual inspection, destructive tensile testing and Minitab statistical analysis.

Project Area	Mechanical Design and Manufacture

6

Project Title	Póstaer – Digital Marketing
Name	Niall Power
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Programme	Enterprise Computing – EC4
Supervisor	Paul M. Clarke

Póstaer is a fresh take on digital advertising in airports. Póstaer aims to capture the public's attention at departure and arrival gates with eye catching digital advertising, that is specifically related to their destination. Our solution works by using an airport gate information API, in order to know what media content should be displayed from a media database on screens at a certain location. This is managed using a web interface.

Project Area	Cloud Computing, Content Management System, Databases, Multimedia, Web Application
Project Technology	CSS, HTML5, JavaScript, Python, Django

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Project Title	EmpowerYou
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Name	Rumen Panov
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Programme	Enterprise Computing – EC4
Supervisor	Cathal Gurrin

EmpowerYou aims to empower young graduates to understand and encourage them to start inventing in the stock market on a clear and interactive platform. EmpowerYou's solution is a chatbot interface with a matching web application. This gives users the ability to see their investments in a simple manner, through a chatbot or with the use of a virtual assistant like Amazon Alexa.

Project Area	Natural Language Processing, Optical Character Recognition, Web Application
Project Technology	CSS, HTML5, JQuery, JavaScript, Python, SAP Conversational AI (Formally RecastAI), Amazon Alexa, Microsoft OCR

8

Project Title	Timetable Generator
Name	Daniel Asofiei
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Programme	Computer Applications – CASE4
Supervisor	Charlie Daly

The aim of this project is to facilitate and speed up the generation of a timetable. Organisers can select various parameters and invite participants, enter contraints and create timetables, while also allowing participants to input their constraints. It is based on a MVC architecture written in Ruby On Rails framework and it handles authentication, integration with Google Calendar API for automated import of events and for timetable generation it is using a constraint search algorithm implementation.

Project Area	Model View Controller, Software Development, Web Application
Project Technology	CSS, HTML5, JavaScript, Ruby, PostgreSQL, Ruby On Rails

9

Project Title	Electronic Drum Signal Analysis
Name	Sean Deery
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Alan Kennedy

This project was undertaken to investigate if it is possible to use a single piezoelectric sensor in an electronic drum. High-end drum pads normally use two or more sensors to identify the location and force of a hit. Using fewer sensors will save on part and repair costs. It will also allow the drum module to have fewer inputs. The aim is to detect and distinguish different types of hits on the drum. The drum hits produce a signal, which is processed by using standard signal analysis techniques.

Project Area	Data Analytics, Digital Signal Processing
Project Technology	Excel/VB, Matlab

10

Project Title	Design and Development of an Experimental Apparatus to Monitor the Degradation of Calcium Phosphate Cements
Name	Leontia O'Driscoll
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Programme	Biomedical Engineering – BMED4
Supervisor	Nicholas Dunne

This project investigated and developed an experimental apparatus capable of monitoring the degradation of calcium phosphate cements. The degradation of such cements was investigated under static and dynamic physiological conditions. The mechanical properties were then investigated, such as compressive strength, Young's modulus and fracture toughness. Gravimetric changes were also observed and recorded. Properties were also investigated as a function of pH, temperature, flow rate, flow type and degradation time.

Project Area	Advanced Material Engineering, Biomedical Engineering
Project Technology	Excel/VB, Solidworks

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Project Title	eMusic
Name	Andreea Olaru
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Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

eMusic is an emotion aware web based music player. The application allows the user to take a picture of their facial expression. This picture is processed into a unique playlist based on the user emotional state. The music player dynamically changes its appearance based on the detected emotion of the user. eMusic also logs and displays the users emotional state over time via some helpful graphs.

Project Area	Computer Vision, Databases, Image/Video Processing, Web Application
Project Technology	HTML5, JQuery, JavaScript, Python, REST, SQLite, React Js, Keras, Tensorflow, OpenCv, Flask, Bootstrap

12

Project Title	Modelling of Bolted Joints using Finite Element Analysis
Name	Elochukwu Njeze
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Bryan MacDonald

Modelling of bolted joints using Finite Element Analysis enables an analyst to predict the behaviour of a structure before manufacturing the parts.

For this project, 3 different bolt models were evaluated namely, no bolt model, hybrid bolt model and solid bolt model.

All 3 models were validated for functionality and applicability to analysis. However, the no bolt model was the concluded to be optimal modelling method, producing results within an error of ±10% with the least computational cost. Other factors affecting the modelling of joints were also examined e.g. the meshing, contacts and boundary conditions.

Project Area	3-D Modelling, Finite Element Analysis, Mechanical Design and Manufacture, Simulation
Project Technology	ANSYS Workbench, Solidworks

13

Project Title	Crystal – A Web app that gives insights on brand acceptance
Name	Lisa Koilparambil
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Programme	Computer Applications – CASE4
Supervisor	Andrew Mccarren

A well maintained brand image is a valuable intangible asset to any firm. Failure to protect this brand image can result in loss of customers, reputation and revenue. Crystal is a web app that recognises this and allows a user to monitor the public opinions on a brand. It does this by using Twitter API to pull related brand tweets and performs sentiment and word2vec analysis.

Project Area	Data Analytics, Data Mining, Databases, Web Application
Project Technology	HTML5, JQuery, JavaScript, Python, REST, Django

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Project Title	Entertainment Republic
Name	Christopher Dunne
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Programme	Computer Applications – CASE4
Supervisor	Makus Helfert

The Application is cross-platform. Designed with the intention of smarter marketing. It allows business's to get closer to their customer, while rewarding users for carrying out certain tasks that will in turn benefit the business. The aim is for the businesses to have better social media coverage, while getting closer to their customer.

Project Area	Android, Mobile App, Social Networking
Project Technology	JavaScript, Nodejs, React Native

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Project Title	Efficient FPGA Implementation of the lightweight cipher HIGHT
Name	Alex Doherty
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Xiaojun Wang

This project investigates the lightweight block cipher HIGHT. The aim of this cipher is to encrypt data, 64-bits at a time using as little resources as possible. This was designed in VHDL to run on an FPGA development board. The cipher was analysed in terms of its performance, power and resource utilisation.

Project Area	Cryptography
Project Technology	C/C++, FPGA, VHDL/Vivado

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Project Title	Interactive Smart Mirror
Name	Robert Grall
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Name	Eoin Gibbs
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Programme	Enterprise Computing – EC4
Supervisor	Cathal Gurrin

The Interactive Smart Mirror is a hands-free home assistance device that uses voice commands to retrieve information. The smart mirror was created using a Raspberry Pi and a Matrix Voice. A Two-way mirror film was applied over a 42 TV to create a mirror effect. PocketSphinx was chosen as the voice recognition engine. The current data that can be retrieved includes: Time, Date, News, Personal calendar, Weather, Google Traffic, Spotify and more.

Project Area	Device Design, Information Retrieval, RaspberryPi, Speech Recognition
Project Technology	CSS, JavaScript, Nodejs, PocketSphinx

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Project Title	Open Eyes VR
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Name	Sean Williams
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Programme	Enterprise Computing – EC4
Supervisor	Cathal Gurrin

Open Eyes VR is a Virtual reality Tour application for College Campus' aimed at colleges to broaden their marketing potential nationally and internationally. It is downloaded by end users and experienced through a VR Headset.

We will provide audio description throughout the tour and include virtual talks and tutorials, enabling prospective students to receive all the information they would at an open day.

Our product allows colleges to promote themselves from anywhere in the world and stand out from competitors.

Project Area	Android, Mobile App, Virtual Reality, Web Application
Project Technology	C#, Java, Unity

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Project Title	Dyne for Restaurants
Name	Chris Cullen
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Programme	Computer Applications – CASE4
Supervisor	Monica Ward

An Android application which allows users to order and pay for meals in a restaurant. Restaurants can upload their details and menu's via a web application written in AngularJS/ JavaScript. Here they can also view visual data analytics on customer activity within their restaurant. This project also includes another Android application for restaurants to manage current orders from within the kitchen. This project combines the ideas of other current Android applications for ordering food from a takeaway and brings the idea into restaurants. This saves both the customer and restaurants time as well as helping restaurants to make informed business decisions.

Project Area	Android, Data Analytics, Databases, E-Commerce, GPS/GIS, Mobile App, Software Development, Web Application
Project Technology	AngularJS, CSS, HTML5, JQuery, Java, JavaScript, Firebase

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Project Title	AIRace – Comparing Machine Learning Algorithms within a 3D Racing Game
Name	Kyril Khaletsky
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Programme	Computer Applications – CASE4
Supervisor	Martin Crane

AIRace demonstrates how machine learning can be used to drive cars autonomously. I developed two neural network algorithms, backpropagation and NEAT (NeuroEvolution of Augmented Topologies) a genetic algorithm to train the cars using inputs from its sensors. AIRace determines which one performs best under particular scenarios. To showcase these algorithms I created a 3D racing game, where a user can either play by themselves or race against other cars controlled by said algorithms. More advanced users can observe the training process of either algorithm and experiment with various attributes pertaining to them.

Project Area	Artificial Intelligence, Automotive Technology, Gaming, Simulation, Software Development, Vehicle Control
Project Technology	.NET, C#, Unity

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Project Title	Which Way?
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Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

The aim of this project is to allow a cyclist to easily identify directions to take to get to their desired location without looking at their mobile device. Directions such as what turns to take prior to a junction will be displayed in an LED form in such a way that a simple glance would ensure the cyclist is aware of what turn to take. The cyclist is able to use their peripheral vision to also attain this information whilst being able to keep their eyes on the road.

Project Area	Android, Arduino, Mobile App
Project Technology	Java

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Project Title	Manufacture of porous tissue engineering scaffolds using supercritical fluids
Name	Aaron Fenlon
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Programme	Biomedical Engineering – BMED4
Supervisor	Garrett McGuinness

The fabrication of 3-dimensional tissue scaffolds for the repair and regeneration is an ever growing field within tissue engineering. Existing fabrication methods exhibit issues with uniform porosity and irregular internal micro-architecture. Current research theorizes that supercritical fluids can be utilized to mitigate this issue. This project investigates the capability of manufacturing uniformly porous tissue scaffolds, using supercritical carbon dioxide; in-house, in Dublin City University.

Project Area	Tissue Engineering

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Project Title	Intelligent Predictive Maintenance
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Programme	Computer Applications – CASE4
Supervisor	Liam Touhey

This project focuses on creating a predictive maintenance service that will be able to detect a potential fault in a system using an external piece of hardware. This is done so using machine learning technology and data gathered from a sensor to train the service, the project works with temperature readings in order to detect the fault and when it has done so, the user will be alerted via SMS.

Project Area	Data Analytics, Intelligence Pattern Matching, Model View Controller, Sensor Data
Project Technology	.NET, C#, JavaScript, SQL

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Project Title	EyeLearn
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Programme	Computer Applications – CASE4
Supervisor	Cathal Gurrin

EyeLearn is a web application based around multiple Machine Learning based microservices which allows users to learn the basics of a new language. These microservices use techniques such as computer vision (Convolutional Neural Networks), speech recognition, part-of-speech (POS) tagging and text-to-speech to make the app immersive and interactive.

EyeLearn allows users to engage with activities that will improve their language skills. The users can translate the world around them using their camera, translate their speech and POS Tag phrases.

When used in a class the teacher has full control over the vocabulary and what the students can see. Teachers can track the progression of their class and a student can track their own performance, this is shown through a series of visualizations.

Project Area	Artificial Intelligence, Computer Vision, Data Analytics, Databases, Distributed Systems, Educational, Model View Controller, Speech Recognition, Web Application
Project Technology	CSS, HTML5, JQuery, JavaScript, MySQL, Python, REST, Keras, Tensorflow JS, NGINX, Flask, ORM

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Project Title	Characterisation and synthesis of monetite bone cement for bone repair
Name	Ciara Lee
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Programme	Biomedical Engineering – BMED4
Supervisor	Nicholas Dunne

The aim of this project was to synthesise and characterise a self-setting monetite bone cement for bone repair. The monetite cement was synthesised by dehydrating brushite cement. The cement had varying concentrations of sodium chloride and different liquid phases to compare how these factors would affect the setting and mechanical properties of the cement.

Project Area	Advanced Material Engineering
Project Technology	Excel

25

Project Title	Automatic fruit classification
Name	Purev-Ochir Ganbaatar
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Paul Whelan

This project developed a neural network using deep-learning based computer vision system in order to develop a system capable of automatic fruit classification of 81 classes of fruits. This project leveraged an already existing database of fruits to train deep learning neural network and test it with similar fruit images.

Project Area	Artificial Intelligence, Computer Vision
Project Technology	Python, Keras

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Project Title	ClubKit
Name	Conor Ward
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Name	Gavin Boyle
Email	gavin.boyle8@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Andrew McCarren

ClubKit is a web application which assists sports club volunteers with day to day tasks such as member registration, training rosters, pitch rentals and in club shop purchases, moving away from conventional and time consuming methods. Clubs can sign up for free to avail of our free services which include a home page, club posts, teams and pitch organisation. All other features can be purchased separately or as a package.

Project Area	E-Commerce, Software Development, Web Application
Project Technology	CSS, HTML5, JQuery, JavaScript, Python, SQLite, Django

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Project Title	AstroBooker
Name	Aaron Carey
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Name	Robert Fallon
Email	robert.fallon5@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Jane Kernan

This project involved the development of a feature-rich web application for booking AstroTurf pitches and facilities. Users are able to book, compare and review facilities on our web app. This application allows users to search for facilities based on location and can make a booking from a selection of available time slots. The easy-to-use interface of this application can be used both on desktops and on mobile. In addition, our website has the capability of taking deposits and provide an easy platform for customers to make cancellations to avoid wasting time slots.

Project Area	Databases, E-Commerce, Mobile App, Web Application
Project Technology	CSS, HTML5, JavaScript, MySQL, PHP, Python

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Project Title	Life Cycle Cost Analysis of A Seawater Reverse Osmosis Desalination Plant Design for The Greater Dublin Area
Name	Bashayar Al Mukhaini
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Lorna Fitzsimons

In Ireland and especially in recent times, a shortage in freshwater supply is developing at a concerning rate. Irish Water has studied view options in efforts to find a suitable solution for the water shortage such as seawater reverse osmosis desalination plant and Shannon River extraction The objectives of this project are to redesign the Irish Water desalination model and with the use of Water Application Value Engine (WAVE) software, research and industry guides perform a life cycle cost analysis in an effort to provide a more cost effective seawater reverse desalination plant. The life cycle cost analysis was performed for a 26 year operational period for a plant run at three different capacities over three phases.

Project Area	Water Treatment
Project Technology	WAVE

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Project Title	Alexa skill that asks user automatically generated questions
Name	Victor Keane
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Programme	Computer Applications – CASE4
Supervisor	Monica Ward

The purpose of this project is to act as a revision tool. It has been supplied with various pieces of text from many sources and has automatically created questions revolving around each piece of text. These questions and their corresponding answers are stored in an S3 bucket which can be accessed by the Alexa enabled device when requested.

Project Area	Natural Language Processing
Project Technology	Python

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Project Title	Implementation and Comparison of Methods to Detect Driver Drowsiness
Name	Garry Raymond
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Noel Murphy

Driver drowsiness is a common reason for accidents on the road. This project investigates different methods to be able to detect driver drowsiness to help prevent this problem. The project involves using physiological sensors, such as an electrooculogram (EOG) to detect slowed eye movement and a steering wheel sensor to detect abrupt movements, which are symptoms of fatigue for a driver. Other methods are considered and others are also implemented alongside these to assist in its accuracy. The methods used are less intrusive and easier to use, and the data is stored and transmitted wirelessly.

Project Area	Arduino, Biomedical Engineering, Data Analytics, Embedded Systems, Image/Video Processing, Internet of Things, Sensor Data, Wireless Technology
Project Technology	MSP432 LaunchPad

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Project Title	VRetailer
Name	Kate Cullen
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Name	Luke Evans
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Name	Alex Tuns
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Programme	Enterprise Computing – EC4
Supervisor	Markus Helfert

VRetailer is a service we plan to sell to marketing directors of retailing outlets. The service involves mapping a store's interior to create a digital twin which will be transformed into a virtual environment. The virtual environment is mapped using panoramas and 360 degree cameras. Within the virtual environment we will use software to create "hotspots" which are points of navigation throughout the store which users click to look around in a 360 degree view. Products within near view of these hotspots will be click able to show information such as price and give the ability to add to a user's basket. The main goal of our idea is to make online shopping more fascinating for users, more profitable for our customers and providing a more accessible physical store experience to everyone.

Project Area	E-Commerce, Environmental Mapping, Virtual Reality
Project Technology	C#, JavaScript, Unity

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Project Title	VoIP Test Suite Tools for Troubleshooting
Name	Dillin Corbett
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Programme	Computer Applications – CASE4
Supervisor	Brian Stone

This project supports a cloud-based VoIP service. The aim is to automate fault finding through data analysis with automation and machine learning. Data may be analysed statically from logs or live from events captured by Tshark.

Project Area	Automation, Cloud Computing, Telecommunications
Project Technology	CSS, Docker, HTML5, JavaScript, Nodejs, Python

33

Project Title	Weed Growth Stage Estimation Using Deep Learning Based Computer Vision
Name	Jack O'Brien
Email	jack.obrien89@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Paul Whelan

This project is based around the design and creation of a deep learning model that is capable of classifying weeds based on their growth stage. A model was designed that achieves accuracy levels in excess of 70%, when a variation of plus or minus one leaf is allowed the accuracy increases up to 90%. A variety of different models were tested and compared until the optimal one was found and implemented.

Project Area	Artificial Intelligence, Computer Vision
Project Technology	Python

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Project Title	SafeDriving
Name	Edward Maguire
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Programme	Computer Applications – CASE4
Supervisor	Gareth Jones

SafeDriving is an android mobile application which targets the problem of "Driver Fatigue". The apps aim is to prevent crashes due to driver fatigue. It does so by monitoring the drivers face through the devices front camera and processes each frame to detect different driver states. An alarm system wakes up a tired driver and other features such as crash detection/ emergency contact sms notification are also implemented.

Project Area	Android, Cloud Computing, Computer Vision, Data Analytics, GPS/GIS, Image/Video Processing, Mobile App, SMS, Sensor Data
Project Technology	Eclipse, Java, Python, REST, XML, Flask, AWS, Scikit-Learn

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Project Title	Weather-based learning system for Geography Students
Name	Lonneke Schutte
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Programme	Computer Applications – CASE4
Supervisor	Monica Ward

Intended for the use of young students in compulsory education, this project uses live weather data to present students with an active learning environment that familiarizes them with basic weather concepts. The web application consists of a learning hub consisting of generated quizzes, analysis of severe weather conditions and a world map view, and functionality that allows an overview of class progress.

Project Area	Web Application
Project Technology	AngularJS, CSS, JavaScript, MongoDB, Nodejs

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Project Title	The Design and Build of an Autonomous Visual Inspection Drone
Name	Dylan Do Couto
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Programme	Mechatronic Engineering – ME4
Supervisor	Yan Delaure

A thorough introduction and further development of modern drone control in a new setting, this project explores the design and testing of an underwater drone. This includes an in-depth look at both the fluid dynamics involved in a unique drive system as well as the control method for this project. Throughout this investigation, modern drone theory and relevant fluid dynamics are examined and then applied to the desired outcome and constraints of this project to produce a final product of an underwater visual inspection drone. This design consequently results in the development of an alternative drive system, an intricately designed drone body that is designed to be 3D printed and a control system that utilises and develops upon open source technologies.

Project Area	3-D Modelling, Additive Manufacturing, Arduino, Automation, Control Systems, Mechanical Design and Manufacture, Mechatronic Systems, Robotics
Project Technology	C#

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Project Title	CVBI
Name	Seán Cunningham
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Name	Aidan Lawless
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Programme	Enterprise Computing – EC4
Supervisor	Martin Crane

CVBI is a product which utilises computer vision (CV) technology to provide business intelligence (BI)to high-street retail businesses. Knowledge gained from the analytics can be applied to marketing campaigns, trend analysis and prediction and KPI reporting. This data is gathered by utilising the cameras at the cash desk; they monitor customers buying products and send this data to a computer. Using CV techniques, the computer quantifies these people into groups (demographics) based on their gender, their age, their behaviours etc. Whatever items the customer purchases at the cash desk are linked up to the information gathered about them via the camera to produce BI. This information will be presented to the store via a personal web application in the form of data visualisation.

Project Area	Computer Vision, Data Analytics, Image/Video Processing, Web Application
Project Technology	HTML5, Python, Django, Bootstrap

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Project Title	TikTok Restock
Name	Robert Grehan
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Name	Robert McGreevy
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Programme	Enterprise Computing – EC4
Supervisor	Andrew McCarren

TikTok Restock aims to be a delivery app that delivers items from a supermarket to businesses and the public, in a 45-minute period using cyclists & shoppers. Business can use this app, to replenish out of stock items without the need for an employee to leave their work duties to retrieve the items themselves; thus, increasing productivity levels.

Project Area	E-Commerce, Web Application
Project Technology	CSS, HTML5, JavaScript, Python

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Project Title	2D Environment Mapping using an Omnidirectional System
Name	Gracious Palissery
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Programme	Mechatronic Engineering – ME4
Supervisor	Jennifer Bruton

This project investigates the viability of 2D Environment Mapping using an Omnidirectional System. This is achieved by a utilizing a laser distance sensor in along with other positioning sensors onboard a 3-wheel omnidirectional platform.

The collected data can be viewed in Realtime and this type of system has many applications in areas where space is limited. Such an implementation would provide a huge benefit to areas such as warehouses, where manoeuvrability is limited.

Project Area	Computer Vision, Embedded Systems, RaspberryPi
Project Technology	C/C++, Python

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Project Title	MyStoreManager
Name	Nessan Lenehan
Email	nessan.lenehan4@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Jane Kernan

MyStoreManager is a virtual store management system that removes the headache from various aspects in the running of a store. It provides managers and employees, in a store, a platform to efficiently complete different tasks such as stock-taking, nominating an employee of the month and uploading a virtual rota. MyStoreManager is an Android application built with JAVA technology, with data stored and mined in a Firebase database.

Project Area	Android, Databases, Mobile App, Software Development
Project Technology	Java, NoSQL, XML

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Project Title	An Integrated Pick and Place Tool for Additive Manufacturing
Name	Christopher Carragher
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Programme	Mechatronic Engineering – ME4
Supervisor	Harold Esmonde

This project focuses on developing new ways to automate some of the post-processing required when 3D printing. The aim is to develop a pick and place tool head for E3D's new Tool Changer. The tool adds two degrees of freedom to the printer's motion system which allows for the orientation of parts. This allows non-printable components such as nuts, magnets and bearings to be added to the part during the print. New design options like waterproofing of electronic components are now available too.

Project Area	Additive Manufacturing, Automation, Mechatronic Systems, Robotics
Project Technology	C/C++, Python, Solidworks

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Project Title	VR learning in STEM education
Name	Mark Gannon
Email	mark.gannon9@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Cathal Gurrin

This project investigates how efficient and effective virtual reality technology is in regards to teaching secondary school students. This application uses this technology to teach anatomy (muscles groups, organs and bones). A user will use their phone as the VR device and browse through the parts of the human body. VR technology is being used in education more and more and this application shows its growing potential.

Project Area	Android, Educational, Gaming, Mobile App, Virtual Reality
Project Technology	C#, Unity

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Project Title	Dynamic Wireless Charging
Name	Alexander McConnell
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Programme	Mechatronic Engineering – ME4
Supervisor	Robert Sadleir

The use of electric vehicles as a replacement to standard fossil fuel modes of transport has long been considered a necessary evolution of transportation technology. This project investigates the use of a dynamic wireless charging rig as a method of solving such a dilemma. The goal of the report is to supply a complete explanation of how the technology works and the demonstration of the key principles through the construction of a small scale dynamic wireless charging system. This system proved to be quite effective in increasing the operational range of the electric vehicle that was constructed to drive along it.

Project Area	Automotive Technology, Device Design
Project Technology	Solidworks

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Project Title	MDsmrt
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Programme	Computer Applications – CASE4
Supervisor	Andy Way

The purpose of this project was to create a decentralised platform, MDsmrt, which powers modern healthcare to create a healthier world. Here, I created a platform for lung cancer patients that improves the portability of scan images through the Ethereum blockchain, creating a decentralised platform and the ability to analyse these scans through a 3D convolutional neural network. Each patients scan image, with their consent will be stored on a peer to peer network which will be only accessible through the blockchain, making it an anonymous, tamper-proof platform where both patients and doctors can keep track of their scans.

Project Area	Artificial Intelligence, Image/Video Processing, Web Application
Project Technology	Python, React, Solidity, IPFS, Infura, Truffle, Ganache, Metamask, Ethereum

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Project Title	Ourselves
Name	Anita Wielgus
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Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

Ourselves is a 2D action puzzle game. The objective is to clear levels by manipulating objects and working with a team of characters created by the player. These characters act according to their traits and are not directly controllable by the player. To get high scores, the player must create a team with the optimal traits and skills for a given level. The player must also be careful around randomly generated characters as they can be both cooperative and obstructive.

Project Area	Gaming, Software Development
Project Technology	Lua, LÖVE

46

Project Title	Classifier Analysis Application
Name	Cian Manley
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Programme	Computer Applications – CASE4
Supervisor	Mark Roantree

A web application developed to aid the decision on which classification algorithm to use. Included in the application is an implementation of Naive Bayes, Decision Tree, K-Nearest Neighbours and Support Vector Machines. Each of the classifiers can be configured to what the user is looking for. It provides a side by side comparison of the results to see the difference in performance for each of the classifiers.

Project Area	Data Analytics, Statistical Analysis, Web Application
Project Technology	Excel/VB, JavaScript, Nodejs, Python, REST, React

47

Project Title	Further Development of a Ball-bot
Name	Deividas Slomskis
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Programme	Mechatronic Engineering – ME4
Supervisor	Noel Murphy

A Ball-bot is a dynamically stable mobile-robot which is capable of balancing on a spherical ball. The Ball-bot balances itself on a spherical drive wheel by employing sensors, a microcontroller and actuators, along with a suitable control algorithm. This project focuses on improving previously developed Ball-bot projects, while implementing weight reduction and recyclability themes.

Project Area	3-D Modelling, Automation, Control Systems, Embedded Systems, Mechanical Design and Manufacture, Mechatronic Systems, Robotics
Project Technology	C/C++, Matlab, Simulink, Solidworks

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Project Title	Air D&D
Name	Ailish Flanagan
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Name	Clodagh Flood
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Programme	Enterprise Computing – EC4
Supervisor	Alan Smeaton

Air D&D is a service that allows homeowners to rent out their driveway as a parking space to paying drivers. It is particularly targeted at environments like DCU where on-street parking, some of it illegal, is particularly annoying to local residents some of whom have empty driveways that could earn them money. Homeowners register the availability of their driveway and our service generates a price for drivers to use it based on a dynamic pricing model which factors in demand as well as distance from the driver's destination, in this case to DCU. Drivers can view driveways, choose one and reserve the parking space. They will also be given the option to use our journey management tool to get directions to their parking spot. Drivers pay based on usage and homeowners are paid monthly.

Project Area	E-Commerce
Project Technology	Python, Django

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Project Title	Sudoku Problem Solver
Name	Gearoid Flanagan
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Programme	Computer Applications – CASE4
Supervisor	Charlie Daly

The Aim of this project is to help people learn about algorithms through the medium of sudoku.

Users are able to pick their own algorithm which will be explained and run for the user.

As the algorithms are running the user will see a visual representation of how the algorithm performs which will help them understand and appreciate the importance of algorithms.

Project Area	Educational, Gaming, Graphics, Software Development, Web Application
Project Technology	CSS, HTML5, JavaScript

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Project Title	Dynamic cloud document storage (DCDS)
Name	Warren Purcell
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Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

DCDS (Dynamic cloud document storage) is a customisable opensource document archival and storage management platform. DCDS is a "cloud-friendly" IaaS. The system was developed for docker, allowing the use of serverless-services e.g. Elasticsearch and Python docker. The efficient use of cloud resources and storage while keeping documents at user's fingertips is the projects primary goal. Helping users achieve smarter storage and reducing costs without the need for the development of custom solutions.

Project Area	Cloud Computing, Information Retrieval
Project Technology	Docker, NoSQL, Python, REST

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Project Title	Open StoreFront for Competitive Marketing
Name	Mark Dunne
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Programme	Computer Applications – CASE4
Supervisor	Paul M.Clarke

This website's purpose is to provide a consumer-friendly storefront to discourage unethical business practices. It is an ecommerce site designed with a microservice architecture. It follows a MVC design pattern and use an item-to-item recommendation system to suggest products to users.

Project Area	Distributed Systems, E-Commerce, Web Application
Project Technology	CSS, HTML5, MongoDB, Python, Microservices

52

Project Title	Design, Build and Test a Novel Device for Wheelchair Users
Name	Steffanie Azaela Bonode
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Programme	Biomedical Engineering – BMED4
Supervisor	Harold Esmonde

The purpose of this project is to provide a solution for some wheelchair users that have fallen on the ground to get back up to the seat of their wheelchair, independently. The aim was to design a lifting mechanism that can be attached to the wheelchair. The final design was modelled in SolidWorks and a prototype was produced to demonstrate the idea. The device also include a control system to activate its up and down movement.

Project Area	Biomedical Engineering, Device Design
Project Technology	Solidworks

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Project Title	Hyperloop Vehicle Suspension
Name	Jordan O'Brien
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Programme	Mechatronic Engineering – ME4
Supervisor	Paul Young

This project sets out to conceptualise, design, model and test a suspension system for use in a hyperloop vehicle.

Project Area	Automotive Technology, Control Systems, Mechanical Design and Manufacture, Simulation, Vehicle Control
Project Technology	Excel/VB, Matlab, Simulink, Solidworks

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Project Title	Sensory Augmentation using the Skin as the Interface
Name	Sarah Whelan
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Noel Murphy

The earth's magnetic field is used by humans and animals alike. While this field is used to control devices like compasses, some animals possess the unique ability to see the magnetic field, and can use it to locate and direct themselves. A device is created that can add an additional sense to the user using sensory augmentation. The device uses vibrotactile inputs to provide the user with the location of magnetic north.

Project Area	Biomedical Engineering, Sensor Data, Software Development, Wearable_Technology
Project Technology	C/C++, MSP432 Clicker

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Project Title	Altimeters Companion
Name	Conor Nugent
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Programme	Computer Applications – CASE4
Supervisor	Charlie Daly

Altimeters Companion is an Android application that is used to help carers keep track on the patient to see if they have gone missing by grouping locations together as journeys and sending a report to the carer if a new journey is detected.

Project Area	Android
Project Technology	Java

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Project Title	Optimization of the particle morphology of the glass phase of an injectable composite material
Name	Colm Ferguson
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Programme	Biomedical Engineering – BMED4
Supervisor	Owen Clarkin

A novel composite hydrogel has been developed to prevent the recurrence of intra cranial aneurysms. The hydrogel is made up of a silica-based glass, an alginate derived from brown seaweed and glucono-delta lactone. The glass phase of this composite hydrogel was analysed using image processing techniques and laser diffraction particle analysis. Different processing parameters were altered when milling the glass, to see what kind of effects they play on the particle morphology of the glass particles. The effect of milling time and milling speed on the glass samples were investigated. Optimum processing parameters were discovered which increased the specific surface area of the glass samples, which in turn enhanced the working time and mechanical properties of the resultant hydrogels.

Project Area	Biomedical Engineering

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Project Title	Destructive versus Non-Destructive Testing of Electro-Fused Polyethylene Pipes
Name	Conor Daly
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Programme	Mechatronic Engineering – ME4
Supervisor	Lorna Fitzsimons

This project compares destructive and non-destructive testing of EF PE pipes, commonly used in the gas and water transmission industry. Ultrasonic testing is compared to Peel testing in terms of potentially replacing it as the industry standard for testing this type of pipe weld. Samples of EF PE pipe joints were tested using the peel testing method to determine the accuracy.

Project Area	Advanced Material Engineering

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Project Title	FestiMaps
Name	Tawhid Abdallah
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Name	John Ryan
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Programme	Enterprise Computing – EC4
Supervisor	Monica Ward

FestiMaps is a brand new mobile application that will allow festival attendees to make their way around festivals with relative ease with their friends and family. FestiMaps will also give users the information they need on the vendors, acts and stages! Features will include a map of the festival, a messaging groupchat and a filtered vendor search. It will also allow for all sorts of vendors at these festivals to reach a broader customer audience to sell and market their products or services to festival attendees. Helping to establish an online market place for vendors and festival attendees alike, seamlessly connecting them together like never before.

Project Area	Databases, E-Commerce, Mobile App, Social Networking, Web Application
Project Technology	CSS, HTML5, JavaScript, MySQL, PHP, Python, SQL

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Project Title	Car Recognition and Price Prediction
Name	Evan Murphy
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Haolin Wei

Automated vehicle recognition and price prediction are two interesting problems encountered within the automotive industry. The ability to accurately identify a vehicle within an image is extremely useful in many areas including intelligent transport systems and autonomous driving. This project utilises popular deep learning techniques to design two systems, used to address problems encountered within the automotive industry. Using web-scraping techniques, the car sales website DoneDeal.ie is scraped to obtain the necessary data required to train the deep learning models. The first model is used to recognise the make, model and year of a vehicle found within an image and the second system is used to estimate the current market value of a vehicle in the Irish car sales market.

Project Area	Artificial Intelligence, Computer Vision, Data Analytics, Image/ Video Processing, Software Development, Statistical Analysis, Web Application
Project Technology	Python

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Project Title	Smart Cabinet
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Programme	Computer Applications – CASE4
Supervisor	David Sinclair

The project is a Raspberry Pi based Smart Cabinet. The cabinet stores users prescription medication in drawers. Facial Recognition is implemented to change the cabinet interface to show details about your medication. Weight sensors let the user know when you are running low. Real-time notifications are sent to the user's email to remind them to take their tablets. A ReactJS based front-end is used to change what tablets are in each drawer and also to add and delete users.

Project Area	Computer Vision, Databases, Image/Video Processing, Information Retrieval, Internet of Things, RaspberryPi, Software Development, Web Application
Project Technology	CSS, HTML5, JavaScript, Nodejs, Python, REST, SQL, ReactJS, PostgreSQL, ExpressJS, Flask, OpenCV, Keras, Tensorflow

61

Project Title	Modality Transformation of Multichannel Time Series for Human Activity Recognition Using Deep Learning
Name	Mark Kane
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Noel O'Connor

Human activity recognition (HAR) is the task of classifying human actions. This project uses deep learning to create a model that can classify human actions using multichannel time series data recorded by a set of body-worn inertial sensors. It then investigates a machine vision approach to HAR, where the mutichannel time series inputs are converted to image data. It does this by creating plots of the inertial signals and passes these plots as inputs to a convolutional neural network (CNN) in an attempt to exploit their strong image classification capabilities. The machine vision approach proposed by this project produces competitive results to the state-of-the-art, producing stronger classification on certain activities but weaker classification on others.

Project Area	Artificial Intelligence, Computer Vision, Intelligence Pattern Matching, Motion Analysis, Software Development
Project Technology	Python

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Project Title	Rabble
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Programme 4	Computational Problem Solving and Software Development – CPSSD4
Supervisor	Jennifer Foster

Rabble (https://rabble.network) is a decentralised social blogging network built on the ActivityPub federated social protocol. Rabble uses the power of the decentralised web to maximise authors' control and build communities. It uses recommender systems and searching to try to alleviate the problem of echo chambers.

It is composed of Docker-bound python & go microservices orchestrated by docker-compose, making instances easy to deploy and lightweight to run, with a Typescript/React client to create a great (and customisable!) user experience.

Project Area	Blogging, Distributed Systems, Information Retrieval, Social Networking, Software Development, Web Application
Project Technology	CSS, Docker, Go, HTML5, JavaScript, Python, REST, SQL, SQLite, Typescript, Webfinger, gRPC, Protobuf

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Project Title	Cold gas thruster vehicle propulsion system
Name	Stuart Donnelly
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Programme	Mechatronic Engineering – ME4
Supervisor	Brian Corcoran
Project Area	3-D Modelling, Advanced Material Engineering, Device Design, Finite Element Analysis, Fluid Mechanics, Mechanical Design and Manufacture, Mechatronic Systems, Sensor Data, Sensor Technology, Thermodynamics
Project Technology	ANSYS Workbench, Excel/VB, LabVIEW, Matlab, Simulink, Solidworks, Swift

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Project Title	Papphlet NFC: A better way to do pamphlets
Name	James Nolan
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Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

Career fairs kill the Amazon. Papphlet, for Android, replaces bags of brochures, (which at best will end up in recycling), with NFC and RFID cards. The "RDS Higher Options" is the starting point for Papphlet. However, Papphlet can be applied to any fair, including this DCU project "expo". Tap an RFID card instead of picking up a brochure. Use "Google Firebase Firestore" instead of a bag of brochures. Use "Google BigQuery" to elicit engagement statistics instead of feedback forms.

Project Area	Android, Cloud Computing, Data Analytics, Educational, Sensor Data
Project Technology	CSS, Docker, HTML5, JQuery, Java, JavaScript, NoSQL, Nodejs, Python

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Project Title	Development of Scaffolds for Tissue Engineering Applications with Optimal Porosity and Mechanical Properties
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Programme	Biomedical Engineering – BMED4
Supervisor	Nicholas Dunne

The amount of fractures occurring which require surgery has increased greatly in recent years. Due to this increase, synthetic bone substitutes are being explored to replace autografts. Scaffolds require a structure which is similar to that of bone along with sufficient mechanical properties to be successful.

Marine sponges have been identified as having a structure which is ideal for this application. Sponges were infiltrated with hydroxyapatite and beta-tricalcium phosphate slurries and the subsequent scaffolds analysed. The compressive strength and porosity of the scaffolds were measured and compared to identify the most promising scaffold.

Project Area	Advanced Material Engineering, Biomedical Engineering, Tissue Engineering
Project Technology	Excel/VB

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Project Title	3-D Printed Electronic Drum Pad
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Alan Kennedy

An electronic drum that has some printed parts using 3D printer is studied in this project. An investigation of different sets was carried out. Four tests were run and the results were discussed in detail to distinguish between the similarities and differences. The software used in the project is Matlab and a device called U-Control UCA202 was sued as a microphone. All printed parts were designed using Solidworks, and the materials used is PLA.

The design of the project was changed after some tests as mentioned in the FYP report. Measurements were taken carefully to build the typical design. Finite element analysis was another test added to the rest done on the electronic drum. A background research was done that cleared the image of the electronic drums and what was needed.

Project Area	3-D Modelling, Finite Element Analysis, Mechanical Design and Manufacture
Project Technology	Excel/VB, Matlab, Solidworks

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Project Title	NFSecure
Name	Adam Walsh
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Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

This project is an access control system that emulates modern day key card entry systems utilizing a Raspberry Pi to engage and disengage an electric strike lock. Through the use of Near Field Communication(NFC) tags and an accompanying Android application, users will be able to open the lock both locally and remotely respectively.

Project Area	Android, Databases, Mobile App, RaspberryPi
Project Technology	Java, MySQL, Python, XML

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Project Title	CompuCheck
Name	Sean Newman
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Name	Katie O'Mahoney
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Programme	Enterprise Computing – EC4
Supervisor	Monica Ward

CompuCheck will provide information relating to the availability of computing resources. Students can access and view all available computing resources to their course and faculty along with floor plans in a single real time application, highlighting available computing resources along with a notification system, notifying students of resource availability/ unavailability. CompuCheck will monitor both user click rates requesting resource availability and also usage tracking of these resources to assist facilities management in understanding the demand and usage of their resources.

Project Area	Data Analytics, Databases, Educational, Web Application
Project Technology	CSS, HTML5, JavaScript, MySQL

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Project Title	Electronic Bass Drum Pedal and Drum Module Development
Name	Kieran Brennan
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Programme	Mechatronic Engineering – ME4
Supervisor	Alan Kennedy

Modern musical intruments utilise the function of electronics to enhance performance. For the electronic drum kit, it allows players to fully optimise their performance. The current configuration of the bass pedal can still produce a level of unwanted noise. To remedy this, a new format of sensors are used in conjunction with a newly developed module to process the triggered signals. These signals are converted into a musical message protcal known as a MIDI message. Once activated with a laptop/PC using a digital audio workstation (DAW), the system will respond with a correct dynamic measure of audio volume corresponding to the force applied to the bass pedal.

Project Area	Circuit Modeling, Embedded Systems, Sensor Technology
Project Technology	C/C++, Digital Signal Processing, Excel/VB, LabVIEW

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Project Title	Development of a Clinical Cognitive Assessment App Based on a NP-Hard Problem
Name	Fergus Redmond
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Conor McArdle

This project investigates the possibility of utilising the Travelling Salesman problem as a mobile cognitive assessment application that can administer remote testing. The application was developed in Unity and written in C#. This app allows for the collection of relevant data which can be transmitted to a trained clinician for later review. In order to fulfil the need to have progressively more difficult problems in the assessment, an algorithm was produced which utilised an existing difficulty metric to generate Travelling Salesman Problems of a given difficulty. Human and performance testing was carried out to determine its effectiveness.

Project Area	Android, Gaming, Mobile App, Software Development, Statistical Analysis
Project Technology	C#, C/C++, Eclipse, Java, Unity

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Project Title	Real Time Web Based Volume Rendering using Texture Mapping
Name	Caryl Joy Baybay
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Robert Sadleir

Direct volume rendering has become a useful tool on the visualisation and analysis of medical images as it allows inner structures of data to be seen. This project explores the development of creating a standard volume rendering application in WebGL. The application uses 2D texture mapping approach. In addition, experiments to optimize the standard application in WebGL is presented. The experiments involves the testing and rendering of the minimum bounding boxes of each texture slices through the use of texture coordinates on a texture atlas, andpre-processing the volume data. One of the experiments demonstrates a 10% increase in frame rates.

Project Area	3-D Modelling, Graphics, Software Development, Web Application
Project Technology	HTML5, JavaScript, WebGL

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Project Title	Filtered – The Social Media Abusive Content Analyser
Name	Daniel Allen
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Programme	Computer Applications – CASE4
Supervisor	Suzanne Little

Filtered is a web application which analyses a user's social media posts for abusive and negative content. Users can connect up to three accounts (Twitter, Facebook and Reddit) and are given a profile rating based on the 'healthiness' of their posts.

Each post is analysed for abusive language, named entities, sentiment and custom filters. The post is then given a rating based on these factors. Once the analysis is completed, the posts are returned to the user and are ordered by rating, with the highest rated posts having the unhealthiest content.

Project Area	Data Analytics, Information Retrieval, Natural Language Processing, Social Networking, Statistical Analysis, Web Application
Project Technology	JavaScript, NoSQL, Nodejs, React

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Project Title	MyRoster
Name	Arman Hanley
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Programme	Computer Applications – CASE4
Supervisor	Andrew McCarren

MyRoster is an Android based Roster Management System. The app consists of two different types of User Interfaces, an Employers and an Employees. Employers are able to create/edit rosters and add members while Employees can view their rosters, manage their workable days and hours and they also have the capability of swapping shifts between their fellow colleagues. This Android Application also uses Firebase to manage data allowing for Realtime in app updates.

Project Area	Android, Databases, Mobile App
Project Technology	Java, Firebase

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Project Title	DCU Carpool
Name	Benas Sudzius
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Programme	Computer Applications – CASE4
Supervisor	Ray Walshe

DCU Carpool is a native Android application that allows DCU students to commute in and out of DCU. It aims to provide an alternative form of transport for students that lack access to their own transportation or access to good public transportation. The application uses technologies such as Google Firebase, Google Maps and HERE Maps.

Project Area	Android, Databases, Mobile App, Software Development
Project Technology	Java, Firebase, Google Maps API's, HERE Maps API

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Project Title	Streaming Audio Server with Listener-Tracking Embedded Clients
Name	Michael Lenehan
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Martin Collier

This project aims to implement an audio server solution which can stream music over the network to a number of client devices, at high quality, with minimal audio artefacts and synchronised output. Listener tracking is implemented via the AltBeacon Bluetooth Beacon protocol alongside a cross-platform mobile application developed using Google's "Flutter" framework. Ranging information from the Beacons, as measured by the mobile application, is then used to increase the volume on the streaming client nearest the listener.

Project Area	Internet of Things, Mobile App, RaspberryPi, Wireless Technology
Project Technology	Dart, Flutter, AltBeacon

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Project Title	Humans VS Zombies Platform
Name	Ciara Godwin
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Programme	Computer Applications – CASE4
Supervisor	Monica Ward

This project facilitates the running of large scale Humans VS Zombies games hosted by DCU Games Society. The system is responsible for maintaining and balancing the state of the game by using both triggered events and configurable heuristics while also providing a pleasant user experience.

The platform is designed to provide the same experience on both mobile and desktop. It also provides powerful admin tools to allow for easy modifications of the game.

Project Area	Android, Gaming, Mobile App, Software Development, Web Application
Project Technology	CSS, Docker, JavaScript, Nodejs, Python, REST, PostgreSQL, React

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Project Title	Photonic Gas Sensing
Name	Hanad Al Saidi
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Prince Anandarajah

Optical frequency comb sources are a platform laser technology that can be applied to many diverse markets. An application of OFCs that recently has stirred a lot of interest is photonic sensing as OFCs can be applied in sensing applications to provide extremely high sensitivity and selectivity. The aim of this project is to design a gas sensor using OFC technology that should serve as a low cost, miniaturised optical sensor platform, based on gain switching optical comb technology.

Project Area	Digital Signal Processing, Optical Communications, Sensor Technology, Simulation
Project Technology	VPI

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Project Title	Citylore
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Programme	Enterprise Computing – EC4
Supervisor	Jane Kernan

Citylore is an android application aimed at providing a personalized experience for Tourists visiting Dublin. The application generates a schedule for Tourists based on their interests. It provides an optimal route for Tourists trying to reach their destination via Google Maps API. It aims at providing useful attractions that are personalized for the user. This is achieved through gathering information about Tourists through a profile questionnaire.

Project Area	Android, Cloud Computing, Mobile App
Project Technology	Java, XML

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Project Title	Blockvote
Name	Adnan Luwalira
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Name	Aaron Connolly
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Programme	Enterprise Computing – EC4
Supervisor	Cathal Gurrin

Blockvote is a decentralized voting application that allows people to vote in a secure environment. The purpose of Blockvote is to eliminate the need of a centralized voting system which raises security issues in elections. Blockvote allows the voting process to be verifiable by anyone and creates transparency by using blockchain technology.

Project Area	Cryptography, Distributed Systems, Web Application
Project Technology	HTML5, JavaScript, React Native, Ethereum

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Project Title	Updated Logic Control of a Domestic Rainwater Harvesting System
Name	Christopher Cassidy
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Programme	Mechatronic Engineering – ME4
Supervisor	Brian Corcoran

This Project examines the design and build of an updated PLC controlled small-scale domestic rainwater harvesting system. The main focus of the project was to update the control system in use on the project, make it functional and update the appearance using modern technology such as 3D printing.

Project Area	Automation
Project Technology	PLC Control & PLC Programming

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Project Title	Movie Centre
Name	Anas Alagtal
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Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

This project involved building an android mobile application that pulled movie information from the "The movie Db" and displayed their posters within the interface. The application allows users to further explore movie information along with giving their own ratings.
A recommender system was implemented in python that would constantly grab any movies that user rated to offer a range of recommended movies it deems to be of interest to the user.

Project Area	Android, Information Retrieval, Mobile App
Project Technology	Java, Python, XML

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Project Title	The Development of an Efficient Solution To Long Range Unmanned Aerial System for Emergency Services
Name	Daraigh O'Toole
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Programme	Mechatronic Engineering – ME4
Supervisor	James Carton

A gap was seen in the use of unmanned aerial systems for search and rescue between short range multirotors and long range, fixed wing, unmanned aerial systems. The aim of this project was to develop a solution to fill that gap with a system capable of rapid deployment in any terrain with practical range and endurance. The final design uses innovative thrust vectoring techniques to achieve vertical take-off and landing with a 2kg payload capacity, a top speed of 120km/hr and an endurance of more than 3 hours.

Project Area	3-D Modelling, Additive Manufacturing, Control Systems, Device Design, Finite Element Analysis, Mechanical Design and Manufacture, Mechatronic Systems, Robotics, Vehicle Control
Project Technology	Solidworks, OpenAeroVTOL

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Project Title	Versadesk
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Programme	Computational Problem Solving and Software Development – CPSSD4
Supervisor	Jennifer Foster

VersaDesk is a "Desktop as a Service" suite which utilises Linux containers to provide full desktop environments for terminal services. It leverages Docker to provide lightweight, customised and resource efficient sessions to each user on demand. The WebRTC based remote desktop protocol and web management console empowers users to access their computer on any device. It aims to lower hardware costs and administration overhead for academic and office environments by eliminating the need for every user to own a PC.

Project Area	Cloud Computing, Distributed Systems, Filesystems, Image/Video Processing, Software Development
Project Technology	C/C++, Docker, Go, JavaScript, REST, Typescript

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Project Title	The Development of a Compliance Test System for Vascular Grafts and Tissue Engineered Blood Vessel Scaffolds
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Programme	Biomedical Engineering – BMED4
Supervisor	Garrett McGuinness

Mechanical properties play a significant role in the function of many tissues and in the performance of implanted grafts and tissue engineered scaffolds. For vascular grafts, the property of compliance relates to how vessel diameter changes in response to internal pressure. There is convincing evidence that the dynamic mechanical compliance properties of these grafts influence their long-term patency. This project looks at developing a compliance testing system for vascular grafts and tissue engineered blood vessel scaffolds.

Project Area	Biomedical Engineering, Image/Video Processing, Tissue Engineering
Project Technology	Excel/VB, LabVIEW, Matlab

85

Project Title	Design, 3-D print, Validate and Test a tensile testing rig for soft materials
Name	Conor Hogan
Email	conor.hogan27@mail.dcu.ie
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Jeremiah Murphy

3D printing was investigated as a method of manufacturing and replication of engineering equipment. This project explores methods to produce an inexpensive tensile testing machine to be validated with Standardized apparatus. The overall goal of the project is to produce an alternative apparatus to conventional teaching and an interactive approach to learning. An apparatus was produced costing €33.29 and found to be accurate to 4.9% resulting in an apparatus was used to demonstrate anisotropism and viscoelasticity in soft bio-materials.

Project Area	3-D Modelling, Additive Manufacturing, Biomedical Engineering, Educational, Mechanical Design and Manufacture
Project Technology	Solidworks

86

Project Title	Things to do
Name	Adam Craig
Email	adam.craig3@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Yvette Graham

Things to do is a user-friendly web application which aims to remove the strain of searching for things to do in one's free time. Activities will be suggested for the user based on their individual interests and some final parameters such as their price range and day of choice. The user will have the option to rate activities. The ratings will be used in a matrix factorization-based algorithm to generate recommendations, enhancing user experience while introducing the user to new interests.

Project Area	Data Mining, Databases, Model View Controller, Web Application
Project Technology	AngularJS, CSS, HTML5, Java, MySQL, Python, REST, Spring MVC

87

Project Title	World Energy Simulation Game: Online Mode
Name	Xiaonan Li
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Barry McMullin

World energy simulation game is group role playing exercise that participants test out a mix of policies and strategies that could address world climate change. This project investigates to port the World Energy Simulation Exercise into an online mode. In order to run the World Energy Simulation Exercise in a fully online mode, the web conferencing system discovered cooperates with the events management website designed and implemented to give online users the best performance.

Project Area	Educational, Energy Conservation, Simulation, Web Application
Project Technology	CSS, HTML5, Java, JavaScript, MySQL

88

Project Title	Rugby Real Time
Name	Michael Margiotta
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Programme	Computer Applications – CASE4
Supervisor	Mark Roantree

This application was developed to analyse a Rugby team's strengths and weaknesses during a game. The coach on the sideline enters the events(Linebreak, Turnover, Offside, Kick/Chase), the outcome (Success/Failure) and what area of the pitch the event happened. The result gets saved in the cloud and can be viewed by the Manager up in the stand on the Web application, or in the application itself. The Web application updates as the application is being updated in real time.

Project Area	Android, Data Analytics, Databases, Mobile App, Web Application
Project Technology	ReactJS, React Native, Firebase

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Project Title	2020 Care
Name	Conor Matthews
Email	conor.matthews22@mail.dcu.ie
Name	Clodagh Keegan
Email	clodagh.keegan34@mail.dcu.ie
Name	Carol Kenny
Email	carol.kenny39@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Alan Smeaton

This project investigates the use of IOT-enabled sensors coupled with a mobile application for automatic and manual collection of information on the health and wellbeing of nursing home residents. Data securely collected over a Low Powered Wide-Area Network is captured, stored, analysed and then visualised through analytical dashboards. This will reduce nursing home staff's workload and also enable them to track subtle changes in residents health over-time, ultimately providing 21st century care to their residents.

Project Area	Data Analytics, Internet of Things, Mobile App, Sensor Data
Project Technology	Excel/VB, JavaScript, Qlik Sense

90

Project Title	Instrumentation of an Electric Bike
Name	Stephen Smith
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Programme	Mechatronic Engineering – ME4
Supervisor	Barry McMullin

Instrumentation of an Electric Bike" is a project regarding the process of instrumenting an electric bike through the planning phase to the implementation of the designs conceived in the planning phase. For this project, data was to be gathered from the bike itself such as battery level, power in to the electric motor, and displayed on an off the shelf android device alongside information gathered from the in-built sensors on the device such as speed, altitude, and route taken. This was to be all integrated into the existing electronics of the bike, ensuring no external power was needed.

Project Area	Android, Circuit Modeling, Content Management System, Internet of Things, Mechatronic Systems, Mobile App, Power Electronics, Sensor Data
Project Technology	C/C++, Fritzing, MIT App Inventor 2

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Project Title	Tell me about…
Name	Ciaran Hand
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Programme	Computer Applications – CASE4
Supervisor	Gareth Jones

This project is based on the idea of researching a topic that a person wants to learn about. Using Apache Lucene a user will query a wikipedia dump with a topic they want to learn about. Apache Lucene will then remove the stop words and stem the words in the query to ensure all grammatical tenses of the query are included in the search. The system will search for relevant documents and rank them depending on their score in terms of pertinence to the query. Apache Lucene uses the vector space model and boolean model to rank documents on their relevance to the query. The highest ranking documents will be shown to the user in a simple GUI where they can see keywords. They can remove documents they feel irrelevant which will then be replaced with the next highest ranking document.

Project Area	Information Retrieval, Natural Language Processing
Project Technology	CSS, Eclipse, Java, XML, Apache Lucene

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Project Title	Virtual Reality Control of Mobile Robotics
Name	Amy Slevin
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Programme	Mechatronic Engineering – ME4
Supervisor	Derek Molloy

In this project, a mobile robot was constructed with a suitable hardware configuration that includes mechanics, sensors, controllers, hardware interfaces and an embedded microprocessor system. The software design is based on integrating virtual reality technology with the control of a teleoperated system. The objective is to allow the operator to control and manage a mobile robot. This project incorporates mechanical, electronic and software development. Therefore the different areas were developed in a collaborative form which allowed a link between the different disciplines.

Project Area	3-D Modelling, Arduino, Automation, Mechanical Design and Manufacture, Mechatronic Systems, RaspberryPi, Robotics, Software Development, Vehicle Control, Virtual Reality
Project Technology	C#, C/C++, Solidworks, Unity

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Project Title	Google Analytics Alexa Skill
Name	James Gallagher
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Programme	Computer Applications – CASE4
Supervisor	Mark Roantree

This project is a voice interface that allows users to access and interpret their Google Analytics data through the Amazon Alexa platform. The system can answer multidimensional user queries, aid in anomaly detection and use data mining techniques to predict future trends. The aim of this system was to reduce the learning curve associated with Google Analytics, and allow non-technical users to achieve a similar level of insight through intuitive natural language queries.

Project Area	Artificial Intelligence, Data Analytics, Data Mining, Information Retrieval, Internet of Things, Natural Language Processing, Speech Recognition
Project Technology	Python, REST, AWS Lambda, AWS DynamoDB

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Project Title	MyHealthSum
Name	Áine Harte
Email	aine.harte24@mail.dcu.ie
Name	Sarah Talukder
Email	sarah.talukder2@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Cathal Gurrin

MyHealthSum is web application that aims to help users monitor and understand their health better. The application links with wearable sensors and aggregators, including Fitbit and the Freestyle Libre, to gather data relating to the user's health. Based on the data retrieved, the user receives a percentile regarding their physical activity and inactivity. The user also receives recommendations to help them improve and change their lifestyle if needed.

Project Area	Databases, Information Retrieval, Model View Controller, Web Application
Project Technology	CSS, HTML5, JavaScript, MySQL, Python

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Project Title	Gesture
Name	David Uzumaki
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Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

This projects uses the opencv library to allow a user to control their desktop using hand gestures.

Project Area	Computer Vision
Project Technology	Python

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Project Title	Barcode Reader and Generator
Name	Salim Al-Shanfari
Email	salim.alshanfari2@mail.dcu.ie
Programme	Mechatronic Engineering – ME4
Supervisor	Tamas Szecsi

The Project Develops two software for Reading 1-Dimensional barcode and Generating Barcodes. The Project used Microsoft Visual Studio 2017 with C++ programming language and OpenCV image processing libraries to Develop the software. The barcode reading software uses a webcam to detect the barcode region. A barcode scanner is used for barcode entries in the barcode generator software.

Project Area	Computer Vision, Image/Video Processing, Software Development
Project Technology	C/C++, OpenCV

97

Project Title	Development of a Smart External Door Damper
Name	Jakub Galka
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Alan Kennedy

As building regulations get stricter, public buildings require new door solutions to reduce environmental costs by lowering the amount of heat transfer between the inside and outside. Methods of improving these costs make the universal design of entrances difficult to achieve.

The project involved the development of a smart external door damper capable of detection between wind forces and human interaction. It employed a peristaltic pump mechanism to produce controllable damping. A Simulink model of a door was developed to tests the damper and determine the damping it can achieve.

Project Area	Mechanical Design and Manufacture
Project Technology	Excel/VB, Matlab, Simulink, Solidworks

98

Project Title	OnTime – Dublin City Transit and Tourism Chat Bot
Name	Matthew O'Leary
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Programme	Computer Applications – CASE4
Supervisor	Marija Bezbradica

On Time is a chat bot developed for the Facebook Messenger platform. The chat bot specialises in queries relating to transport in the Dublin City area and can be privately messaged through its Facebook page using the Facebook website and Facebook Messenger app. The application is hosted on the Heroku Cloud Application Platform and uses node.js and Javascript to process user queries, retrieve transport information and return this information formed as a message to the user.

Project Area	Information Retrieval, Instant Messaging, Software Development
Project Technology	JavaScript, Nodejs

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Project Title	Design and Development of Ionic and Thermoresponsive Hydrogels for Bone Tissue Engineering Applications
Name	Kate O'Hanrahan
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Programme	Biomedical Engineering – BMED4
Supervisor	Nicholas Dunne

Hydrogels are very versatile materials which can be used in the fields of tissue engineering and drug delivery. High levels of variation are attainable between hydrogels of different composition depending on their chemical composition and physical formation. The aim of this project was to design and develop ionic and thermoresponsive alginate hydrogels with varied levels of crosslinked bonding to determine the effect on the mechanical properties of the hydrogels. Characterisation was completed by examining the swelling, degradation, compressibility, injectability, rheological and spectroscopic results of the hydrogels.

Project Area	Advanced Material Engineering, Biomedical Engineering, Tissue Engineering
Project Technology	Excel/VB

100

Project Title	Clothes Similarity Search
Name	Dovydas Baranauskas
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Programme	Computer Applications – CASE4
Supervisor	Suzanne Little

Similar clothes search, aims to analyse fine grained similarity, using deep neural networks allowing users to upload an image of clothing to the web application and receiving similar images of clothes.

Project Area	Artificial Intelligence, Computer Vision, Image/Video Processing, Web Application
Project Technology	HTML5, Python, SQL, Flask

101

Project Title	Towards Creating a Pipeline for Unsupervised Neural Simultaneous Location and Mapping
Name	Cathal Ryan Hynes
Email	cathal.ryanhynes2@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Kevin McGuinness

A dataset of scenes is developed, consisting of groups of views; each an image, a corresponding depth map via unsupervised learning, and a world-view translation matrix. A neural-SLAM network is trained on this dataset.

Project Area	Artificial Intelligence, Computer Vision
Project Technology	Docker, Python

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Project Title	Paper to Cloud
Name	Ibrahim Darwish
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Lorna Fitzsimons

The aim of this project to research, develop, and implement a new system into Renley production line by organising, accessing, and establishing the retrieval of documents using software based on Lean Six Sigma tools. This was done by using a software called iAuditor that will digitise tests and inspection checklists, streamline the process by providing a more flexible way to create records and generate them straight from a smart device called Galaxy Tab Active 2.

Project Area	Cloud Computing, Information Retrieval, Lean Manufacturing, Mobile App, Operating Systems Development, Statistical Analysis, Web Application

103

Project Title	Deep Learning for Semantic Segmentation of Agricultural Imagery
Name	Robert McConnell
Email	robert.mcconnell3@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Noel O'Connor

With increasing demands on food production, Artificial Intelligence is being used in the Agricultural domain to automate visual inspection tasks and to perform robotic harvesting. Semantic Segmentation is a specific Deep Learning problem which involves labelling regions by assigning every pixel in an image to a meaningful class. The difficulty in performing Semantic Segmentation in an agricultural setting is that it can be difficult for a Convolutional Neural Network to cater for all environmental conditions such as change in seasons and weather along with the large amount of variance between crops. This project aims to address this issue by using Neural Style Transfer techniques to augment the dataset and improve generalisation.

Project Area	Artificial Intelligence, Data Analytics, Image/Video Processing, Intelligence Pattern Matching, Software Development
Project Technology	Python, TensorFlow

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Project Title	HeadTrack
Name	Éanna Ó Donnchadha
Email	eanna.odonnchadha3@mail.dcu.ie
Name	Cian Hughes
Email	cian.hughes55@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Andrew McCarren

"HeadTrack" is a psychiatric tool intended for use by therapists to use data analytics to improve their patient's treatment and lives.

The app will have two interfaces. The app gathers information through the client interface. The therapist can analyse the data from the therapist interface.

An annual license fee will be charged to therapists who can then provide access to their clients.

This app is intended to replace the unreliable pen and paper diary system which is current practice.

Project Area	Biometrics, Cloud Computing, Content Management System, Data Analytics, Data Mining, Databases, Internet of Things, Model View Controller, Network Applications, Security, Sensor Data, Statistical Analysis, Wearable_Technology, Web Application
Project Technology	CSS, HTML5, MySQL, Python, Django Python Framework

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Project Title	A Wearable Fall Detection Device
Name	Sophie Mills
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Programme	Mechatronic Engineering – ME4
Supervisor	Eamonn Martin

This project is based on the development of an Email and SMS communicative wearable fall detection device for the elderly and people with motor impairment conditions. The device utilises three inertial parameters which aid in the improvement of the sensitivity and specificity of the threshold-based fall detection algorithm and evaluates approaches taken to successfully distinguish a fall from a daily activity. The developed device is evaluated based on its performance characteristics such as sensitivity, specificity, accuracy and precision.

Project Area	Arduino, Motion Analysis, SMS, Sensor Data, Wearable_Technology
Project Technology	C/C++, Solidworks

106

Project Title	Aeroshell Design for the Hyperloop Vechile
Name	Kate Galvin
Email	kate.galvin4@mail.dcu.ie
Programme	Mechatronic Engineering – ME4
Supervisor	James Carton

The aim of this project is to design an optimised aeroshell for the Eirloop pod, for participation in the 2019 Hyperloop Pod Competition. Design of a sensor array will allow for validation of the CFD model and data collection.

An optimised aeroshell design was be achieved through an iterative process of design simulation and analysis, using CFD software ANSYS Fluent. A prototype sensor array was be constructed and tested on a scaled model.

Project Area	3-D Modelling, Arduino, Fluid Mechanics, Simulation
Project Technology	ANSYS Workbench, C/C++, Solidworks

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Project Title	Stock Investor Advisor
Name	Mateusz Koltun
Email	mateusz.koltun2@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Yvette Graham

The purpose of this application is to predict short-term trends of a particular stock share price in the market. The predictions are based on few variables. The main one is a score of sentiment analysis of related to the business blogs and news articles. The program finds the correlation between the analysis and the historical price of the share and it applies numerous data mining and machine learning techniques to improve the confidence of the prediction.

Project Area	Data Mining, Natural Language Processing, Statistical Analysis
Project Technology	Java, SQL, XML, Stanford NLPcore, JavaFX

108

Project Title	Time Keepers
Name	Aaron Edgeworth
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Programme	Computer Applications – CASE4
Supervisor	Renaat Verbruggen

In the modern world many people struggle to achieve a correct or fulfilling work life balance. A study conducted in 2017 found that around 66% of respondents in the US believe that they struggle to find good work/life balance. The intent behind this project is to combine the highly addictive and engaging practices of mobile app games, and a scheduling app. To create a motivation to adhere to a pre-planned schedule by rewarding users through simple and proven gameplay mechanics.

Project Area	Android
Project Technology	Java, Android Studio

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Project Title	Letter Writing Checker
Name	Ryan O' Dowd
Email	ryan.odowd@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Monica Ward

The project involves developing a web application the helps young children improve their letter writing skills. The app is designed to be used in classrooms or at home with parent supervision. All student attempts are recorded in a database so that their teacher can look at their students progress as they attempt each letter.

Project Area	Educational, Web Application
Project Technology	Python, SQLite

110

Project Title	Competitive Language Learning
Name	Jason Madden
Email	jason.madden8@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Monica Ward

This competitive language learning application is a platform which enables fun and enjoyable language learning by matching players of similar skill against each other to translate words and phrases the fastest before the time runs out. The application is platform independent so players can play from most internet enabled devices. Different game modes and phrase types are available to customize the game mode further for everyone to enjoy. English, French, Spanish and limited Irish is available to play with.

Project Area	Gaming, Software Development, Web Application
Project Technology	CSS, HTML5, JavaScript, Nodejs

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Project Title	Dissemination of critical traffic information using VANETs
Name	Johnnie Pidgeon
Email	johnnie.pidgeon2@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Jennifer McManis

The contents of this report is based on how vehicles communicate with each other. It commonly known as vehicle ad hoc netowrks (VANETs). It outlines techinical aspects of the technology that is needed for vehicle to vehicle and vehicle to infrastructure. It explores the applications that it is used for from the safety aspects to the commerical. It has design that is based on the “Dissemination of critical traffic information using VANETs. It also has results from simulations based on the design.

Project Area	Internet of Things, Network Applications, Sensor Data, Sensor Technology, Wireless Technology
Project Technology	C/C++, Eclipse, NS-3

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Project Title	Artificial Life
Name	David Craig
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Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

A project that simulates Artificial Life which uses a genetic algorithm to represent a population of single celled organisms which interact via game theory which is expressed through their genes. Cells are born with a cell wall 'thickness' which determines how much protection they have against their environment and how much energy they can generate. Cells with thicker cell walls generate energy slower but can also consume those with cell walls which are thinner. Cells can cooperate by joining together to form a multi-cellular organism to share the benefits of both genes.

Project Area	Artificial Intelligence, Simulation, Software Development, Web Application
Project Technology	CSS, HTML5, JavaScript

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Project Title	Robotic Development in the Horticulture Industry
Name	Patrick Doran
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Programme	Mechatronic Engineering – ME4
Supervisor	Harold Esmonde

This provides the bases for an automated solution of the propagation process for hard nursery stock. The project develops the inital station of part feeding for the automation of the process.

Project Area	Automation

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Project Title	Self-driving vehicle prototyping using computer vision
Name	Cillian O'Donnell
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Paul Whelan

This project investigates methods for real-time embedded deep learning methods for self-driving applications in limited resources computing environments.

Project Area	Artificial Intelligence, Computer Vision, Embedded Systems
Project Technology	Python

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Project Title	Self-Guiding Computer Vision Based Tracking System
Name	Niall Sheehan
Email	niall.sheehan5@mail.dcu.ie
Programme	Mechatronic Engineering – ME4
Supervisor	Paul Whelan

A self-guided vision-based camera tracking system was developed. This device uses data from a camera which mounted on the end of the to control the arm. The image analysis software uses the camera data to orientate the arm to keep it pointed at a target object. This system uses a Raspberry Pi as a micro-controller as well as Matlab for the image processing capabilities.

Project Area	Image/Video Processing, RaspberryPi
Project Technology	Matlab

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Project Title	TourGo
Name	Jemil Gambo
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Name	Declan Moore
Email	declan.moore39@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Cathal Gurrin

TourGo is a Car as a Service platform that provides customers with a fully taxed, insured and maintained vehicle. The service utilities Internet of Things Telematics devices which are installed into each vehicle. These devices record driving behaviors based on each journey and how they performed. A journey score is then calculated and fed into a learning platform. This platform then returns feedback to the driver to passively improve their driving behaviors.

Project Area	Data Analytics, Databases, Internet of Things, Web Application
Project Technology	CSS, HTML5, JavaScript, Python, SQL, SQLite, Djano

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Project Title	Explore Éire
Name	David Costello
Email	david.costello24@mail.dcu.ie
Name	Deividas Keturakis
Email	deividas.keturakis2@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Marija Bezbradica

This web platform explores the different possibilities available to us in order to help international students to navigate around Ireland. It allows us to provide them with a wide array of options which are determined by the choices they will make based on 4 things: age, budget, length of stay and their interests.

Project Area	Web Application
Project Technology	CSS, HTML5, MySQL, Python, SQL

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Project Title	Mechanical and Resorption Analysis of Bioresorbable Coronary Stents
Name	Alex Fleming
Email	alex.fleming26@mail.dcu.ie
Programme	Biomedical Engineering – BMED4
Supervisor	Owen Clarkin

This project was been designed to look at the mechanical and resorption kinetics of a bioresorbable coronary stent. Specifically, Abbott's Absorb Bioresorbable Vascular Scaffold. The mechanical and degradation performance of the stents were examined with various mechanical tests and specially designed experiments. They were then compared to the performance of a drug-eluting metal stent. This study provides new insights into the performance of a failed bioresorbable polymer stent, and whether the future really lies with bioresorbable stents.

Project Area	Biomedical Engineering
Project Technology	Excel/VB, Solidworks

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Project Title	Event Assist
Name	Cian Shovlin
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Programme	Computer Applications – CASE4
Supervisor	Marija Bezbradica

This Project is an Android app which assists users in planning events with friends. Users sign in with their Google accounts giving access to a variety of Google services. The app also has a recommendation system which uses machine learning to personalize suggested activities for each user.

Project Area	Android, Data Analytics, Databases, GPS/GIS, Mobile App, Social Networking
Project Technology	Java, SQLite, TensorFlow Lite

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Project Title	SmartPredict (Trading Platform)
Name	Ben Kelly
Email	ben.kelly45@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Martin Crane

SmartPredict is a web application trading platform which aims to help users make intelligent decisions on buying and selling of currencies (foreign exchange & cryptocurrency markets). This is achieved through machine learning and Sentiment Analysis. The application provides the user with predictions for the market. Recommending whether the user should buy, sell or hold their specific currency relative to its current value. Users can trade, view the current market sentiment and review the prediction of the machine learning algorithm all within the application.

Project Area	Artificial Intelligence, E-Commerce, Software Development, Web Application
Project Technology	CSS, HTML5, Python, REST

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Project Title	Investigate and develop an autonomous, human locating UAV to aid in Cave Rescue
Name	Angela Prior
Email	angela.prior7@mail.dcu.ie
Programme	Mechatronic Engineering – ME4
Supervisor	Paul Young

This project explores the validity of introducing programmable and mechanical technology into a cave rescue environment. The main focus became the development and introduction of autonomy into an unmanned aerial vehicle (UAV) with the intention to aid in a cave rescue situation. The objectives were to produce a line-following drone, which could evade obstacles and locate heat signatures in order to identify people who may be lost or injured. The results obtained revealed that basic autonomous drone flight without GPS was not very repeatable and contained a lot of drift. Further development would be required to increase flight accuracy, such as filtering the drone's directional coordinates which would be retrieved from the accelerometer to verify its location.

Project Area	Artificial Intelligence, Embedded Systems, Environmental Mapping, Motion Analysis, Robotics, Sensor Data, Sensor Technology, Software Development, Vehicle Control, Wireless Technology
Project Technology	C#, Excel/VB, Nodejs

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Project Title	Ancient Brain's Introduction to JavaScript Programming for Beginners
Name	Alex Murphy
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Programme	Computer Applications – CASE4
Supervisor	Mark Humphrys

This project is a beginners programming course built in JavaScript. The course is built to be run within the Ancient Brain environment. It covers the very basics of programming and is aimed at young beginners. The idea is to make all tasks as entertaining as possible while also communicating the power of programming. The course consists of various separate lessons, all covering different topics and building on the previous lessons. The project utilises the p5 and Ancient Brain libraries.

Project Area	3-D Modelling, Educational, Graphics, Web Application
Project Technology	JavaScript

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Project Title	StockCheckr
Name	James Leahy
Email	james.leahy4@mail.dcu.ie
Name	Bronwyn Conroy
Email	bronwyn.conroy5@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Suzanne Little

Aimed at fashion consumers, StockCheckr is an android mobile app that enables shoppers to search a product code and check the store's inventory levels for different sizes of the product. The user can search multiple locations from one place. This app empowers shoppers to take control of their shopping experience by querying the stores database themselves. Stockcheckr is the mobile assistant that makes shopping quicker and easier.

Project Area	Android, Databases, Mobile App
Project Technology	Java, SQLite, XML

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Project Title	SmartDiet
Name	Eoin Molloy
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Programme	Computer Applications – CASE4
Supervisor	Gareth Jones

This project aims to provide users with a mobile application that recommends recipes to users while keeping within the boundaries of nutritional goals. Machine learning techniques are used to recommend recipes that the user will actually enjoy eating. As the user gives the system preferences, recommendations will become more appealing. In addition to this the system allows users to track weight lost or gained by following the diet plan the system created.

Project Area	Android, Databases, Mobile App, Software Development
Project Technology	NoSQL, Python, REST, Flutter

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Project Title	Toward sustainable advanced manufacturing: Investigation of waste gases from laser processing
Name	Anthony Byrne
Email	anthony.byrne248@mail.dcu.ie
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Dermot Brabazon

This Final Year Project focuses on the analysis of CO2 emitted from the plywood when cut with a 1.5W CO2 laser to determine ways of reducing CO2 in order to reduce the impact of Industrial greenhouse gas emissions. The percentage content of the gas for each run was examined using the Geotech Biogas Analyser 5000 available in DCU.

Project Area	Advanced Material Engineering

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Project Title	StockControl
Name	James Collins
Email	james.collins36@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Ray Walshe

StockControl is an android application that was developed to allow retailers greater control and management of their stock. It allows employees to update stock and view stock levels. The application makes use of NFC tags to allow automatic stock updates from suppliers.

The application uses statistical methods such as market-basket analysis,time-series analysis and product promotion analysis to examine a stores transactions data. It then uses these results to provide managers with information on where stock should be best placed in the store to maximise sales and also to provide optimal stock levels.

Project Area	Android, Data Analytics, Databases, Mobile App, Software Development, Wireless Technology
Project Technology	Java, MySQL, PHP, Python, SQL, XML

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Project Title	Cineviews – Movie & TV Show Website
Name	Yvonne Murphy
Email	yvonne.murphy4@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Suzanne Little

This website is designed for users who are fans of movies and TV shows. The unique aspect of this website is that it allows users to search for movies/TV shows based on their version of the plot using natural language processing. Cineviews also recommends content based on what they like. It has been designed for both mobile and desktop viewing.

Project Area	Information Retrieval, Natural Language Processing, Web Application
Project Technology	CSS, HTML5, JavaScript, REST, ReactJS

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Project Title	To Assess Energy Storage Solutions for Renewable Energy Applications
Name	Odhran Casey
Email	odhran.casey5@mail.dcu.ie
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	James Carton

This project reviews Renewable Energy Storage Technologies to assess their viability in a domestic environment. This includes Pumped Hydro, Compressed Air, Lithium Ion Zinc Air and many more Energy Storage Technologies. From this literary review an Energy Storage Database Application is developed to increase the utility of these technologies to a designer or home owner.

Project Area	Databases, Energy Conservation, Renewable Energy Technology, Software Development
Project Technology	.NET, C#

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Project Title	Human Activity Recognition using wrist-mounted PPG sensors based on Symbolic Aggregate Approximation and Machine Vision
Name	Shane Creedon
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Programme	Computer Applications – CASE4
Supervisor	Tomas Ward

Human activity recognition is a challenging time-series classification task. This project aims to demonstrate that wrist-mounted optical sensing, usually used for heart rate determination, can also provide useful data for relevant activity recognition. Based on Python, this project consists of a Django web application alongside a desktop application built using PyQt5. TensorFlow and Keras have been used to construct the Machine Learning back-end with an emphasis on Transfer Learning. MQTT has been involved to allow for asynchronous communication between the client and server.

Project Area	Arduino, Artificial Intelligence, Computer Vision, Data Mining, Digital Signal Processing, Image/Video Processing, Internet of Things, Motion Analysis, Sensor Data, Sensor Technology, Software Development, Wearable_Technology
Project Technology	CSS, Digital Signal Processing, HTML5, Python, REST, SQL, Django, PyQt5, TensorFlow, MQTT

130

Project Title	Electronic Retail Store Chatbot
Name	Eoin Newman
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Programme	Computer Applications – CASE4
Supervisor	Jane Kernan

This project is a chatbot for electronic home appliance retail stores. The chatbot is accessed through facebook, but the webhook can be easily integrated to other messenger services. The bot can answer user queries related to order information, stock and it can also make recommendations on products. The query is pulled from Facebook using a NodeJS webhook. This is then sent to dialogflow which gathers intents and entities. Finally, Javascript written functions take the broken down query and format an accurate response for the user.

Project Area	Artificial Intelligence, Databases, Instant Messaging, Natural Language Processing, Software Development
Project Technology	JavaScript, MongoDB, Nodejs, Python

131

Project Title	Design, Test and Build a Reject Transfer Device for a Generic Pharmaceutical Line
Name	Niall Treacy
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Programme	Mechatronic Engineering – ME4
Supervisor	Noel Murphy

This project set out to design an alternative to the monopolized reject detection systems available in modern pharmaceutical inhalation facilities. Its purpose is to design and manufacture a standalone automated reject detection system using the skills acquired from the Mechatronic Engineering course in DCU.

Project Area	Automation

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Project Title	QLite
Name	Riain Condon
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Programme	Computer Applications – CASE4
Supervisor	David Sinclair

QLite is a control-flow management system for running theatre productions. Used by Stage Managers and Technical Operators, this project uses a Huzzah 8266 chip with LED indicators and haptic feedback along with a Control Centre UI to efficiently and effectively trigger cues for each department working on a production – lighting, sound, set among others. This project is a inexpensive solution to cueing systems for smaller scale theatres, yet can be scaled for larger spaces.

Project Area	Arduino, Control Systems, Databases, Model View Controller, Multimedia, Software Development, Wireless Technology
Project Technology	C/C++, CSS, HTML5, Java, JavaScript, MongoDB, Nodejs, REST, TypeScript, ReactJS, ElectronJS, Spring Boot

133

Project Title	Dynamic Kanban Allocation
Name	Katie O'Brien
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	John Geraghty

This project presents an overview on the different kind of control strategies that are being used worldwide by manufacturers. An experimental approach to find a way in which to actively add and subtract authorisation cards and varying demand distributions is investigated to develop a picture of how a system responds to disruption. The return to normal conditions and associated response time of a system after change is discussed and presented.

Project Area	Lean Manufacturing
Project Technology	ExtendSIM

134

Project Title	The Letter App
Name	Victoria Crabbe
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Programme	Computer Applications – CASE4
Supervisor	Monica Ward

This project is a system that enables primary school students to write letters of the alphabet with their finger on a mobile device. The system is able to check if the student has written the letter in the correct manner and record the information, which will be made visible for the teacher.

Project Area	Android, Software Development
Project Technology	Java, XML

135

Project Title	Stormwater Modelling
Name	Aaron Dunphy
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Programme	Biomedical Engineering – BMED4
Supervisor	Lorna Fitzsimon

Over the past few decades stormwater modelling software's have flooded the market. The models study many different aspects such as flowrates and pollution levels. The objective of the project is to compare two stormwater modelling tools. The tools are compared by a literature review, a defined evaluation criteria and comparing the results generated from the stormwater modelling tools to a case study. The case study is a small residential estate situated in Ireland with a waste water treatment plant onsite.

Project Area	Environmental Mapping, Fluid Mechanics, Water Treatment
Project Technology	Matlab, Simulink

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Project Title	Modelling and Analysis of Closed Loop Supply Chain Management for Reusable Articles
Name	Ben Treacy
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	John Geraghty

The Efficiency of a Closed Loop Supply Chain is an extremely important factor to take into account in industry especially for companies with reusable articles. Sub optimal processing times can cause large delays in the company delivering its produce to the consumer. This project aims to investigate the potential effects of constraints on the collection and regeneration processes of reusable articles and to find optimal solutions to the fleet size required by a company to guarantee consumers are supplied with a product with minimal wait time while the company itself has the minimum fleet size required to satisfy this demand resulting is cost savings in multiple areas.

Project Area	Lean Manufacturing, Simulation
Project Technology	ExtendSIM

137

Project Title	Development of a Planetary Gearing System for Centrifugal Microfluidics
Name	Eimear Higgins
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	David Kinahan

This project aimed to develop a planetary gearing system to improve on current platforms used to implement two degrees of freedom in centrifugal microfluidics. Essentially, the device needed to enable the controlled rotation of a disc placed either end of a spinning arm. A custom platform was designed and built alongside a Labview control interface. Finally, a microfluidic disc was fabricated and, with dyed water, demonstrated the potential for the platform to successfully purify a DNA sample.

Project Area	3-D Modelling, Device Design, Mechanical Design and Manufacture
Project Technology	LabView, SolidWorks

138

Project Title	Where To Next (Travelling Sales "Men" Problem)
Name	Husam Aldean Afana
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Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

Where To Next is a Web Application developed for delivery companies. It is designed to minimize a companies cost while increasing its drivers efficiency by utilizing Clustering and Heuristic Search Algorithms. Given "n" delivery locations, the WebApp computes the optimal number of delivery drivers (via clustering), allocate each driver their drop off location(from each Cluster) and display the best route for each driver to reach their allocated drop off locations (via heuristic Algorithms to solve TSP).

Project Area	Artificial Intelligence, Data Mining, GPS/GIS, Software Development, Web Application
Project Technology	CSS, Docker, HTML5, JavaScript, Python, REST, SQLite, RPC

139

Project Title	Frontier
Name	Ore Ibikunle
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Programme	Computer Applications – CASE4
Supervisor	Charlie Daly

Frontier is an online 2-D space shooting game built using the Unity Engine. The game is based on classic arcade games like Space Invaders and Galaga. The objective of the player is to battle and destroy incoming enemy ships. The player will have health points and can pick up items to regain health. The game has features such as collision detection, dynamic difficulty adjustment, and an online database where players will be ranked based on their scores.

Project Area	Databases, Gaming
Project Technology	C#, Unity

140

Project Title	Adhesives Testing
Name	Ghayadah Alkharusi
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Programme	Biomedical Engineering – BMED4
Supervisor	Harold Esmonde

The project involves designing rigs to control and monitor the temperature of hot melt adhesives using Arduino. The development of the project involved assessing different concepts to figure out the best material to heat the polymers being tested. The study provides a full presentation of the rheological behaviour of hot melt adhesives (HMA) Ethylene-Vinyl Acetate (EVA). The two EVAs viscoelastic behaviour were analysed using the Micro Fourier Rheometer. The behaviour of the materials was tested under random oscillations with a high frequency of 20Hz. The experimental data were compared with the Maxwell model and Kelvin Voigt model.

Project Area	Advanced Material Engineering, Arduino, Circuit Modeling, Control Systems, Device Design
Project Technology	C/C++, Excel/VB, Solidworks

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Project Title	GAA E-Ticketing
Name	Aaron Kinsella
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Name	Aidan Kieran
Email	aidan.kieran7@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Jane Kernan

GAA E-Ticketing is a mobile/web application aimed to introduce digital ticketing into Club Level GAA. The client version of application will be aimed at GAA county boards providing them functionality that assists in stadium management and a platform to store and display all upcoming fixtures/results. The end-user version of the application is a ticketing platform that provides users with QR code tickets to matches. It also will provide users with a platform to view all fixtures/results across all codes/grades.

Project Area	Mobile App, Web Application
Project Technology	CSS, HTML5, JavaScript, MySQL

142

Project Title	Exploring data augmentation strategies for deep learning
Name	Sarah O'Gara
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Kevin McGuinness

Currently deep learning requires large volumes of training data being available to fit models. However, in practice, there is insufficient training data available, which results in data augmentation being utilised to expand the amount of training data. Historically, only simple forms of augmentation were used, such as cropping and horizontal flips. In recent years more complex methods of augmentation have been developed, but it is still unclear which techniques are most effective, and at what stage in the learning process they should be introduced. This project investigates several different augmentation strategies on an image classification problem trained using the CIFAR-10 dataset and ResNet model.

Project Area	Artificial Intelligence
Project Technology	Python

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Project Title	Gesture Control Interface Coupled with Touchless Haptic Feedback
Name	Padraig McGuinness
Email	padraig.mcguinness9@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Conor McArdle

This project uses Time-of-Flight (ToF) distance sensors and a correlation-based detection algorithm to provide a gesture control interface. It also makes use of air vortex based haptics to provide contactless tactile sensations to mid-air gestures.

Project Area	Arduino, Sensor Data, Wireless Technology
Project Technology	C/C++, Solidworks

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Project Title	iBIKE
Name	Declan Lunney
Email	declan.lunney2@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Ray Walshe

This project is an easy to use mobile application available on iOS and Android for all bike users. It has an accident protection system using device sensors to alert a primary contact that a user is in a possible accident. It allows users to report their bike as stolen and a database for searching all reported stolen bikes. Users can route their bike journey from anywhere in the world and get biking directions. Bike users across the world are able to record their bike journeys and see specific stats like distance covered and average speed.

Project Area	Android, GPS/GIS, Mobile App, SMS, Sensor Data
Project Technology	AngularJS, CSS, HTML5, JavaScript, NoSQL, Nodejs, Python, SQLite, TypeScript

145

Project Title	Development of Web Applications for Visualisation of Electromagnetics
Name	Jason McKeown
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Conor Brennan

The problem that this project solves is to update and add further web applications to an existing website for visualisation of Electromagnetics. The web applications that are to be created are:

- An interactive screen to create a wave transmitter, receiver and obstacles, to show the possible paths for the wave to get to the receiver past these objects.
- A contour plot to show wave propagation from a transmitter, the factors that affect the wave and to demonstrate beamforming.

Project Area	Software Development, Web Application
Project Technology	CSS, Eclipse, HTML5, JQuery, Java, JavaScript

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Project Title	CA400 – Bróga Nua
Name	Olan Buckeridge
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Programme	Computer Applications – CASE4
Supervisor	Gareth Jones

Bróga Nua is an Irish Sneakers E-Commerce Android application. This project focuses on providing users products from Irish retailers and supporting the Irish Sportswear/Streetwear culture. It is comprised of two major sections, the Catalogue and the Limited Releases. The catalogue is built using data from Irish retailers – Life Style Sports, Brown Thomas, Elverys and Nowhere. The limited releases focuses on highly limited releases such as Yeezys and provides the users with how to get them in Ireland.

Project Area	Android, E-Commerce
Project Technology	Java, Python, XML

147

Project Title	The control of energy harvesters
Name	Anesu Nyabadza
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Programme	Mechatronic Engineering – ME4
Supervisor	Marissa Condon

This project is considered a research project; the objective is to research a piezoelectric energy harvester used in any medical device under development or on the market and investigate potentially improving it. Various engineering skills are implemented in the investigation. These include MATLAB programming, 3D printing, Arduino programming, circuits and calculus. The approach is to use appropriate engineering skills in pursuit to understand and improve the current models.

Project Area	3-D Modelling, Arduino, Biomedical Engineering, Circuit Modeling, Energy Conservation, Sensor Data, Simulation
Project Technology	Matlab, Simulink, Solidworks

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Project Title	Investigation of metal AM produced thermal field, microstructure and resultant part properties
Name	Maryam Alalawiya
Email	maryam.alalawiya2@mail.dcu.ie
Programme	Biomedical Engineering – BMED4
Supervisor	Dermot Brabazon

This project is to study the laser material interaction which involved development of 3D model to study the temperature gradients of the applied laser power and with varying variable. In the project I used two different programs, solidwork and matlab a d stintless Steel was the tested material, Even though the laser temperature unknown, the solidwork results seem more logical.

In this project I try to find the prefect temperature for steel to be modified by laser in order to use at in medical field instead the titanium or other expensive materials.

Project Area	3-D Modelling, Thermodynamics
Project Technology	Matlab, Solidworks

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Project Title	Graphical user interface for neural networks
Name	Liam McAweeney
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Programme	Computer Applications – CASE4
Supervisor	Charlie Daly

This project allows users to design and train neural networks using a interactive and intuitive web application. The user simply drags and drops layers into the network design. They can then train the model and analysis training metrics in real-time.

The purpose of this project is to allow user to learn about neural networks and design one without having to write any code, and possibly spark an interest this field.

The models created by the user's are compiled and trained by the browser with TensorflowJS. The application is built using Flask and React. The application is a single page application (SPA).

Project Area	Artificial Intelligence, Web Application
Project Technology	CSS, MySQL, Python, REST, SQL, React

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Project Title	Twitter Hate Speech App
Name	Gavin McQuaid
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Programme	Computer Applications – CASE4
Supervisor	Suzanne Little

The Twitter Hate Speech App aims to help reduce the amount of abuse on Twitter. It uses Twitter's API to pull in hundreds of thousands of tweets a day. These tweets are then run through a deep learning model to determine whether or not they are hate speech. Flagged tweets are stored and displayed on a dashboard where human reviewers can assess the model's judgments. These human judgements are then used to retrain the model in order to further improve its accuracy.

Project Area	Artificial Intelligence, Automation, Natural Language Processing, Web Application
Project Technology	CSS, Docker, JavaScript, MySQL, Python, REST, Ember.js, Keras, Flask

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Project Title	Investigation of the Dynamic Behaviour of a Photovoltaic System
Name	Martin Corteel
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Marissa Condon

The aim of the Final Year Project is to implement in MATLAB® a PV model which operates at the Maximum Power Point (MPP) associated with the environmental conditions and to assess its stability. A model of a PV panel, a DC to DC Boost converter and a Maximum Power Point Tracker (MPPT) need to be implemented. Equations describing a PV panel under different conditions are used to determine this MPP and an application of the Filippov method to the Boost converter is required to determine whether the whole system is stable or not. A proposed algorithm for ensuring stability is suggested.

Project Area	Control Systems, Renewable Energy Technology
Project Technology	Matlab

152

Project Title	Design, 3-D print, Validate and Test a Shear Test Rig for Soft Materials
Name	Cathal Doran
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Programme	Biomedical Engineering – BMED4
Supervisor	Jeremiah Murphy

Shearing can occur in soft tissue in a number of different scenarios. The limited set of experimental data in this area suggests that there is a challenge to accurately and consistently collect data. This project investigates the lack of experimental data and the challenges involved in collecting shearing information for soft biomaterials. The project looks at the design of a simple shear test rig as a way to highlight the shear characteristics of materials. The project begins with the design and manufacturing of a simple shear test rig and follows the steps taken to validate the rig and then using it to test soft biomaterials.

Project Area	3-D Modelling, Additive Manufacturing, Biomedical Engineering, Device Design
Project Technology	Solidworks

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Project Title	B.I.Box
Name	Gerard Cullen
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Name	James Lynch
Email	james.lynch44@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Jane Kernan

The idea driving this project is the potential to provide business intelligence technology to charitable organisations. This is done through the use of contactless donation devices and the data which can be gathered from them. B.I.Box provides real-time reports of donations, allowing organisations to view the performance of volunteers based on dates, times and locations. B.I.Box removes the time spent counting and handling cash and provides a tool to further optimise the collection process.

Project Area	Databases, Mobile App, Web Application
Project Technology	CSS, HTML5

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Project Title	CherryPik
Name	Emma O'Keeffe
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Programme	Computer Applications – CASE4
Supervisor	Suzanne Little

CherryPik is a vitamin and nutrient logging application for iOS. Users can track if they are fulfilling the recommended daily vitamin/nutrient intake through their consumption of fruit and vegetables. These Recommended Daily Allowances (RDA) will be based on the European Food Safety Authority recommendations. The two main features to add items to a user's profile in CherryPik is by syncing the app to the user's Fitbit profile or by taking a photo or importing a photo from the camera library which is then analysed by an image classifier. This feature has other uses such as aiding users in identifying fruits or vegetables they may not have encountered before. Each food item will have its nutrient and vitamin values displayed to the user before they add it to their profile.

Project Area	Computer Vision, Educational, Image/Video Processing, Mobile App
Project Technology	NoSQL, Python, Swift, Firebase, OAuth

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Project Title	Cyber Threat Intelligence Tool
Name	David Jenkins
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Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

The Cyber Threat Intelligence (CTI) tool is a web application designed to gather information on potential malicious malware affecting businesses. As the amount malware is growing where banks and high-level government officials are prone to cyber-attacks. Malware files can be converted to a hash value and analysed visually in order gather intelligence to the severity of the sample. The web application will be used by cyber threat intelligence analysts to make predictions on potentially harmful malware and to counter the threat posed.

Project Area	Automation, Data Analytics, Intelligence Pattern Matching
Project Technology	HTML5, JavaScript, Python, Django

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Project Title	Computer Network Simulation: Networker | An IP addressing and subnetting learning application.
Name	Adlan Djimani
Email	adlan.djimani2@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Donal Fitzpatrick

This project is an IP addressing and CIDR subnetting learning tool. Users can create computer networks by connecting routers and devices using IP addressing and subnetting. The web application is built on ReactJS using Redux for state management. It consists of a graph visualisation and Web Content Accessibility Guidelines accessible DOM representation of the network. This learning tool also provides exercises to aid students in their learning of IP addressing and subnetting.

Project Area	Educational, Network Applications, Simulation, Web Application
Project Technology	CSS, HTML5, JavaScript, ReactJS, Redux

157

Project Title	Design and build of a smart recycling system for reducing contamination in commercial recyclable waste
Name	Sadhbha Medlar
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Programme	Mechatronic Engineering – ME4
Supervisor	James Carton

The project aim is to design and build a prototype smart recycling system (SRS) to reduce contamination levels in recycling bins and lower the percentage of recyclables misplaced in residual bins. The initial target market is businesses that generate significant volumes of commercial waste and want to improve their recycling levels. Through identification and data acquisition technologies, the system identifies the user and items being recycled. It then leverages communication technologies and software to calculate and apply monetary rewards.

Project Area	Databases, Device Design, Mechanical Design and Manufacture, Mechatronic Systems, Optical Character Recognition, Sensor Data, Sensor Technology
Project Technology	PLC Programming, Solidworks

158

Project Title	Aithin Canúint: Irish Dialect Recognition
Name	Eileen McGarvey
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Programme	Computer Applications – CASE4
Supervisor	John McKenna

The basis of my project is to design, implement and evaluate a dialect recognition system for Irish language dialects. The audio has been tested against training data, which I collected from native speakers. My project is primarily a research project. It uses a toolkit called HTK (Hidden Markov model toolkit), which allows you to build and manipulate Hidden Markov Models (HMMs) for Automatic Speech Recognition (ASR). I have built a HMM for each of the three dialects – Ulster, Munster and Connacht.

Project Area	Natural Language Processing, Speech Recognition
Project Technology	Java, Python, Hidden Markov Model Toolkit (HTK)

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Project Title	A Twitter Based Social IoT Network
Name	Danielle Sheridan
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Gabriel Muntean

The Internet of Things(IoT) is a fast-growing phenomenon that creates machine to machine to communication and sharing of data. In the same way social media connects people to people, the IoT mirrors these connections with devices. This project will focus on interconnecting these two by building a communication network between human and machine through the use of social media, Twitter. In this project, a network will be built to allow for this human to machine connection through IoT protocols such as REST and MQTT, where a human will control a component connected to Raspberry Pi on the network through a Tweet.

Project Area	Internet of Things, Network Applications, RaspberryPi, Social Networking, Software Development
Project Technology	Python, REST, MQTT, Adafruit

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Project Title	LUCAS
Name	Niall Walsh
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Programme	Computational Problem Solving and Software Development – CPSSD4
Supervisor	Jennifer Foster

The LUCAS project is a cutting edge study of online fake reviews and opinion spam. Taking the latest and greatest advances in natural language processing and deep learning, we train a series of models using datasets of user submitted reviews, to attempt to spot fake and deceptive reviews. The output of this research is threefold: an open source API providing access to query our trained models; a scientific paper describing our research; and Lucify, an interface that integrates with Yelp to make our service available on the web, allowing end users to view an interactive and comprehensive report of review deception and legitimacy.

Project Area	Artificial Intelligence, Data Analytics, Natural Language Processing, Software Development, Web Application
Project Technology	JavaScript, Nodejs, Python, React, Tensorflow, Jupyter, Keras

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Project Title	Memorability-based Video Abstraction
Name	Lorin Sweeney
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Programme	Computer Applications – CASE4
Supervisor	Alan Smeaton

This project pertains to the exploration and application of a novel approach to dynamic video abstraction (generating a short representation of an original video) predicated on contemporary memorability research. The video abstraction tool consists of a series of Deep Neural Networks – a CNN-RNN encoder-decoder model, used to extract features from the video and generate apposite captions, and an LSTM which assigns memorability scores to those captions – followed by a simple submodular maximisation of qualities inherent to a "good" video abstract. A web-app hosts the video abstraction tool, where users can upload a video and receive an according abstract consisting of their video's most memorable segments.

Project Area	Artificial Intelligence, Computer Vision, Image/Video Processing, Natural Language Processing, Web Application
Project Technology	CSS, Docker, HTML5, JavaScript, Python, REST, Flask, TensorFlow, TensorFlow Serving, Keras, OpenCV

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Project Title	The Simpsons' Script Generator
Name	Sarah Rutledge
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Programme	Computer Applications – CASE4
Supervisor	Andy Way

The project hopes to train and develop a Long Short Term Memory modeled recurrent neural network to create its own version of a brief episode transcript of 'The Simpsons'. The network will utilise a data set of over 600 episodes in order to observe individual character speech patterns and screenwriting techniques.

Project Area	Artificial Intelligence, Data Analytics, Natural Language Processing, Web Application
Project Technology	CSS, HTML5, JavaScript, Python, Postgres

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Project Title	Play By Hand
Name	Edward Meade
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Programme	Computer Applications – CASE4
Supervisor	Alan Smeaton

Play by hand is a toolkit to help piano players learn scales. The project explored how electromyography (EMG) can be used to give back information to the player about how well they play a piano scale. The application uses audio and EMG data, electrical signals sent from the brain to the muscles in the arm to tell them to move, to give feedback to musicians on aspects where they can improve. The feedback that they receive is based on the Royal Irish Academy grading system for scales and outlines the overall musicality of the scale while also outlining the smoothness of the hand movements and whether correct fingering was used.

Project Area	Data Analytics, Data Mining, Statistical Analysis, Wearable_Technology, Web Application
Project Technology	CSS, Fast Fourier Transform, HTML5, JavaScript, Python, REST, ReactJS

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Project Title	Finite Element Analysis of the Deep Drawing Process
Name	William Mc Donald
Email	willmc96@gmail.com
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Bryan MacDonald

This project involved the design and simulation of the deep drawing process using Finite Element Analysis for comparison against experimental and previous FEA results. The model looked at stress and strain distribution within the workpiece of the manufacturing process simulated in ANSYS workbench. Other areas of interest for investigation were springback and thickness variation within the workpiece. The use of these previous results aided in achieving the ultimate aim of model validation.

Project Area	3-D Modelling, Finite Element Analysis, Simulation
Project Technology	ANSYS Workbench, Excel/VB, Solidworks

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Project Title	Dublin Bus Assist
Name	Damhan Richardson
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Programme	Computer Applications – CASE4
Supervisor	Mark Roantree

An app to improve on the Dublin Bus real time info.

Project Area	Android, Data Analytics, Data Mining
Project Technology	Java, Python, SOAP, SQL

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Project Title	Production And Inventory Control Strategies For Systems Manufacturing Perishable Goods
Name	Gary Gilmore
Email	gary.gilmore2@mail.dcu.ie
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	John Geraghty

The performance of Kanban minimal blocking, CONWIP, hybrid Kanban-CONWIP and a push system for production and inventory control of perishable items were analysed through discrete event modelling. The four strategies were modelled as a four-stage tandem production process. The strategies were studied with constant and varied demands. Perishability was implemented to the models by reneging items from inventory buffers along the production line and also setting a maximum allowed cycle time for production. The principal performance metrics for the study are service level, the amount of work-in-progress and the variability of time between loadings of each workstation. The results were obtained through a large series of simulations.

Project Area	Lean Manufacturing, Simulation
Project Technology	ExtendSIM

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Project Title	Heads-up No Limit Poker AI
Name	Sean Mulvaney
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Programme	Computer Applications – CASE4
Supervisor	David Sinclair

This project allows users to play Heads-up No Limit Texas Hold'em poker against a computer player through a web application. The game is 1v1 so the Artificial Intelligence player learns their opponent's behaviour and implements strategies to counteract the opponent's actions in order to maximise their winnings. The computer player is generated using neurogenetics, meaning Neural Networks are evaluated and mutated through genetic algorithms in order to generate interesting and viable poker strategies.

Project Area	Artificial Intelligence, Gaming, Software Development, Web Application
Project Technology	Java, MongoDB, NoSQL, Python, Angular 7, Flask, TypeScript, Spring Boot

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Project Title	Efficient FPGA Implementation of the Lightweight Cipher LED
Name	Conor Sherlock
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Xiaojun Wang

This project researched the Lightweight Block Cipher LED and investigated four different design methods, comparing the area utilisation and power consumption of the designs. This project also implemented the cipher on the ZYBO FPGA development board, as well as providing documentation for implementing VHDL code on the board.

Project Area	Cryptography, Software Development
Project Technology	FPGA, VHDL

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Project Title	EPensions
Name	Mantas Pankinas
Email	mantas.pankinas2@mail.dcu.ie
Name	Emmett O'Brien
Email	emmett.obrien77@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Markus Helfert

E-Pensions is a digitalised pension administration system which uses Blockchain technology to facilitate payments. Uses biometrics to replace the traditional "Certificate of Existence" method to allow a client to trigger an instant payment from an Ethereum based Smart Contract.

Provides automatic reporting on client transactions to the administrators, which reduces the organisations paper & admin expenses. Reduces administrative workloads due to automatic transaction reports generated by the Blockchain network.

Project Area	Biometrics, Databases, Information Retrieval, Web Application
Project Technology	CSS, HTML5, JavaScript, MySQL, Solidity

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Project Title	TalkDex
Name	Barry Reynolds
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Programme	Computer Applications – CASE4
Supervisor	Andrew McCarren

This project implements a call tracking metrics application for any business or organisation. It replaces existing telecommunication solutions from a public switched telephone network towards VoIP. Through keeping traffic over the internet, the application captures call records and metadata to analyse and improve the customer experience. This gives the end user a powerful tool to gain actionable customer insights into the target audience along with obtaining higher quality, cheaper communication solutions.

Project Area	Android, Data Analytics, Databases, Mobile App, Telecommunications
Project Technology	Java, REST, SQL, XML

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Project Title	CoderDojo Leads Project
Name	Maimuna Ahmed
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Programme	Computer Applications – CASE4
Supervisor	Mark Roantree

This project aims to build a leads management service for the CoderDojo Foundation. The Foundation employees will see the predicted success of each coding club application (lead) on a new management board. It can be run and interacted with locally and in the browser.

Project Area	Content Management System, Data Mining, Web Application
Project Technology	CSS, Docker, Nodejs, Python, VueJS

172

Project Title	Spell it!
Name	Laura Galea
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Programme	Computer Applications – CASE4
Supervisor	Alan Smeaton

This project has built an application that is able to recognise the one-handed alphabet in Irish Sign Language (ISL) by recording and analyzing the electrical activity in the muscles of the forearm. Using EMG (electromyography) sensors, worn on the forearm, muscle movement is recorded as the hand moves to sign each of the 26 letters and then these electrical signals are used as input to a machine learning classifier. Using EMG from the Myo armband device for ISL recognition brings improvements to communications for people with hearing and speech impairments and has more benefits than using video for ISL recognition. The user should be able to spell a word using the ISL one-handed alphabet and receive a text translation of the letters/word.

Project Area	Data Analytics, Data Mining, Sensor Data, Wearable_Technology
Project Technology	CSS, HTML5, JavaScript, Python

173

Project Title	Short Fibre Reinforced Calcium Phosphate Cement
Name	Rebecca Guyett
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Programme	Biomedical Engineering – BMED4
Supervisor	Nicholas Dunne

Injectable bone cements are routinely used to stabilise fractures and for the augmentation of osteoporotic bone. Calcium phosphate based cement has good biocompatibility but poor mechanical and injectability properties compared to polymer based cement and is not currently used for load bearing applications such as vertebroplasties.

The aim of this project is to improve fracture behaviour of CPC through incorporation of short fibres whilst retaining injectability. Similar techniques have been employed to improve the fracture behaviour of concrete.

Project Area	Biomedical Engineering

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Project Title	PetTrack
Name	Sarah Curran
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Programme	Computer Applications – CASE4
Supervisor	David Sinclair

PetTrack is an Android application that uses a GPS tracker to allow pet owners to track their pet's location. The tracker, which can be attached to a pet's collar, sends GPS coordinates to a server. The app retrieves these coordinates so users can view their pet's location on a map in real time and view their pet's previous locations as a route. These routes can be saved in the app and viewed later by the user.

Project Area	Android, Arduino, GPS/GIS, Internet of Things, Mobile App, Wearable_Technology
Project Technology	C/C++, Java, Python, SQL

175

Project Title	Investigations Into A GMP HVAC System
Name	Lauren Conlon
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Brian Corcoran

In a pharmaceutical manufacturing plant in Ireland, there was found to be significant issues in the glycol chilled AHU (Air Handling Unit). The aim of this project is to investigate and address the mechanical and psychometric conditions that caused these issues and to implement a solution that would solve any underlying problems. The investigation was carried out through a thorough survey of the AHU, and then a series of simulations were carried out on the rig in DCU.

Project Area	Thermodynamics

176

Project Title	Voice Assistant
Name	Alex Randles
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Programme	Computer Applications – CASE4
Supervisor	Cathal Gurrin

The Voice Assistant is a voice controlled device that can assist you with a wide variety of task's such as controlling a television or smart home device, reading or sending emails, playing music, taking pictures, receiving news and weather updates. The Voice Assistant also offers a privacy setting which allows the user to restrict access to the device.

Project Area	Artificial Intelligence, RaspberryPi, Speech Recognition
Project Technology	JavaScript, Nodejs, Python, SQLite

177

Project Title	Development of a Biomimetic Flow Model of a Cerebral Aneurysm
Name	Amy Leddy
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Owen Clarkin

This project entailed the investigation of cerebral aneurysm properties in an animal model. Animal models provide a mechanism for the fundamental studies of the morphology, hemodynamics and histology where diseases like cerebral aneurysms occur. This project evaluated the capability of elastase-induced aneurysm models on deceased rabbits to reproduce the properties examined in human intercranial aneurysms. This project produced a model that mimics many of the characteristics of human arteries when the formation of aneurysms occur.

Project Area	Biomedical Engineering
Project Technology	Excel/VB

178

Project Title	Hopeful – A First Programming Language
Name	Gillian Mullen
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Programme	Computer Applications – CASE4
Supervisor	David Sinclair

This project, Hopeful – A First Programming Language, involved the development of a programming language. This language is aimed at students who are learning how to program in a university setting. It has a simple and clean syntax that allows students to focus on the fundamentals of programming, instead of a complicated syntax.

Project Area	Educational
Project Technology	Java, JavaCC, LLVM

179

Project Title	Designing an RF Antenna using 3D Printing
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Programme	Mechatronic Engineering – ME4
Supervisor	Pascal Landais

The manufacturing process used to create an antenna can be quite wasteful, therefore it is costlier than it needs to be. This project explores a novel method of creating a low-cost antenna. This antenna will be manufactured using 3D printing which can create components without producing waste. This antenna will be based on a Fresnel zone plate. This project aims to explore the feasibility of this concept from all perspectives. The design and 3D printing process of creating this Fresnel zone plate, exploring the capabilities of 3D printers to utilise materials with dielectric properties. The effectiveness of this Fresnel zone plate will be evaluated by completing a series of physical tests of the created part, and by creating a simulation of these tests for a clear view of its effect.

Project Area	3-D Modelling, Telecommunications
Project Technology	Solidworks

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Project Title	A Wireless 3D Embedded RTOS Human Computer Interface
Name	Ciarán O'Donnell
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Derek Molloy

This project investigates the design of a wireless 3D input device for a computer. The platform used for the design is the Texas Instrument cc2650 embedded system, with the real time operating system TI-RTOS. The project investigates different methods of interfacing with the embedded system and its software as well as the systems wireless communication capabilities.

Project Area	Device Design, Embedded Systems, Sensor Data, Software Development, Wireless Technology
Project Technology	C/C++, Eclipse, Ti-RTOS

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Project Title	Using Artificial Intelligence and Machine Learning to Predict Hospital Emergency Department Admissions
Name	Chloe D'Arcy
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Name	Amy Rowe
Email	amy.rowe2@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Suzanne Little

This project is based on a web application that will identify patterns through the use of our designed algorithm and develop a highly informative prediction system. This system will aid hospital staff in preparing for busy times in advance by aligning their resources with the predicted rates. The system will help to effectively allocate their workflow, machinery and vacancies depending on the admission rates, creating a more efficient deployment of resources and a better overall patient outcome.

Project Area	Artificial Intelligence, Cloud Computing, Data Analytics, Web Application
Project Technology	CSS, HTML5, JavaScript, Python

182

Project Title	Electromagnetic operated rejection system for food sorting device
Name	Robert Byrne
Email	robert.byrne66@mail.dcu.ie
Programme	Mechatronic Engineering – ME4
Supervisor	Jeremiah Murphy

This report details the research, design and manufacture of an electromagnetically driven prototype. The project was focused on an issue proposed by Tomra sorting solutions ltd. The prototype following detailed research was referred to as a Quarter dc motor which, following proof of concept would be developed to replace a pneumatically operated system. The prototype consisted of the rejection finger which is modeled off current designs with the addition of a rotor at the opposing end. A stator which contains the internally designed electromagnetic coils in a 3d-printed housing unit was then fixed in place in close proximity to the finger. The coils were then pulsed using a control system comprising of an Arduino Uno and a circuit built around a dual motor driver chip.

Project Area	Mechatronic Systems
Project Technology	C/C++, Solidworks

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Project Title	Software Success
Name	Kealan Thompson
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Programme	Computer Applications – CASE4
Supervisor	Paul M. Clarke

This project investigates the relationship between successful software projects and predictors of success. Training a neural network capable of determining whether or not a git repository is successful. Using publicly accessible git data, from which a dataset of a sufficient size is gathered, to train an accurate neural network on. Using well established objectively successful projects, looking at them in their infancy (first year) to train the model. Which can then classify any git repository with sufficient data.

Project Area	Artificial Intelligence
Project Technology	Python, Tensorflow

184

Project Title	Non-Circular Gears
Name	John Mc Guirk
Email	john.mcguirk23@mail.dcu.ie
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Tamas Szecsi

This project investigates to test if the following statement is correct "Given the shape of one gear and the transmission ratio of that shape can the other gear be defined using the SolidWorks CAD package and its internal programming language.

Project Area	Simulation
Project Technology	Solidworks

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Project Title	CURART: Visual Search for Stolen Artworks 0
Name	Thomas Doyle
Email	thomas.doyle9@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Brian Stone

This research project attempts to determine if the SIFT algorithm can be used efficiently at scale. A user submitted image will be compared to prepossessed images based on their features rather than their semantic components. The domain of this project has been restricted to artworks but concepts can be extended to any image search system. The aim is to find images that are being used without permission and in breach of copyright.

Project Area	Graphics, Image/Video Processing
Project Technology	CSS, Docker, HTML5, Python, PostgreSQL

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Project Title	Arduino vehicle anti-theft device
Name	Aidan McGivern
Email	aidan.mcgivern3@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

This project is an Arduino based device, that aims to help a car owner track their car if it has been stolen. The device will alert the owner when their car has been stolen so they can act instantly in recovering their car. The device then provides updates of the location, through SMS to aid the owner in tracking their car down as quick as possible. The device can also be triggered to send its location to the owner at any time.

Project Area	Arduino, Automotive Technology, GPS/GIS, Internet of Things, SMS, Telecommunications
Project Technology	C/C++

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Project Title	Design and Implementation of a low-cost, 3D printed and electronically operated prosthetic arm'
Name	Khaled alaydi
Email	khaled.alaydi2@mail.dcu.ie
Programme	Mechatronic Engineering – ME4
Supervisor	Paul Young

The project involves, the design and build of a low-cost, 3D printed prosthetic arm, controlled through muscle sensing technology. The project was broken down into 3 sections, the mechanical design, electrical design and the software implementation.

Project Area	3-D Modelling, Additive Manufacturing, Biomedical Engineering, Mechanical Design and Manufacture, Mechatronic Systems
Project Technology	C/C++

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Project Title	Fittune
Name	Kevin Mosse
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Programme	Computer Applications – CASE4
Supervisor	Ray Walshe

FitTune is a cross-platform cardio challenge application and route planner for Android and iOS. It makes use of real-time communication and GPS technologies to enable users to take part in both walking and running races against other smartphone users around the world. It allows users to design their own running routes on screen or can automatically generate a selection of suitable routes in a user's area. It also monitors and gathers statistics on exercise performance to help improve fitness levels.

Project Area	Cloud Computing, GPS/GIS, Mobile App, Software Development
Project Technology	Java, Nodejs, Swift, AWS, Dart, Flutter

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Project Title	ShopSmart
Name	Ian Martin
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Programme	Computer Applications – CASE4
Supervisor	Paul M. Clarke

The product is an Android Application which allows users to scan in receipts, using OCR technology, and compare the prices across multiple retailers to give the user the best possible price for the products purchased. ShopSmart will help users make savings when they shop daily and weekly, whilst also making them aware of which retailers are cheaper than others for a specific shopping list.

Project Area	Android, Databases, Image/Video Processing, Mobile App
Project Technology	Java, SQLite, XML, OCR

190

Project Title	Design and Manufacture of a Router Tool Attachment
Name	Declan Bridges
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Programme	Manufacturing with Business Engineering – MWB4
Supervisor	Tamas Szecsi

This project is the design and build of a wood routing attachment. The objective was to re-design and improve on current wood routing attachment options. Through research of current and past wood routing attachments found that there is room for redesign around safety and router attachment functionality. The objective was to implement the attachments possibility to provide a compact design and fix the router at an angle.

Project Area	Mechanical Design and Manufacture
Project Technology	Solid Works

191

Project Title	Design and simulate an EDW magnetic levitation system
Name	Jake Williams
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Programme	Mechatronic Engineering – ME4
Supervisor	Jennifer Bruton

In this project, we have investigated one particular solution that of electrodynamic wheel (EDW) magnetic levitation. This system consists of a rotating permanent magnet Halbach rotor above a passive conducting guideway/track. Eddy current is induced in the guideway due to the rotation and translational motion of the Halbach rotor. The induced eddy current, in turn, produces an opposing magnetic field which interacts with the source magnetic field to provide both lift and thrust force simultaneously.

- Designed and simulated an EDW magnetic levitation system
- Built a proof of concept Maglev system utilising the EDW system

Project Area	3-D Modelling, Arduino, Automotive Technology, Mechatronic Systems
Project Technology	C/C++, Solidworks

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Project Title	Stock Price Prediction using Sentiment Analysis on News Headlines
Name	Gareth Farrell
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Programme	Computer Applications – CASE4
Supervisor	Martin Crane

This project investigates the relationship between the publishing of news articles on a company and the impact they have on that company's stock price. Through the use of Sentiment Analysis, the news headlines can be judged to be positive, negative or neutral, then assigned a score based on how the stock price reacted to the news, e.g. stock price increased after a positive article.

Project Area	Artificial Intelligence, Data Analytics, Data Mining, Databases, E-Commerce, Natural Language Processing, Software Development, Statistical Analysis, Web Application
Project Technology	CSS, HTML5, JavaScript, Python, SQLite

193

Project Title	Q&A Extraction from Factual Text
Name	Traian Svinti
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Programme	Computer Applications – CASE4
Supervisor	Yvette Graham

This project aims to improve the process of teachers creating comprehension type questions or students testing themselves, on a text input. As it's main NLP component, this uses spaCy to analyze inputted text for question extraction.

This project runs as a web app with 2 types of ways to input text, either pasting or inputting a .txt file. Once the text is inputted, it can be very efficiently analyzed and questions can be extracted with little to no delay and high fluency, which can then be downloaded with the click of a button!

The project is a full backend to frontend development with technologies such as; Python, Django Project, Django Rest Framework, AWS EC2 and Docker, which includes auto-deployment and auto-start on EC2 running on a nameserver accessible from any location.

Project Area	Automation, Cloud Computing, Educational, Natural Language Processing, Software Development, Web Application
Project Technology	CSS, Docker, HTML5, JavaScript, Python, REST, AWS, Django, Postgres, NGINX

194

Project Title	The Biomechanics of the Rowing Stroke
Name	Aidan Greene
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Programme	Biomedical Engineering – BMED4
Supervisor	Garrett McGuinness

This role of this project was to investigate the biomechanics of the rowing stroke on a Concept 2 indoor rowing machine. It was decided to create a dynamic machine system by designing and manufacturing a pair of sliders that would allow the standard static Concept 2 machine to slide forwards and backwards and behave like a factory built dynamic rowing machine.

Tests were carried out on both the standard static machine and the dynamic machine system with an aim to investigate performance and injury.

The data from each test was recorded on a laptop which had been plugged into the PM5 monitor on the Concept 2 rowing machine. Data was collected in a csv file format from the PM5 and the rowers acceleration recorded by a smartphone in tsv file format. All data was analysed in excel.

Project Area	Biomedical Engineering
Project Technology	Excel/VB, Solidworks

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Project Title	UniPool
Name	Donal O'Connor
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Programme	Computer Applications – CASE4
Supervisor	Donal Fitzpatrick

UniPool is a cross-platform mobile application that provides a carpooling service that enables users to request or offer a lift to/from college. Based on location pinpoints on a map, drivers can select users who are searching for a lift to the same destination and add them to their carpool. The map displays the shortest route to get to the destination and adapts to different stops a driver may have to make to collect fellow passengers.

Project Area	Mobile App, Social Networking, Software Development
Project Technology	AngularJS, HTML5, JavaScript, MongoDB, Nodejs, ExpressJS, Google Firebase

196

Project Title	Remanufacturing Supply Chain Management
Name	Ciara Fitzpatrick
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	John Geraghty

Remanufacturing is the part of the reverse supply chain loop, where obsolete products are returned to the remanufacturer to be returned to a new or 'like new' condition and then sold to the customer. Remanufacturing adds complexity to the production line due to uncertainties in the rate of returns, demand and the quality of the returned products. Different CONWIP models were tested to determine the optimum model for ensuring reliability and consistency in the quality of the remanufactured products and system service level.

Project Area	Lean Manufacturing
Project Technology	Excel/VB, ExtendSIM

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Project Title	Laser Processing for High Density and Low Pore Size for More Efficient Aerospace Filter Production
Name	Brian Blake Mc Gillick
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Dermot Brabazon

This project aims to investigate the effect of laser power, material reflectivity and assist gas pressure on the diameter, circularity and taper of holes produced in aluminium sheets during laser processing. The project has been undertaken to provide a possible solution for filtering contaminant particles from propellant in a space launch vehicle thruster. A 3 Factorial Design of Experiments approach was taken with both microscopic images and 3D microscope scans obtained. This data was analysed through image processing and Microsoft Excel. Statistical analysis was then performed to determine optimal process parameter levels.

Project Area	Advanced Material Engineering
Project Technology	Laser Processing

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Project Title	AR-T
Name	Russell Brady
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Programme	Computer Applications – CASE4
Supervisor	Monica Ward

AR-T is an augmented reality based learning application for the subject Technical Graphics. The main aim of the app is to enhance students ability to grasp the main fundamental concepts of the subject through the use of augmented reality. There are lessons and quizzes to test students knowledge as well as a classroom interface for interaction between teacher and students. Students can also view objects they have created on CAD based software through the app and share their AR experience with their classmates.

Project Area	Android, Augmented Reality, Educational, Mobile App, Web Application
Project Technology	Java, MySQL, Nodejs, REST, ARCore

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Project Title	Docker Einstein
Name	Ben Coleman
Email	ben.coleman5@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Stephen Blott

This project aims to recreate the Einstein programming script correction utility found within DCU with Docker technology. This will allow it to be used in other university's as a standalone containerized web application, and remove any external dependencies relating to DCU.

Project Area	Automation, Educational, Filesystems, Software Development, Web Application
Project Technology	CSS, Docker, HTML5, JavaScript, Nodejs, Python, ExpressJS

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Project Title	Design and Build – Smart Devices powered by a Fuel Cell Power Module (FCPM)
Name	Guylene Ornela Sockeng Nziko
Email	guylene.sockengnziko2@mail.dcu.ie
Programme	Biomedical Engineering – BMED4
Supervisor	James Carton

Fuel cells are an attractive source of power for a variety of applications. Fuel cells chemically convert a fuel, such as hydrogen, into electricity cleanly and efficiently producing a good by-product, water. This project focus on sensors and small connected devices, designing a coin-cell type Fuel cell Power Module (FCPM) to suit the power requirements of the devices (for example 2450 coin cell), build and test new concept PEM fuel cell materials, designs and manufacturing processes for coin cell type Fuel cell Power Module (FCPM), produce prototype cells for testing in a number of connected device. It will be tested in a blood sugar metre which operates with 3V voltage.

Project Area	Device Design, Energy Conservation, Internet of Things, Mechanical Design and Manufacture, Sensor Technology
Project Technology	Solidworks

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Project Title	Numerical and Experimental Implementation of a Low-Frequency Oscillator
Name	Azza AL Mayyasi
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Marissa Condon

The oscillators are one of the main block of today's technologies; e.g., telecommunication systems, computer industry. However, the very low-frequency oscillators are important in biomedical, biological and sensor applications. The project involve the numerical and experimental implementation of an effective and economical oscillator.

Project Area	Simulation
Project Technology	Matlab, Signals & Systems, Circuit, pSpice

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Project Title	SiteInfo
Name	Neil Lapuz
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Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

SiteInfo is a landmark recognition application. It aims to remove the manual process of searching for information about a landmark that is unfamiliar to the user. The app enables the user to take a picture of a landmark. With the use of a pre-trained Convolutional Neural Network, it identifies the picture for them and presents the user related facts about the landmark that they have taken a picture of in real-time.

Project Area	Android, Artificial Intelligence, Computer Vision, Mobile App, Software Development
Project Technology	Java, Python, REST, Flask, Google Cloud Platform

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Project Title	Design & Test of an Active Antenna for Use in the Low Frequency (LF) and Very Low Frequency (VLF) Ranges of the Electromagnetic Spectrum
Name	Taha Omer
Email	taha.omer2@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Patrick McNally

This project looks into the ability of VLF (very low frequency) waves to measure the health of the ionosphere, checking whether conditions are favourable or not to broadcast information.

The ionosphere is a portion of the atmosphere that facilitates the propagation of radio waves, thus allowing radio-based communication to take place. By comparing the strength of radio signals received during the day and at night one can confirm that the system is capable of determinig the health of the ionosphere.

Project Area	Simulation, Telecommunications
Project Technology	LTspice, Waveforms, SDRuno

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Project Title	Development of a Control System for a Free-Rotating Lab-on-a-Disc
Name	Nathan Cahill
Email	nathan.cahill7@mail.dcu.ie
Programme	Biomedical Engineering – BMED4
Supervisor	David Kinahan

This project investigated the possibility of a control system for a free rotating Lab-on-a-Disc. Electromagnetic levitation was attempted and a functional disc spin stand was assembled and tested with a custom microfluidic disc. The electromagnetic levitation showed promise, but was not sufficiently strong for the proposed system and so the concept was tested with smaller objects.

Project Area	Biomedical Engineering, Device Design, Mechanical Design and Manufacture
Project Technology	C/C++, Matlab, Solidworks

205

Project Title	Development of a Google Cardboard based medical image viewer
Name	Radwan Duadu
Email	radwan.duadu2@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Robert Sadleir

The project develops a three-dimensional medical viewers for handheld android devices. The viewer enables the user the ability to see medical image data as a three-dimensional model, enabling users to more easily understand and interact with the data acquired.

The project creates an immersive three-dimensional medical image viewer. The medical models will be generated using real medical data acquired from CT or MRI scans.

The project investigates the use of different platforms to develop the android medical viewer being Unity and Android Studio IDE.

Project Area	3-D Modelling, Android, Mobile App, Model View Controller, Motion Analysis, Software Development, Virtual Reality
Project Technology	C#, Java, OpenGL, OpenGL ES

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Project Title	Fast Deep Video Shot Boundary Detection
Name	Ameen Oladehinde-Bello
Email	ameen.oladehindebello2@mail.dcu.ie
Programme	Electronic and Computer Engineering – ECE4
Supervisor	Kevin McGuinness

Deep Learning based video shot boundary detector. Used to detect the frames in video that are part of hard cuts, crop cuts, dissolves, fades and wipes.

Project Area	Artificial Intelligence
Project Technology	Python

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Project Title	Accessible Scrabble App
Name	Peter Conroy
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Programme	Computer Applications – CASE4
Supervisor	Donal Fitzpatrick

The goal of this project is to produce a fully accessible online Scrabble app for iOS. The ideal results are that blind or visually impaired users can play the game against sighted players and/or an AI unassisted.

Project Area	Artificial Intelligence, Gaming, Mobile App, Software Development
Project Technology	Swift

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Project Title	Food Identification Android Application
Name	Hasan Fakhra
Email	hasan.fakhra2@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

This project is an Android Application that allows its users to take photos of different types of foods, where the food image will then be processed through a pre-trained Convolutional Neural Network(CNN). The CNN will identify the type of food and relay interesting information about the food to the user. This will allow users to instantly get information about their food.

Project Area	Android, Artificial Intelligence, Computer Vision, Mobile App, Software Development
Project Technology	Java, Python, XML

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Project Title	Croke Park Turf Traction Device
Name	Scott Shelly
Email	scott.shelly3@mail.dcu.ie
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Brian Corcoran

The main aim of this project was to instrument a device created last year by a student in DCU. The device was designed to measure rotational resistance in playing fields. Croke Park requested a device that would be able to measure the turfs rotational resistance while a 30Kg load is being applied to the device. The device last year used springs to attempt to reduce the user's bodyweight to the desired 30Kg. The goal was to instrument the device to be able to measure the weight being applied to the football boot.

The device was instrumented successfully using a load cell, after testing was completed it can be said with confidence that the design last year does not limit the load being applied to the boot to 30Kg.

Project Area	Arduino, Circuit Modeling, Device Design
Project Technology	Solidworks

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Project Title	Design and Build a Water Test Facility for Problem-Based Learning Assignments
Name	Jennifer Harrington
Email	jenny.harrington24@mail.dcu.ie
Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Yan Delaure

In this project, a water test facility was designed and built that would be used for problem-based learning assignments undertaken by students in the fluid mechanics module. The test facility has also been used to test the suitability of fluid mechanics theory for predicting the dynamic behaviour of a floating vessel.

Project Area	Fluid Mechanics, Mechanical Design and Manufacture, Water Treatment
Project Technology	Excel/VB, Solidworks

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Project Title	InterAppt
Name	Niall Flattery
Email	niall.flattery2@mail.dcu.ie
Name	John Russell
Email	john.russell26@mail.dcu.ie
Programme	Enterprise Computing – EC4
Supervisor	Markus Helfert

InterAppt is an Android application that will act as a platform for friends and strangers alike to challenge and compete with each other in a fun and competitive way. InterAppt will consist of a variety of personalized games which will allow the users to compete, connect, and form relationships through gamification. The aim of InterAppt is to get people interacting in work and social environments and give them a chance to get to know new people.

Project Area	Android, Databases, Gaming, Mobile App
Project Technology	Java, XML

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Project Title	Car Damage Analysis
Name	David Weir
Email	david.weir3@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Suzanne Little

Car Damage analysis is a project which aims to streamline the returns process in car rental companies at the moment.

Images of cars are captured by an enclosure surrounding the car, these images are then analysed using machine learning algorithms to check whether the car is damaged or not. Damaged cars are displayed to employees through a web application.

This project aids in increasing the productivity of employees in car rental companies by reducing the amount of time taken to analyse a car for damages.

Project Area	Artificial Intelligence, Automation, Computer Vision, Image/ Video Processing, Web Application
Project Technology	CSS, Java, MySQL, Python, Spring, Flask, OpenCV, Angular7, typescript

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Project Title	SDN – Stocks Data & News Analysis
Name	Mikhail Arkhangelskiy
Email	mikhail.arkhangelskiy2@mail.dcu.ie
Programme	Computer Applications – CASE4
Supervisor	Yvette Graham

SDN is a web application for the financial market analysis of the information technology stocks. The application aims to provide an informative performance analysis, to help users detect market inefficiencies and perform educated predictions. To detect market trends the application performs the sentiment analysis of the financial news. The sentiment analysis results are used to perform technical analysis with the help of an artificial recurrent neural network (RNN) and a number of machine learning techniques. The application also provides essential financial data and fresh financial news.

Project Area	Artificial Intelligence, Data Analytics, Data Mining, Natural Language Processing, Software Development, Web Application
Project Technology	CSS, HTML5, JQuery, JavaScript, Python, SQLite, Django, Keras, PostgreSQL, JSON

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Project Title	NFC Authentication for Locking Mechanisms
Name	Paul Darcy
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Programme	Computer Applications – CASE4
Supervisor	Marija Bezbradica

The system comprises of an Android application which uses NFC to interact with locking mechanisms via an Arduino micro controller. This is a system which could be used in any situation where a physical item (e.g. key card) is needed to grant authorised users access to an area/safe/door etc. in a building. As these physical items can often be lost easily, having the same functionality contained within the user's Android smartphone is much more convenient.

Project Area	Android, Arduino, Circuit Modeling, Mobile App
Project Technology	C/C++, Java

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Project Title	Underwater Sensing Platform
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Yan Delaure

Underwater sensing platforms has many aspects design ranging from fluid dynamics to mechanical structure. This project focuses in on the mechanical design of the chassis while still taking a look at some fluid dynamics to estimate the drag forces acting on the chassis. Solidworks was used to create a 3D working model of the rig before it was build. The solidworks programme was also used to simulate fluid flow around the chassis. The device was then build and tested using six different types of propeller to see the effect of change diameter size, number of blade and pitch of the propeller.

Project Area	3-D Modelling, Fluid Mechanics, Mechanical Design and Manufacture, Optical Communications, Power Electronics, Simulation, Wireless Technology
Project Technology	Solidworks

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Project Title	Passport Application System
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Programme	Computer Applications – CASE4
Supervisor	Alistair Sutherland

This Web application is designed to be an easy to use passport application service. The user is required to enter the appropriate information as well as an image which is checked to be of passport quality using an LBP Cascade Classifier. Included within the web app is a chat-bot which has been trained to answer any questions the user may have about the application process.

Project Area	Image/Video Processing, Software Development, Web Application
Project Technology	AngularJS, Java, REST, SQLite, Spring MVC, OpenCV, Dialogflow

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Project Title	Simulation of Vertical Cavity Surface Emitting Laser (VCSEL)
Name	Peadar Greene
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Pascal Landais

In this project the dynamics of semiconductor LASERs are investigated through the analysis of the rate equations for the carrier and photon densities. The project applies knowledge from research into the area of LASER technology to develop a simulation of a VCSEL. The simulation of a VCSEL with radial current distribution is of particular interest to this project.

Project Area	Simulation
Project Technology	Matlab

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Project Title	A First Programming Language
Name	Christopher Clarke
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Programme	Computer Applications – CASE4
Supervisor	David Sinclair

Programming is an important discipline across the sectors of computer science, engineering and communication technology. However, learning to program can be an arduous task that requires both computing knowledge and higher order thinking skills. This project investigates the key characteristics of an ideal programming language for beginners. In order to evaluate these characteristics a language was designed with beginners in mind and a compiler for the language was built to test and determine its efficacy.

Project Area	Educational, Software Development
Project Technology	Java, Javacc & LLVM

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Project Title	TravSafe
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Programme	Enterprise Computing – EC4
Supervisor	Jane Kernan

TravSafe is a mobile application, which is an Irish travel safety system app aimed at travelers to give them assistance when they travel to places within Ireland. The app aims to help the user find a safe area and also to update them on areas that are unsafe. The user can enter a place in Ireland where they would like to visit. This app incorporates live updates, relevant suggestions, reviews and great tips for the traveler.

Project Area	Android, Data Analytics, GPS/GIS, Mobile App
Project Technology	CSS, HTML5, JavaScript

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Project Title	Javascript Operating System
Name	Marin Bivol
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Programme	Computer Applications – CASE4
Supervisor	Charlie Daly

This project aims to build an Operating system environment which minimises the focus on the technology struggles themselves and allows developers to focus on the logic of the programs they are writing with an extensive Operating System API that makes building applications easy.

Project Area	Automation, Cloud Computing, Cryptography, Databases, Educational, Embedded Systems, Filesystems, Graphics, Image/ Video Processing, Network Applications, Operating Systems Development, Security, Software Development
Project Technology	C/C++, JavaScript, MySQL, Nodejs, PHP

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Project Title	Development of a Twist Friction Test Apparatus
Name	Abdulaziz Alhokair
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Programme	Manufacturing with Business Engineering – MWB4
Supervisor	Bryan MacDonald

A Twist Friction Test is required to be designed and manufactured in order to test the Coefficient of Friction in metal forming. The test involves applying a normal load to a metal surface and turning a tool against the surface at varying friction forces to measure the coefficient of friction.

Calibration test was taken and a code generated to read the loads applied from a pneumatic cylinder and convert voltage to load (N) in order to measure the coefficient of friction. Initial tests were taken to validate the efficiency of the test rig.

Project Area	Mechanical Design and Manufacture

222

Project Title	Handwriting to Text Converter
Name	Conor Hanlon
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Programme	Computer Applications – CASE4
Supervisor	Ray Walshe

This project is aimed at students who prefer writing notes and essays by hand, but would like a digital copy for safekeeping. Users sign into the web application via their Gmail account. Once signed in, they can upload image(s), which are sent to the Flask server. Individual words are found in the image(s) using OpenCV. Each word is then identified via the Tensorflow model. The model is trained on the IAM handwriting dataset and consists of convolutional layers, recurrent layers and a CTC decoder.

Users can then save the resulting text as a document in their Google Drive, as well as downloading a local file. At any later stage, users can grant specific permissions to their contacts on a created Google Doc via the web application.

Project Area	Artificial Intelligence, Computer Vision, Image/Video Processing, Optical Character Recognition, Web Application
Project Technology	CSS, MySQL, Python, OpenCV, Tensorflow, Flask, EmberJS, Handlebars, Google APIs

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Project Title	Simulation of Knee Meniscus Mechanics
Name	Caoilfhionn O'Driscoll
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Programme	Biomedical Engineering – BMED4
Supervisor	Garrett McGuinness

This project simulated and observed the behaviour of the knee meniscus in conjunction with a comparison of two finite element analysis software packages. An idealised model of the knee joint was used to enable the observation of the knee meniscus mechanics and how the cartilaginous tissue reacts to different stimuli. The capabilities and requirements of biomechanical specific FEA software and general FEA software were explored in order to obtain accurate solutions to biomechanical simulations.

Project Area	Biomedical Engineering, Finite Element Analysis, Simulation
Project Technology	ANSYS Workbench, Excel/VB

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Project Title	The Development of a Tough, Adhesive and Injectable Calcium Phosphate Cement
Name	Shane Rice
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Programme	Biomedical Engineering – BMED4
Supervisor	Owen Clarkin

Calcium phosphate cements (CPCs) are very promising materials for orthopaedic procedures due to their excellent biocompatibility, biodegradability and injectability properties. However, CPCs need to be further developed due to their brittle nature. This project investigates the handling and mechanical properties of a trisodium citrate modified CPC. The results from this project are analysed and compared with properties of commercially available CPCs and with cortical and cancellous bone.

Project Area	Advanced Material Engineering, Biomedical Engineering, Mechanical Design and Manufacture
Project Technology	Solidworks

225

Project Title	Fake News Detector
Name	David Talan
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Programme	Computer Applications – CASE4
Supervisor	Yvette Graham

This project aims to help users identify if the article they are reading is a potential source of fake news. The user simply puts in the article link and the system extracts the contents and analyses it to determines if the content is unreliable. This web app uses Text Classification with Machine Learning and is built using Python on a Flask framework.

Project Area	Data Mining, Web Application
Project Technology	HTML5, JavaScript, Python, REST, SQLite, Machine Learning, Flask, scikit-learn

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Project Title	Demonstration Rig for Throughfeed Centreless Grinding
Name	Conor Lynch
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Programme	Mechanical and Manufacturing Engineering – CAM4
Supervisor	Tamas Szecsi

The aim of this project was to design and construct a demonstration rig of the throughfeed centreless grinding manufacturing process. Throughfeed centreless grinding is a process used to produce cylindrical products using a grinding wheel and is driven using a rubberised "regulating" wheel.

Project Area	Mechanical Design and Manufacture
Project Technology	Solidworks

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Project Title	Content Selection With 3D Air Mouse
Name	Eoin McHugh
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Martin Collier

This project aims to design and create an interface device that can sense motion in three dimensions. It can be used to select content from a three dimensional library that was also created as part of the project.

Project Area	Device Design, Wireless Technology
Project Technology	C/C++

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Project Title	Automatic Music Transcription WebApp
Name	Patrick Ferry
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Programme	Computer Applications – CASE4
Supervisor	Donal Fitzpatrick

This project analyses audio files and extracts the main melody, features, chords and percussion and creates a midi file containing the information.

Project Area	Artificial Intelligence, Digital Signal Processing, Multimedia, Web Application
Project Technology	Digital Signal Processing, Python

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Project Title	Airport Assistant
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Programme	Computer Applications – CASE4
Supervisor	Ray Walshe

Airport Assistant is an Android application to help users, primarily those who suffer from anxiety, with passing through an airport. Airport Assistant brings users through the process step by step, from their door to their accommodation, completing checks and providing important information along the way.

The primary feature of the application is the hand luggage measurement functionality which has been developed using Augmented Reality. Users are required only to input their flight number which allows the application to scrape all relevant information.

A number of Google APIs have been integrated throughout the application to direct users throughout the process. Similarly, features such as security tips and walk times to gates will help make the entire process less stressful.

Project Area	Android, Augmented Reality, Mobile App, Software Development
Project Technology	Java, NoSQL, XML, Firebase, Jsoup, Google ARCore, Google APIs

230

Project Title	A PYNQ logic analyser and pattern generator
Name	Mark Kiernan
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Programme	Electronic and Computer Engineering – ECE4
Supervisor	Derek Molloy

AN investigation into the logictools overlay (describing the hardware setting for an fpga) for the Digilent Pynq-Z1 board.

This board containing the Zynq 7020 All Programmable System on Chip contains an Arm core processor (The Process System) which recieves an overlay to configure the program logic, the fpga element of the Zynq.

The logictools overlay file was modified in an atempt to allow for the driving of a 64 x 32 led matrix, and looks to call the on board pdm microphone to write values to an Axi-port.

The software used for this project was Vivado High Level Synthesis for exporting c/c++ code as an RTL IP, and Vivado Hlx editions using vhdl for custom IP.

Project Area	Content Management System, Control Systems, Information Retrieval, Software Development
Project Technology	C/C++, Python, VHDL

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Project Title	Entua
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Programme	Computational Problem Solving and Software Development – CPSSD4
Supervisor	Jennifer Foster

Entua is an application designed to create customized home automation sequences using a variety of devices, with a focus towards giving the elderly a way of extending the time they can continue to live within their own homes. It uses a combination of open source smart plugs, as well as proximity beacons to track a user's movement around their home. Using machine learning it analyses a user's daily routines and suggests ways to automate their most common behavioural patterns.

Project Area	Android, Automation, Control Systems, Data Analytics, Databases, Internet of Things, Mobile App, RaspberryPi, Sensor Data, Sensor Technology, Software Development, Statistical Analysis, Wearable_Technology, Wireless Technology
Project Technology	CSS, Go, JavaScript, Python, REST, AWS Services, React Native