



Faculty of Engineering and Computing Final Year Projects **Expo 2013**

SCHOOLS OF COMPUTING, ELECTRONIC ENGINEERING AND
MECHANICAL AND MANUFACTURING ENGINEERING

Final Year Projects Class of 2013

Contents

Welcome	Page 2
Information for Industry	
Computing/Electronic Engineering/Mechanical and Manufacturing Engineering	Page 4
The School of Computing	Page 7
The School of Electronic Engineering	Page 8
The School of Mechanical and Manufacturing Engineering	Page 10
Message from our Sponsor	Page 13
Project Areas/Technology Categories	Page 15
Operating Systems/Programmes	Page 16
Project Index	Page 17
Projects 1-106	Page 20
Companies Sponsoring Prizes	Page 126

Welcome

Welcome to the Final Year Projects Display by us, the graduating classes of 2013 from the Schools of Computing, Electronic Engineering, and Mechanical and Manufacturing Engineering. Our details and respective projects can be found within this booklet.

The projects demonstrate how we put into practice the knowledge gained during our time here in DCU. They cover many areas within computing, electronic engineering and mechanical and manufacturing engineering and are inspired by time spent on *INTRA* (work placement), staff research interests, collaboration with companies and original concepts. The projects clearly demonstrate our hard work and innovation.

We would like to extend our thanks to lecturers, supervisors and the support staff for all their help and assistance throughout our time here. Without their support we would not be here today.

We would also like to thank the main sponsor of this event, SAP and those companies sponsoring prizes. Through their sponsorship they are showing a belief in the ability of Irish graduates and a commitment to the future of Irish industry.

And last, but not least, we thank you, the visitors and the companies you represent, for showing an interest in our work – we hope you enjoy it!

Graduating Class 2013

Computing, Electronic Engineering and Mechanical and Manufacturing Engineering
Faculty of Engineering & Computing



On behalf of the Faculty of Engineering and Computing, we would like to welcome you all to this year's Final Year Projects Display of the Class of 2013.

Today, we have the opportunity to recognise and celebrate the work of these students. We all go through many stages in our careers and lives, and today, for these students, marks the transition from one of those stages to the next.

With the ICT and Smart Manufacturing industries growing and changing at a rapid pace, especially in this country, we believe that the range of Final Year Projects on display today reflect this. Indeed, many of the projects displayed represent products with commercial potential.

To the students, congratulations and well done! Some of you will now go on to careers within the engineering, IT or other sectors of the Irish economy; others will continue your formal education either here in DCU or elsewhere; some may travel across the world; and some may even choose a career as far from technology as possible. But we hope that all of you will look back with fondness at your time here at DCU, and also – and perhaps more importantly – at the friendships you have made here.

We here in the Faculty always enjoy hearing how former students are developing their careers, and we all encourage you to enjoy your career, but also to stay in touch!

To our guests, thank you for taking the time to join us here today. We hope that you enjoy your visit and are impressed with the depth and breadth of the work that the students are presenting. Impressive though they are, these projects represent only a small part of the work that the students have carried out over the last few years.

DCU is well-known for its strong relationship with industry, and we hope the students you meet here today will go on to have a strong impact on the various industries and sectors you represent.

The staff and students of the Faculty look forward to meeting you and sharing these projects with you, and we hope you enjoy your visit to the Faculty and DCU.

Prof. Barry McMullin

Dean, Faculty of Engineering and Computing

Information for Industry – Computing/Electronic Engineering/Mechanical and Manufacturing Engineering

Taking Students on INTRA Work Placement

Relevant work experience through DCU's INTRA (INtegrated TRAIning) programme is a central feature of education at DCU and an integral part of most of the University's undergraduate degree programmes. Students from all of our programmes are required to complete a six month INTRA placement at the end of third year, from April to September inclusive. In many cases, students return to work with their INTRA employers after they have completed their undergraduate studies.

Why Hire a Student?

Every year, employers in Ireland and overseas hire more than 800 students from DCU for an INTRA placement. Ranging in size from the largest multinational, to the sole trader start up, these employers are convinced of the merits of choosing DCU students and come back to INTRA year after year. INTRA provides the following opportunities for an employer:

- Access to a supply of highly motivated young people who have proven that they can make a real contribution
- An opportunity to evaluate and train possible future employees
- Frees existing staff from time-consuming but essential tasks
- Allows relief or assistance during seasonal peak work loads
- Permits new projects to be undertaken
- Develops existing staff by providing mentoring opportunities
- Raises awareness of your company and products/services on campus
- Provides an ideal opportunity for employers and academics to establish long-term relationships and the potential for working together on projects
- Provides an opportunity for involvement in the development of graduates with the required key skills essential to the Irish economy
- Helps to promote and reinforce a lifelong learning culture within an organisation through the establishment of strong links with a third level institution

Employing Graduates from the School of Computing/Electronic Engineering/ Mechanical and Manufacturing Engineering

DCU's Careers Service offers a comprehensive employment service for companies wishing to recruit graduates from our Engineering programmes as well as providing a crucial link to students from a range of other disciplines including Computing, Business, Humanities, Science and Education.

As an employer, you have the opportunity to reach excellent DCU students and graduates through availing of the following:

- Advertising vacancies online, which are seen by up to 1,000 students and graduates per week. Check out: www.dcu.ie/careers
- Participating in an annual Employer Recruitment Fair, which allows companies to meet up to 2,000 talented DCU students and graduates in October every year as well as students from a range of other Irish Universities and Third Level Colleges
- Visiting Employer Programme: To recruit competent, highly-educated DCU students and graduates from relevant courses, you may wish to make presentations on campus or even conduct interviews here. The Careers Service runs a Visiting Employers Program and provides opportunities for companies to come on campus and advertise their vacancies and meet plenty of enthusiastic DCU students
- Opportunity to advertise your vacancies to a range of DCU Alumni in conjunction with DCU Careers Service and DCU Alumni
- Raise your company profile on campus: DCU Careers Service can email company information on vacancies of relevance to DCU students and graduates directly into the mail accounts of the appropriate students

To learn more about how DCU Careers Service can assist you in recruiting high calibre graduates, visit www.dcu.ie/careers or contact Contact Yvonne McLoughlin, Head of Careers, email: Yvonne.mcloughlin@dcu.ie.

Collaboration on Undergraduate Projects

An interesting way in which companies can raise their profile among graduating students is by putting forward projects which students can work on as part of their course. Companies are also invited to provide in-house support for projects undertaken by students, or to provide financial support for projects assigned to students. There are several benefits to the company, not least of which is the opportunity to get valuable research undertaken that might not be possible within the company due to company commitments. If you are interested in finding out more about possible collaboration with students in our Schools here are the contact details:

The School of Computing contact Patricia Lacey at Tel: +353 (01) 7008980 or
Email: patricia.lacey@computing.dcu.ie

The School of Electronic Engineering, contact Breda McManus at Tel: +353 (0)1 7005131 or
Email: mcmanusb@eeng.dcu.ie

The School of Mechanical and Manufacturing Engineering contact Suzanne Dockery at
Tel: +353 (01) 7005104 suzanne.dockery@dcu.ie

The School of Computing

Student Knowledge and Aptitudes

The objective of the *B.Sc. in Computer Applications* and *B.Sc. in Enterprise Computing* degrees is to produce qualified computing professionals who:

- Have a capacity to adapt, change and keep abreast of new developments
- Have a sound understanding of computer hardware, software engineering and computer programming
- Have a sound understanding of the techniques of systems analysis and design and of quantitative methods
- Are thoroughly familiar with the use of computer technology in various administrative systems, in manufacturing systems and in management decision making
- Have a sufficient understanding of the ideas underlying areas such as artificial intelligence, robotics and computer-integrated manufacturing

Career Possibilities

Students from the *B.Sc. in Computer Applications* and the *B.Sc. in Enterprise Computing* have/will have the ability to work in many computing roles, some of which are listed below:

The *B.Sc. in Computer Applications* allows graduates to prepare for a career in software development. Graduates are able to design and implement software solutions. Graduates have learned to use techniques from disciplines, such as software engineering, databases, multimedia, computer graphics, artificial intelligence and computer security, to write computer programmes that can be used in real world applications in computer games, financial services and mobile phones. The *B.Sc. in Computer Applications* has a strong practical focus. Graduates have learned how to apply knowledge gained

in the course and they will have developed key practical skills. The degree incorporates a six month work placement (INTRA) to provide graduates with a greater in-depth understanding of how software is used in the modern commercial world.

The *B.Sc. in Enterprise Computing* provides the foundation for a career in information technology for the modern business enterprise. This degree educates high-end IT professionals, with practical skills in information systems, web technologies and IT systems networking management.

It provides an understanding of how software engineers develop software solutions to address real world computing problems and how computing technology can be used to allow people to work together and give companies a competitive edge in the marketplace. Graduates have learned how to use and manage information technology and systems to improve and design the way they do business.

The School of Electronic Engineering

Student Knowledge and Aptitudes

The objective of our taught BEng/MEng programmes in Electronic Engineering is to produce qualified engineering professionals who will:

- Have a sufficient understanding of basic sciences and mathematics appropriate to developing their careers as professional engineers
- Be competent in electronic circuits, systems and software design
- Have a detailed knowledge of the most important sub-disciplines related to their programme of study
- Have a capacity to model and analyse the dynamics of a range of technological systems
- Understand the overall requirements of product design
- Understand the structure and organisation of industry and have relevant industrial experience as a support to attaining the previous objectives
- Be capable of approaching problem-solving in a creative and innovative way
- Have developed a range of communication skills – oral, written and visual
- Have sufficient personal and inter-personal skills to enable them to be effective contributors to technology-based industrial development
- Be critically aware of the impact of engineering on society
- Embody the professional qualities of discipline, discrimination and application
- Be aware of the need to update or deepen their knowledge and skills and have an ability to do so through research, academic or professional training

Work Areas

Students from our taught BEng/MEng Engineering programmes have the ability to work in a range of different engineering areas, some of which are listed below.

BEng/MEng in Electronic Engineering

- Hardware design and development of embedded systems
- Development of optical communications systems
- Semiconductor and nanoelectronic materials and device manufacturing
- ASIC design/testing
- Development of power supplies and converters for industrial applications
- Design, verification and implementation of analog/digital SoC solutions
- Building real time distributed system infrastructure and applications software
- Development of computer and machine vision solutions
- Analysis, development, refinement and optimisation of DSP algorithms

BEng/MEng in Information and Communications Engineering

- Network design and operation for public telecom operators
- Private network design and operation for utility companies or Government organisations
- Design of networks for financial services applications
- System design, concentrating on hardware, software or both
- Technical marketing, including network design
- Telecommunications research organisations
- Telecommunications consultants
- Telecommunications software development

BEng/MEng in Digital Media Engineering

- Systems development for diverse database-backed web services
- Hardware design of Digital Media Devices (phones, PDAs, mobile robots etc.)
- Service creation for tomorrow's mobile networks
- Development of virtual reality, tele-presence and visualisation applications
- Web applications and interfaces for delivery of content to diverse environments
- Systems architecture design for e-commerce/B2B applications
- Designing automated computer vision systems for medical imaging and visual inspection
- Developing archival or browsing systems for libraries of multimedia content

BEng in Mechatronic Engineering (in collaboration with the School of Mechanical and Manufacturing Engineering)

See page 11.

The School of Mechanical and Manufacturing Engineering

Student Knowledge and Aptitudes

The objective of our taught BEng/MEng programmes in Mechanical and Manufacturing Engineering disciplines is to produce qualified engineering professionals who will:

- Have a sufficient understanding of basic sciences and mathematics appropriate to developing their careers as professional engineers
- Be competent in design, professional development, dynamics and control, solid mechanics, fluid mechanics, materials and manufacturing, sustainable manufacturing systems, biomedical engineering and business
- Have a detailed knowledge of the most important sub-disciplines related to their programme of study
- Have a capacity to model and analyse the dynamics of a range of technological systems
- Understand the overall requirements of product design
- Understand the structure and organisation of industry and have relevant industrial experience as a support to attaining the previous objectives
- Be capable of approaching problem-solving in a creative and innovative way
- Have developed a range of communication skills – oral, written and visual
- Have sufficient personal and inter-personal skills to enable them to be effective contributors to technology-based industrial development
- Be critically aware of the impact of engineering on society
- Embody the professional qualities of discipline, discrimination and application
- Be aware of the need to update or deepen their knowledge and skills and have an ability to do so through research, academic or professional training

Work Areas

Students from our taught BEng/MEng Engineering programmes have the ability to work in a range of different engineering areas, some of which are listed below.

BEng/MEng in Mechanical and Manufacturing Engineering

- Design of engineering materials, processes and components, and related developing technologies
- Create models (CAD or otherwise), deriving appropriate equations and specifying boundary conditions and underlying assumptions and limitations.
- Use of appropriate mathematical methods for application to new and ill-defined mechanical and manufacturing engineering problems

- Investigate the performance of systems and components through the use of analytical methods and modelling techniques, and develop software tools including numerical techniques to solve engineering problems
- Product design and development of mechanical systems
- Sustainability of manufacturing processes
- Project management skills

BEng/MEng in Biomedical Engineering

- Modelling and design, production technology, biomaterial science and the requirements for regulatory compliance
- Understanding of Anatomy and physiology, and biomechanics, image processing, sensors, statistics, and the requirements for regulatory compliance
- Evaluation of the latest technology in the Bio Engineering field of interest and use of the appropriate technologies where desired
- Development of computer-based design to mimic bio engineering problems
- Application of ethical standards and duty-of-care towards the end-users of biomedical products

BEng in Manufacturing Engineering with Business Studies

- Design, manufacturing and marketing of engineering products
- Management of manufacturing processes and systems coupled with the awareness of business opportunities.
- Synergistic approach to solving engineering challenges (designing, manufacturing, engineering products and managing manufacturing processes)
- Application of appropriate business skills (marketing, plant operation, project management and business management) within the broad discipline of manufacturing engineering.

BEng in Mechatronic Engineering (in collaboration with the School of Electronic Engineering)

- An understanding of the principles of fundamental sciences, engineering sciences, technology and mathematics.
- An understanding that a few powerful unifying principles govern the function of many different mechatronic systems.
- A thorough knowledge of modelling and design, system integration, actuators and sensors, intelligent systems, robotics, computer integrated manufacturing and automation, motion control and image processing.
- A capacity to take a problem and redefine it in an engineering context; in the course of designing a system, component or process to meet specified needs.
- Proficiency in the design and running of experiments and the analysis and interpretation of data.

- A knowledge of the resources required to put in place a solution to an engineering problem taking into account the practical constraints from a technical, human resources and financial perspective.
- The capability of efficient project management maximising use of available resources to produce a successful outcome in a pre-defined time frame.
- An ability to demonstrate professional conduct in diverse, complex and unfamiliar situations at all times being aware of the implications of their work.
- An understanding of the need for high ethical standards in the practice of engineering, including the responsibilities of the engineering profession towards people and the environment.
- An understanding that sustainability, recycling and product life cycle must be considered at the design stage.
- An ability to work as part of a multidisciplinary team using their hybrid mechatronic training to integrate technologies in a synergistic manner.
- An awareness of the need to update or deepen their knowledge/skill set and an ability to conduct further training through research, academic or professional training.
- An ability to independently acquire further expertise and to ensure that the use of this expertise complies with the ethical standards of the profession.
- An understanding of the importance of the engineer's role in society and the need to communicate effectively within this environment and to other engineers.
- An ability to embrace all modern media for the purposes of communication, with a strong emphasis on visual computer aided design methods.
- An understanding of the need for the highest ethical standards of practice.
- An understanding that, as part of a team, it is important to consider the opinions of other members and to put in place a plan/design/process that is cognisant of these opinions.

Full details of the DCU INTRA programme are available at: www.dcu.ie/intra.

Message from our Sponsor

SAP as ever, is delighted to be here again to celebrate this final step at the end of your undergraduate journey. I'd like to congratulate each of you on this significant life achievement and wish you well on the next phase of your career.

Last year I spoke about the fact that technology has been one of the positive notes in a difficult global economic climate and thankfully that continues to be the case. SAP is now enabling more than 232,000 customers to operate, adapt continuously, and grow sustainably.

The world of IT is moving ever closer to the business and in the last 12 months we've seen many customers dramatically change what is possible for their business processes using our new in-memory technology, HANA. Businesses are going mobile and taking to the cloud in greater and greater numbers opening up exciting new opportunities.

I hope the skills and competencies you have learned here in DCU will serve you well on the road ahead and that our paths cross again in the future.

Liam Ryan

*Managing Director
SAP Ireland*

Tawanda, SAP
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Project Areas:

Technology Categories:

	Project Number:
Mechanical Design and Build Project:	31
Data Analytics:	93
Statistical Analysis:	99
Manufacturing Engineering:	106
Wireless Technology:	103
Gaming:	44 94
Automotive Technology:	85
3-D Modelling:	72
Re-routing Food Waste Service:	39
Advance Material Engineering:	6
Mechatronic Systems:	17
Security:	8 63 66
Thermodynamic Performance and Energy Usage:	70
Power Electronics:	53
Circuit Modeling:	35
GPS/GIS:	49
Zero-Player Game:	82
Multimedia:	1
Mechanical Design:	7
Network Applications:	87 92
Tissue Engineering:	19
Embedded Systems:	1
Renewable Energy Technology:	41
Optimisation of Thermodynamic Systems:	4
Vehicle Control:	5
Mobile App:	10 104 11 15 2 25 26 37 40 45 46 47 52 54 56 67 74 79 83 88 90 91 97
Image/Video Processing:	16 18 24
Renewable Energy:	33
Artificial Intelligence:	62
Modelling of Production Systems:	3 29
Motion Analysis:	9
Digital Signal Processing:	89
Educational:	42
Finite Element Analysis:	61
Web Application:	100 102 12 13 14 22 23 27 32 48 55 57 64 73 77 84 96
Information Retrieval:	101
Filesystems:	65
Software Development:	34 43 81 86
Mechanical Design and Microcontroller:	38
Android Development:	60
Control systems and system modelling:	20
Redesign:	69
E-Commerce:	68 75 8
Social Networking:	95
Design and Manufacture:	8
Databases:	59
Sensor Technology:	50 51 71 76 78 98
Biomedical engineering:	58
Standardisation in Engineering:	105
Data Mining:	36

	Project Number:
Eclipse:	97
Matlab:	17 20 35 5 53 76
Power Electronics:	33
Raspberry Pi:	16
Java:	10 101 102 104 11 14 15 19 2 23 26 37 40 43 45 46 47 52 54 56 60 62 66 67 74 79 8 83 88 89 90 91 95 96 98
None:	39
Node.js:	12
C#:	25 27 78
OpenCV:	18
JSP/Servlets:	48 86
Solidworks:	69 7
PLC Control/Programming:	31
Ultrasound:	58
ExtendSIM 8:	29 3
C/C++:	21 24 28 38 44 51 8 82 87
Objective-C:	49 68
SQL:	22 59
Python:	1 100 13 36 63 65 92
PHP:	32 57 64 84
PHP, MySQL:	73

Operating Systems:

	Project Number:
None:	104 106 18 20 22 28 29 30 31 33 34 38 39 4 5 51 53 58 59 61 69 71 85 86 99
Windows:	105 17 19 21 24 25 3 35 42 44 6 7 70 72 78 81 9 94 96
Arduino:	41 8
Android:	10 11 15 2 37 40 45 46 47 52 54 56 60 67 74 79 83 88 89 90 93 95 97 98
Multi-platform:	100 101 102 12 13 14 23 26 27 32 43 48 57 62 64 66 68 73 75 77 8 82 84 91
Mac_iOS:	49
Unix/Linux:	1 103 16 36 55 63 65 87 92

Programmes:

	Project Number:
Biomedical Engineering:	19 30 54 58 61 69 72
Info and Communications Engineering:	103 52 86 99
Software Engineering:	1 10 100 101 102 11 12 13 14 15 2 23 24 25 26 27 32 36 40 43 44 46 47 48 49 59 62 64 65 66 67 74 77 82 87 89 92 94 96 97 98
Manufacturing Engineering and Business:	29 3
Mechatronic Engineering:	106 17 20 21 38 41 5 53 76 78 8 81 85
Enterprise Computing:	104 22 37 39 51 55 56 57 60 68 71 73 75 79 8 83 84 88 91 93 95
Digital Media Engineering:	16 63 90
Mechanical and Manufacturing Engineering:	105 18 31 34 4 42 45 50 6 7 70 9
Electronic Engineering:	28 33 35

Project Index – Computing/Electronic Engineering/ Mechanical and Manufacturing Engineering

No.	Project Title	Student Name
1:	PyPlay:	Gautam Wadhwa
2:	Network Texas Hold'Em Poker:	Brian Murphy
3:	Modelling of Plant Configuration for Optimisation of Multi-Product Flexible Manufacturing Facilities:	Ken Bourke
4:	A Thermoeconomics Approach to Water Treatment Optimisation:	Ross Norman
5:	Control of a novel three wheeled electric vehicle:	Andrew Merrigan
6:	Erosion-Corrosion Testing Rig:	Abdul Ali Hassan
7:	Implementation of a 532nm Laser for the creation of carbon nanoparticles:	Brendan Flanagan
8:	Sensor and Actuator System Design for a Light-Aircraft Avionics and Autopilot System:	Robert Walsh
9:	Motion Analysis of a Three-Wheeled Vehicle:	Kevin Tynan
10:	Cloud-4-Camera:	Steven Grendon
11:	CloudSync:	Brendan Gerard Kelly
12:	Commando - Keyword-based Web Navigation:	Shane Maguire
13:	Scheduling Application:	Mary Dennehy
14:	Virtual Dropbox:	Daniel Grant
15:	Learning2Write - An application to teach children how to write:	James Darcy
16:	A Low-cost Low-power Visual Sensing Platform:	Mark Marsden
17:	NXT Ballbot: Self-Balancing Robot on a Ball:	Andrew Kiernan
18:	Spillage Sensing Using a Video Camera:	David Connaughton
19:	Development of an electrospun scaffold for Tissue Engineered Blood Vessels:	Ken Lynch
20:	Ballbot control:	Colm Bowden
21:	An ARM'ed Inverted Pendulum:	Ross Byrne
22:	MediFind: An online medical booking system:	Seán Glennon, Thomas Whelehan
23:	TouchSwarm:	Killian Carroll
24:	Streamy - Screen Capture & Broadcasting:	Sam Halligan
25:	Tweetone:	Stephen Hynes
26:	Cloud Academy:	Carl Nolan
27:	Hawkeye:	Philip O'Reilly
28:	Internet Controlled Security Robot:	Ronan O'Driscoll
29:	Inventory Management in Multi-Product Lean Manufacturing Environments:	Josef Kunik
30:	Application of Air Injection in Solar Water Disinfection:	Michael Nolan
31:	Redesign of parts feed device at station C of the FMS Rig:	Conor Lynn
32:	Documentary Heaven:	Daniel Grimes
33:	Off-Grid Solar Inverter:	Najib Malki
34:	Exploring the benefits of Dynamic Value Stream Mapping:	Eoin Carroll
35:	Simulation of Memristor-based Circuits:	Alan O'Connor
36:	Flights Capture:	Kin Hang Tang
37:	MyBalCheck:	Luke Middleton, Louisa Mulholland
38:	Automation of an Environmental Dust/Sampler:	Conor O'Quigley
39:	Re-routing Food Waste:	Louise Barry, Niamh Gibbons
40:	Digital Guitar Tuner:	Cillian Donlon
41:	Electronic and Mechanical Control of a Horizontal Axis Wind Turbine:	Maurice Nugent
42:	Commissioning of a Sectioned Petrol Engine for Engineering Display Purposes:	Muhammad Shakeel Qamar
43:	Who's There?:	Michael Ryan
44:	TDE Game Engine:	Neil Donnelly
45:	Development of a Smartphone Application:	Brian Tyrrell
46:	EasyOrder:	Kevin Conlan
47:	Mobile Alert Management System:	Szymon Zielinski
48:	CS One Online:	Keith Curtis
49:	Spaci - Geo-Location iOS Application:	Stephen Kerr
50:	Spillage Sensing Device:	Ciaran McCann
51:	Kellcam Feedback Reaction Test:	Maebh Kelly, Owen Campbell

Project Index – Computing/Electronic Engineering/ Mechanical and Manufacturing Engineering

52:	Smart Phone Energy Saver:	Reenu Rani
53:	Non-linear Analysis of Digitally Controller Power Electronic Converters:	Brendan Hayes
54:	Development of a Smartphone app to assist in pre-surgical planning:	Jordan Cahill
55:	Web portal with searchable document retrieval and knowledge base:	Ronan Hughes
56:	OrderBuddy Restaurant Ordering System:	Conor Gleeson
57:	BiblioGraph - Analysis and Visual Graphing of Bibliographic Data:	Ken Barnwell
58:	Controlled Drug Release from Polymeric Micelles Using HPLFU:	Rory Gibney
59:	CAO like Database Application using SAP HANA:	Eoin Ffrench
60:	Taxi Assistance Driver's Application:	Karen Kuras, Rachel Bohan
61:	Finite Element Analysis of Fracture Fixation:	Katie Hughes
62:	Chess World for the World Wide Mind:	Dmitri Lerko
63:	An Internet Controlled Embedded Linux Smart Security Camera:	James Reilly
64:	Music On The Move:	Thomad Downes
65:	SyncFS - A Synchronous Distributed Filesystem:	Craig Gavagan Mac Entee
66:	ESP: Security Plugin:	Diarmaid McManus
67:	MoneyJar:	Declan Grogan
68:	Anois - An e-marketing Smartphone Application:	David O'Brien, Niall Coady
69:	Redesign of the Chemical Storage Area in the Xtratherm UK Plant:	Corinne O'Connell
70:	Industrial Chiller Efficiency and Financial Cost Analysis:	Kieran O'Neill
71:	Identifying and Analysing Natural Hand Gestures for TV Motion Control:	Niall Eoin Barry, Robert Joseph Burke
72:	Analysis of the Effects of Sintering on a Vitallium Femoral Knee Implant:	Fionnuala Fitzpatrick
73:	TeamPlus - Sports Team Management Application:	Keith Geoghegan, Malcolm Bolton
74:	JaM Player - An Android Music Player:	Niall Mohan
75:	WOWit:	Cristóir O'Codláin Lachtna, Pete Maguire, Desmond Brodie
76:	Sensor Fusion Data Processing:	Aine Brennan
77:	Programming for Beginners:	John O'Hara
78:	Sensors In Sport:	Gavin Power
79:	The 'My Deals' Application:	Stephen Kealy, Patricia McLaughlin
80:	Review Technology:	Christopher Murphy, Leanne Pigott
81:	Automated Weighing Device:	Pádraig Ferris
82:	Artificial Life:	Sam Murray
83:	Weight Manager:	Paul McGrath, Shauna Lewis
84:	LMS (Landlord Management System):	Aaron Dolan, Mali Kahlout
85:	Magneto-Rheological Fluid Damper Design In Shear Mode:	Brendan Mackey
86:	Google Authenticator Server-side Security Framework:	Doireann Nic Shuibhne
87:	Performance Enhancing Proxy for TCP over lossy connections:	Gregoire Delannoy
88:	IntelliFarm:	Troy Cronin, Joshua Lamb
89:	Vowel Tutor Android App:	Makar Emelyanov
90:	Mobile App to assist Blind Users:	Kaylee Cherry
91:	Golfy:	Ciaran Verdon, Philip Timmins
92:	Network Traffic Analyzer:	David Kernan
93:	TravelPal - A feature rich mobile application using NFC Technology:	Caoimhe Dowling
94:	Procedural Content Generation Game:	Christopher Boyle
95:	GetToKnowMe:	Danil Rusakov, Alexandra Moldovan, Radoslav Kissiov
96:	On Cue - Web Based Reminder Service:	Stephen Lynam
97:	What's Near - Android Location Based App:	Ryan McCloskey
98:	Where Am I?:	Aimee Jones
99:	System dynamics modelling of global sustainability:	Abdelrahman Ibrahim
100:	Python as a client side language:	Owen Corrigan
101:	Bug Prediction Model:	Nathan Ford
102:	DASh - Web-based dashboard system:	Shane Stacey
103:	Remote-HD-Video Delivery over a Microwave Channel in Urban Environment:	Miroslav Dunaev
104:	Deals for Days:	Edward Barron, Philip Byrne
105:	To Standardise a Daily Preventative Maintenance Procedure for a Leading Manufacturer of Medical Devices:	Jason John McGlynn
106:	Design & Automation of Lid Placing Process:	Andrew O'Byrne White

Make a smart career move



A career in business technology needs business intelligence to succeed: exactly what you'll find online at **TechCentral.ie** and in the pages of **ComputerScope**, Ireland's No. 1 magazine for enterprise computing for more than 25 years.

www.techcentral.ie

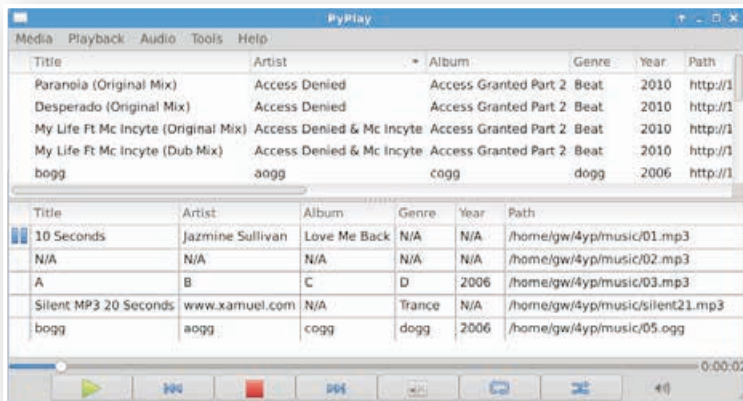
Title: PyPlay
Name: Gautam Wadhwa
Email: gautam.wadhwa2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Brian Stone



Project No 1

The title of this project is 'PyPlay'. It is an MP3 player that can both play local MP3, OGG and FLAC files and MP3s streamed from a server. Additional features of the project include MP3 metadata display and support for opening and creating music playlists. The project will also include a server to stream the MP3s. This project comes from passion for music and recognising that streaming MP3 files from a server would be both convenient and useful. Many people like to listen to music but do not want to keep separate copies of the same music library on different machines. Other people like to listen to music, but they travel a lot and cannot be near their music library all the time. This project aims to solve both of these problems by letting users stream their music collections from a server.

Primary Area: Multimedia
Primary OS: Unix/Linux
Primary Technology: Python



Title: Network Texas Hold'Em Poker
Name: Brian Murphy
Email: brianmartinmurphy@gmail.com
Programme: Software Engineering
Supervisor: Dr. David Gray



Project No 2

This final year project is a Networked Texas Hold'Em poker game for Android tablets. The game is played across a network and can be played by up to 6 players, each on their own separate android device. The game was designed so that it implements client-server networking. The android devices behave as the clients while the server is running on a computer, both are written in Java. The server acts as a dealer and the overall game handler. The game tries to recreate the feel of a real life Texas Hold'Em poker game as best it can. To play, all the users must be on the same network and the server must be run on a computer that is connected to that network as well.

Primary Area: Mobile App
Secondary Area: Gaming
Primary OS: Android
Primary Technology: Java



Title: Modelling of Plant Configuration for Optimisation of Multi-Product Flexible Manufacturing Facilities

Name: Ken Bourke

Email: ken.bourke4@mail.dcu.ie

Programme: Manufacturing Engineering and Business

Supervisor: Paul Young



Project No 3

Within the current economic climate and due to the increasingly competitive environments in all manufacturing industries it is increasingly important to make manufacturing operations as efficient and cost effective as possible in order for manufacturing firms to remain profitable and competitive while still satisfying customer demand.

The aim of this project is to determine the effect of machine-product dedication policies within a manufacturing facility that is constrained by product changeover times when switching between the manufacturing of different product types. This is accomplished by comparing three possible layouts of a manufacturing facility with each layout having a unique machine-product dedication policy. The layouts are compared on two performance indices; process queuing times in each line and cycle times of both production lines and of individual products. Comparison of the individual layouts is achieved through the development of a simulation model of the three facility layouts which is then used to perform a simulation study of the facilities' behaviour over 10,000 hours. The data collected from this simulation model is then used to calculate the performance indices of each layout.

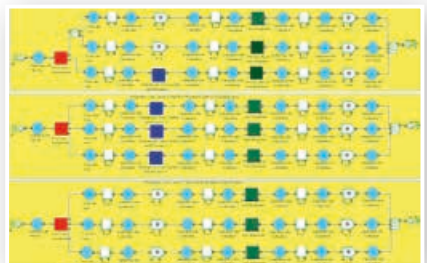
Following the conclusion regarding the most optimal machine-product dedication policy for this layout, the production volume level is varied in order to find the optimal level for this layout and comment on its relationship with the machine-product dedication policy and processing times of the stations. The manufacturing facility studied in this report is a facility with three processing lines, each line having three processing operations. The facility produces three individual product types at a defined ratio of 6:2:1 of Product 1, Product 2 and Product 3 respectively. The manufacturing facility examined is constrained by unscheduled down times of processing stations and by processing changeover times when switching between manufacturing products of different types.

Primary Area: Modelling of Production Systems

Secondary Area: Discrete-Event Simulation

Primary OS: Windows

Primary Technology: ExtendSIM 8



Title: A Thermoeconomics Approach to Water Treatment Optimisation

Name: Ross Norman

Email: ross.norman2@mail.dcu.ie

Programme: Mechanical and Manufacturing Engineering

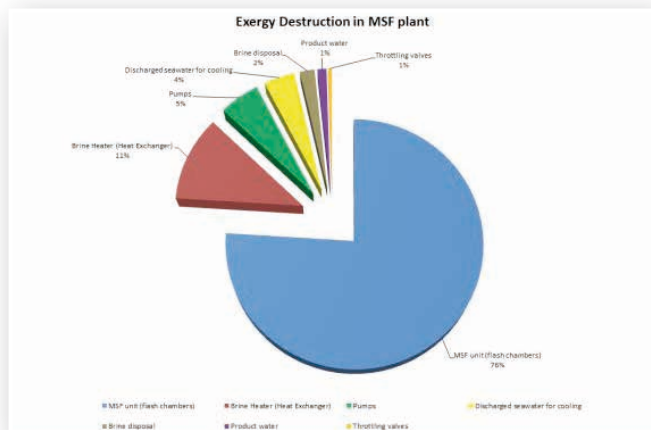
Supervisor: Dr. Lorna Fitzsimons



Project No 4

This project involves the use of a thermodynamic concept called exergy analysis to analyse and optimise a Multi-Stage Flash Desalination plant. Two different exergy models are used as a comparison; one that uses recently updated thermodynamic properties of seawater and another that models seawater as an electrolytic solution. The contents of this project are deemed important as the exergy analysis assesses the efficiency of a system, and is a tool that will be used in future sustainable development projects where the aim is to minimise our carbon footprint by creating more efficient systems. During the analysis of the desalination plant the point of highest exergy destruction (lowest efficiency) was located in the MSF unit by both models, with a near identical percentage fraction of 76%. Knowing that decisions within industry will still be based on economic factors, thermoeconomics it is seen as an important tool that combines both the thermodynamic and economic factors, which is seen as a tool that will be used for basing future environmental decisions by policy makers. This concept is introduced with an application of the theory used on results obtained in the exergy analysis. Through the analysis it was found that the preferred model for the exergy analysis would be the model that bases seawater as an electrolytic solution opposed to an ideal solution.

Primary Area: Optimisation of Thermodynamic Systems



Title: Control of a novel three wheeled electric vehicle
Name: Andrew Merrigan
Email: andrew.merrigan3@mail.dcu.ie
Programme: Mechatronic Engineering
Supervisor: Dr. Paul Young



Project No 5

The aim of this project was to derive relationships for the mechanics of a novel three wheeled electric vehicle. The project vehicle has a high centre of gravity and narrow wheel base. As such, the need for analysis of the vehicles mechanics is an important step in ensuring the vehicles overall stability and safety. Using the derived relationships safe operating limits for the vehicle were established which were then compared to empirically set operating parameters. Finally a controller function was designed in MATLAB to control the vehicles three drive motors ensuring the vehicle handled correctly, maintained stability and protected the operator from excessive acceleration. Through the completion of the project the conclusion was reached that the vehicles empirically set operating parameters ensured the vehicles stability. However these parameters exerted excessive acceleration on the user. A controller function was designed in MATLAB to control the vehicle in the desired manner whilst limiting excessive operator acceleration. The designed controller was then tested in Simulink using appropriate motor models. The designed controller correctly adjusted the rpm of the vehicle's three drive motors ensuring operator safety under various circumstances.

Primary Area: Vehicle Control
Primary Technology: Matlab



Title: Erosion-Corrosion Testing Rig
Name: Abdul Ali Hassan
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Programme: Mechanical and Manufacturing Engineering
Supervisor: Dr. Joseph Stokes



Project No 6

This Project looks at the behaviour of the combined effect of erosion and corrosion wear on a material sample over an hour. The main aims of this project are; -Design and develop an Erosion-Corrosion Testing Rig. -Test the erosion- corrosion behaviour of mild carbon steel with no protective coating. -Monitor the effect of salt Concentration (corrosive solution), high/low, on the erosion- corrosion process.

A sandblaster in the R&D building lab was used as part of the test rig design to provide the abrasive material required for the erosion wear part and another unit was designed to provide the corrosive solution required to cause the corrosion wear effect with a use of a centrifugal water pump (stainless steel pump). The test rig designs and concepts were closely monitored by a skilled experienced team of people (the supervisor, lab technician and a workshop technician). The team assisted the author where necessary during the development stage of the project and finally after the approval of the final concept, the author provided the technical drawings and instructed the workshop technician to go ahead with the manufacturing of the test rig and the lab technician made the purchase of the order list made by the author.

The report goes into detail on the literature of the types of wear, the parameters that accelerate the wear rate, some of the preventions and the combined effect of erosion-corrosion wear on a material. Then the project content shows step by step all the stages, design concept and final design and explaining into detail the function of each part of the assembly.

In the results and discussion section, shows how the test rig operated and the conclusion drawn is test rig functions accordingly and recommendation are highlighted in order to improve the accuracy and better precession results of overall wear of erosion-corrosion effect.

Primary Area: Advance Material Engineering
Primary OS: Windows
Primary Technology: SolidWorks2012



Title: Implementation of a 532nm Laser for the creation of carbon nanoparticles

Name: Brendan Flanagan

Email: brendanmflanagan@gmail.com

Programme: Mechanical and Manufacturing Engineering

Supervisor: Dr. Dermot Brabazon

Programme: Enterprise Computing

Supervisor: Prof. Alan Smeaton



Project No 7

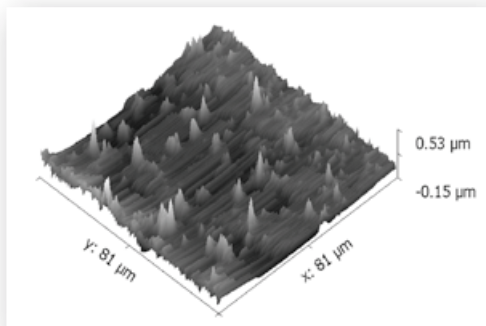
There has been increasing demand for the development of nanomaterials among a variety of industries such as semiconductor, medical devices, pharmaceutical and solar energy. Laser Ablation in Liquid requires less energy, has lower capital costs and higher rate of precision which combined makes it an attractive process for the creation of carbon nanoparticles compared with other techniques such as sputtering or chemical processing. An Nd:YAG laser uses short pulsed laser wavelengths to create nanoparticles. There is an existing 1064nm Laser in the Advanced Processing Technology research centre in DCU. This report seeks to incorporate and expand on the research previously carried out on the 1064nm laser in the design and development of a 532nm laser. The 532nm laser, when complete, should enable the creation of finer nanoparticles, which will allow for a more detailed analysis of the nanostructures created. Some of the measurement techniques used to characterise the carbon nanoparticles created were by Atomic force microscope (AFM) and Scanning Electron Microscope (SEM). Analysis of the AFM data was then completed using design of experiments software.

Primary Area: Mechanical Design

Secondary Area: Statistical Analysis

Primary OS: Windows

Primary Technology: Solidworks



Title: Sensor and Actuator System Design for a Light-Aircraft Avionics and Autopilot System

Name: Robert Walsh

Email: Robert.Walsh29@mail.dcu.ie

Programme: Mechatronic Engineering

Supervisor: Dr. Noel Murphy



Project No 8

Aerospace Engineers develop future technology with a view to optimising aircraft fuel efficiency, safety and performance. Engineers in this field are responsible for many technological breakthroughs e.g. structural carbon fibre, advances in jet engine design, GPS navigation and Doppler radar. Aircraft technology has spread to all areas of modern life and has changed the world for the better. This project investigates one such technological advance 'Autopilot Systems' which owes its development to the aviation industry.

Aircraft autopilot systems use sensors, actuators and computers to achieve autonomous control of an aircraft's heading, altitude and orientation in space. The aim of this project was to design, build and test an autopilot demonstration rig using a sensor, microcontroller and actuator control system. The rig's intended purpose was to act as an educational tool for explaining the principles of autopilot operation to students of AMPS-Aviation Management with pilot studies B.Sc. course at DCU.

This project uses the Arduino platform to demonstrate the operation of roll and pitch control of a two axis autopilot system. The orientation of the rig's platform to the horizon is measured using a MEMS gyro based sensor and the rig is actuated using servo motors connected by mechanical linkages to the platform. During operation, an instructor can move the rig and the control system will correct the orientation of the rig's platform, maintaining an orientation parallel to the horizon. This allows the instructor to use the rig as a visual aid when explaining an autopilot's operation to students.

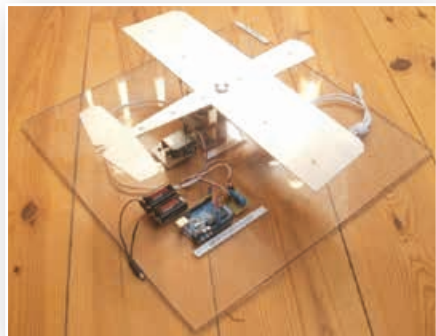
Primary Area: Design and Manufacture

Secondary Area: Aviation

Primary OS: Arduino

Primary Technology: C/C++

Secondary Technology: Target 3001 / PSpice



Title: Motion Analysis of a Three-Wheeled Vehicle
Name: Kevin Tynan
Email: Kevin.tynan3f@mail.dcu.ie
Programme: Mechanical and Manufacturing Engineering
Supervisor: Dr. Paul Young



Project No 9

The origin of the project was the design of a prototype electrically powered small industrial three-wheeled site vehicle. The vehicle was designed to be an environmentally friendly alternative to the common fossil fuel burning industrial site vehicles. The project was centred the motion analysis software in the SolidWorks CAD package. The project had three main aims: research the software motion analysis capabilities, design the loader mechanism for the existing three-wheeled vehicle chassis, and conduct a motion analysis on the mechanism design. Software was researched by analysing both a simplified single cylinder and a more complex two cylinder system. The findings from this research were then recorded into a step by step instruction manual for future reference. The design of the loader mechanism was separated into three sections including; bucket design, lift and stabilising arm design and tilt mechanism design. Three concepts were then designed and comparisons and assessments made to select the most effective design. This concept design was then improved to a final concept stage where additional features were added to produce the final design. A motion analysis was then carried on to the final design. Results in the form of forces, velocities and accelerations were then gathered, analysed and discussed. It was concluded that the software was capable of producing accurate responses for simplified systems that can simulate forces such as gravity, and contact between solid bodies. The design was also concluded to have been within all the design constraints and to meet all the necessary performance criteria. The design would function as required and perform all the necessary tasks, however the materials used could have been optimised more. The motion analysis of the final design was not perfect as the response did produce anomalies and errors. However it still provided an excellent approximation how the vehicle would operate when manufactured.

Primary Area: Motion Analysis
Secondary Area: 3-D Modelling
Primary OS: Windows
Primary Technology: SolidWorks



Title: Cloud-4-Camera
Name: Steven Grendon
Email: steven.grendon2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Monica Ward



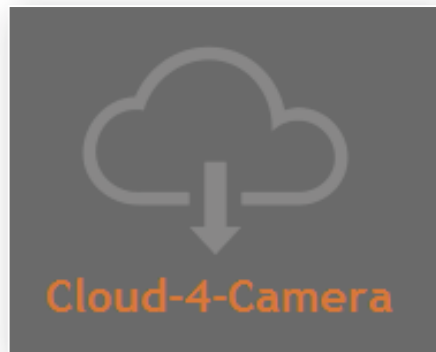
Project No 10

Cloud-4-Camera is application that is easy to use and has both social and business aspects to it. The application has 2 components.

The first component is an Android application that allows users to safely sync all their photos on their smart-phone to their desktop computer. All photos are saved directly to a server. So even if the user loses their phone, their photos will be safe on their desktop. The application allows the user the take a photo and send it straight to their desktop, it also allows you to take a photo and sync it directly to a friends desktop. Users can create a friends circle where they can search, add and remove a friend.

The second component to Cloud-4-Camera is a desktop application where the user can view all their photos that were synchronised to their computer. This side of the application was built using Window Builder and it was designed to give a nice user-friendly interface. The interface presents the user with a current list of their friends and it too provides the functionality to search, add and remove from your circle of friends. The interface also has a nice image viewer where the user can flick through their photo albums.

Primary Area: Mobile App
Secondary Area: Desktop Application
Primary OS: Android
Primary Technology: Java
Secondary Technology: PHP



Title: CloudSync
Name: Brendan Gerard Kelly
Email: brendan.kelly33@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. Monica Ward



Project No 11

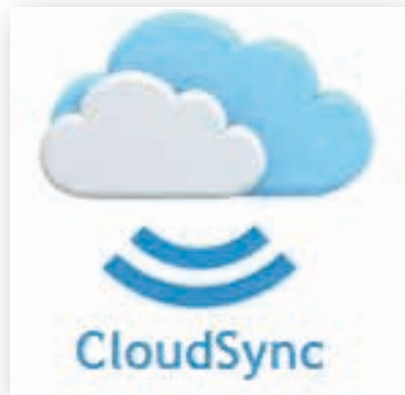
There are currently a lot of applications on the Android market that backup users phone data such as SMS messages and contacts, usually on an external SD card. However, they all have one fatal flaw: there is no way to restore the data if the user actually loses their phone, as the data is stored on the phone.

The aim of CloudSync is to provide a cloud-based backup service to Android users, and to allow users to view and modify their information through a web application. It allows backup of important data, as XML, to a server, which stores the data under the users account. When a user loses/breaks their phone, they only have to login to CloudSync, and they can restore their data from the server easily. Because the application is laid out in such a way, the user can easily use CloudSync to move their information from one phone to another.

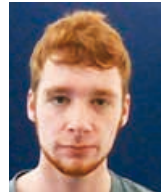
CloudSync can backup 3 types of data: contacts, messages, and user files. Once backed up, users can view their data on the CloudSync web application. This shows them their contacts and messages, and a file manager lets them modify/rename/delete files from the server. Contacts can be edited, and messages deleted individually.

CloudSync uses Android/Java on the mobile side of the application, PHP to process the web server data, and JavaScript to display the information on the web side.

Primary Area: Mobile App
Secondary Area: Web Application
Primary OS: Android
Primary Technology: Java
Secondary Technology: PHP, JavaScript, XML



Title: Commando - Keyword-based Web Navigation
Name: Shane Maguire
Email: shane.maguire2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Stephen Blott



Project No 12

Commando is a social keyword-based navigation service on the cloud. It is a web-based service that allows users to use and define keyword mappings to their favourite websites, content searching services and to Commando specific functions. It is based solely around a 'command line on the web'. A large library of pre-defined keywords for popular web content is bundled with the system. All of Commando's functionality can be used and accessed from this command line. It aims to be the central activity for users searching for an alternative to search engines, as with keywords a user can navigate the web in significantly less keystrokes. Commando is social in a sense that a user can define keywords that can be used by anyone else. Keywords can be defined to be public, personal or even shared amongst groups of friends. Commando aims to appeal to users with its intuitive user interface and is mobile accessible. Commando is hosted on the cloud and is developed using emerging technologies such as Node.js, MongoDB and Twitter Bootstrap.

Primary Area: Web Application
Primary OS: Multi-platform
Primary Technology: Node.js
Secondary Technology: HTML, CSS, Javascript



Title: Scheduling Application
Name: Mary Dennehy
Email: mary.dennehy4@mail.dcu.ie
Programme: Software Engineering
Supervisor: Monica Ward



Project No 13

This project is a web-based application, focused at managers and owners of a business, who are scheduling employees to work. The main aim of the project was to keep all schedules on a website so that employees and managers may access it easily.

Employees are able to access the site at any time to see if their schedule has been changed since it was first added, while managers are able to access and change the schedule as needed.

Managers are also be able to easily access a list of all their employees and what training they have had. This will ensure that when they are creating or editing schedules, they can identify employees with similar training, so that, if an employee cannot work on a particular day, they can be, quickly and easily, swapped out with another employee who has the same skill set.

This project was written in Python using the Django framework.

Primary Area: Web Application
Primary OS: Multi-platform
Primary Technology: Python



Title: Virtual Dropbox
Name: Daniel Grant
Email: daniel.grant8@mail.dcu.ie
Programme: Software Engineering
Supervisor: Darragh O'Brien



Project No 14

Virtual Dropbox is a web application that allows users to manage files from multiple online storage providers. The web storage provider's Virtual Dropbox supports are Google Drive, Microsoft Skydrive, Dropbox and Box.com. These services provide storage space for users to maintain files on the cloud. However all the providers have a different web application for the user to use and the aim of Virtual Dropbox is to act as a central hub for communication between the different accounts. A user will register with Virtual Dropbox and add a storage account. Their account will be authenticated through an OAuth system and access tokens will be stored in a Database for use in further transactions. The user can view their file-lists and navigate through their various folders. A user can upload a file, download a file, delete a file/folder, create a folder or rename a file. The user will be able to avail of 2 file list views within the web application. A Standard View, which will separate storage accounts by type and a Virtual View, which will merge all user storage accounts and display the files in one 'Virtual' file list.

Primary Area: Web Application
Secondary Area: Cloud Computing
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: REST, Javascript, JQuery



Title: Learning2Write - An application to teach children how to write
Name: James Darcy
Email: james.darcy5@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. Monica Ward



Project No 15

Learning2Write is an Android application which aims to teach children how to write letters of the alphabet and other characters, by following recommended teaching procedures used in today's classrooms. It has been developed for an Android tablet, which will allow the children to learn the proper techniques and procedures for writing different characters on a touch screen, using their finger or a stylus. The application presents multiple templates/guidelines for each character, which allows the child to trace over. Learning2Write then examines the input to see if the child has drawn the character properly, and it gives appropriate feedback regarding this. The child has the opportunity to practice re-drawing the characters in order to increase his/her writing abilities. The application is geared towards a young demographic, therefore the user interface has been designed and constructed appropriately, to suit users of a young age. The application has been constructed using the Android SDK, Java and XML.

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Java
Secondary Technology: XML



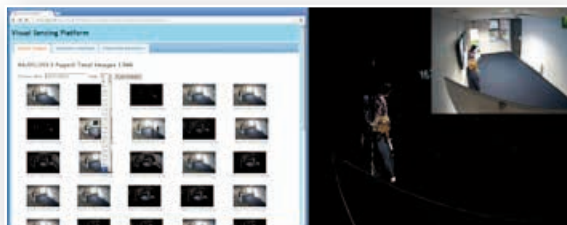
Title: A Low-cost Low-power Visual Sensing Platform
Name: Mark Marsden
Email: mark.marsden2@mail.dcu.ie
Programme: Digital Media Engineering
Supervisor: Dr. Noel O'Connor



Project No 16

This project is motivated by the ongoing work of the Clarity centre on environmental monitoring for both marine and coastal locations. The aim of the project is to develop an autonomous on-site visual sensing platform which can act as part of a larger network of monitoring technologies. The platform developed must be both affordable and energy efficient. The Raspberry Pi embedded system was chosen to act as this autonomous monitoring device. While being quite affordable this device is also capable of performing very computationally intensive tasks. It also has very low power requirements. As part of this project the Raspberry Pi can interface with an Axis IP camera as well as other non-visual sensors, collecting both images and sensor readings. This data is used to intelligently alter the Raspberry Pi's behaviour, possibly capturing images at a higher frame rate or going into a low power state. Image processing techniques including background subtraction are employed to analyse the scene and detect objects. This data can be combined with data from non-visual sensors to provide multi-modal sensing which can improve the robustness of event detection systems through the fusing of complementary data sources. Using a 3G USB dongle the Raspberry Pi can relay any images and data recorded back to a server in the cloud. This data can be then be archived for further processing and analysis. The entire system can be monitored and configured through a J2EE web application, with changes propagated out to the raspberry Pi and implemented in real time. Within this web application users can observe the latest images and data sent back as well as configure how the Raspberry Pi will react to incoming sensor data.

Primary Area: Image/Video Processing
Secondary Area: Sensor Technology
Primary OS: Unix/Linux
Primary Technology: Raspberry Pi
Secondary Technology: Java



Title: NXT Ballbot: Self-Balancing Robot on a Ball
Name: Andrew Kiernan
Email: andrew.kiernan8@mail.dcu.ie
Programme: Mechatronic Engineering
Supervisor: Jennifer Bruton



Project No 17

This report is an investigative report into the model, build and sensor selection of an NXT Lego Ballbot with the overall aim of controlling the motors of the Ballbot. This project was undertaken to better understand the function of the Lego NXT sensors and there control in terms of a Ballbot design towards the hopeful creation of a stable Ballbot either at the end of this report or at the end of further investigation into the project. Where this project's Ballbot differs from previous NXT Ballbots is the use of a single accelerometer and gyroscope to relay the position and speed of the body in both planes of motion assuming the Ballbot does not move in its top plane. This project details the derivation of the equations of motion which will lead into the modelling, simulation and affective control of the Ballbot. A brief discussion on interfacing the NXT software with MATLAB is presented for explanatory purposes. The choices made towards the build of an NXT Ballbot and parameterising the Ballbot created plays a key role in the affective success of a Ballbot. The choices made as well as sensor selection and sensor testing are documented in the project report. Finally the effective control of the Lego Ballbot's motors was carried out and is presented in this report. It presents two possible methods of creating the code for the controlled model and explains what can be done in to possibly obtain a better response from them.

Primary Area: Mechatronic Systems
Secondary Area: Control
Primary OS: Windows
Primary Technology: Matlab



Title: Spillage Sensing Using a Video Camera
Name: David Connaughton
Email: david.connaughton2@mail.dcu.ie
Programme: Mechanical and Manufacturing Engineering
Supervisor: Tamas Szecci



Project No 18

The purpose of this project was to research and develop a program which can be used to detect spillages on the floor using image analysis and processing techniques. The project focused on the sensing of liquid spillages using a video camera. The image processing and analysis were performed using the OpenCV library.

As part of another project a robot was developed that would be used for cleaning in hospitals. Currently the robot uses a procedure for spillage detection that requires human interaction. A nurse who identifies a spillage places a cone at its location. Using infra-red sensors the robot detects the cone and moves to the location that the cone was placed at. This project aimed at eliminating the need for the nurse in the spillage detection procedure. Instead the robot will use a webcam to automatically detect the spillage itself. This will improve the efficiency at which spillages are cleaned and therefore it will help improve the safety of the hospital.

Image processing techniques were used to test different methods that could be used for spillage detection. Research and testing were carried out using a number of different image processing methods.

Primary Area: Image/Video Processing
Primary Technology: OpenCV
Secondary Technology: C/C++



Title: Development of an electrospun scaffold for
Tissue Engineered Blood Vessels

Name: Ken Lynch

Email: kenneth.lynch2@mail.dcu.ie

Programme: Biomedical Engineering

Supervisor: Garrett McGuinness



Project No 19

While the 'gold standard' treatment method for advanced atherosclerosis in coronary arteries remains bypass grafting, the need for an alternative technique is required now more than ever. The increased rate of occurrence of cardiovascular (CVD) worldwide, coupled with the limited supply of suitable vasculature replacement grafts have prompted studies into the development of tissue engineered blood vessels (TEBVs). This project investigates one such method, electrospinning, which can be used to create TEBV.

A rotating collector, used for electrospinning, has been designed, manufactured and optimised to produce tubular scaffolds which could potentially be used in TEBV applications. PHBV was the polymer of choice for this project. A structured Design of Experiments was developed to examine the change in morphology of scaffolds, when subjected to parameter variance.

Electrospun scaffolds were successfully created using this collector and scanning electron microscope (SEM) analysis of the resultant scaffolds was promising. Images obtained from the SEM show no apparent beading with fibre diameters of approximately $5.49 \pm 0.90 \mu\text{m}$. Fibre alignment, a feature which is imperative for TEBV applications, was also observed on the external surface of produced scaffolds. The process parameters for electrospinning were altered to observe their effect on fibre morphology, and an optimal setting for the collector was established. Although no conclusive results were obtained on porosity of the scaffolds, the experimentation conducted has provided the basis for further investigation into the area of TEBV development within the college. Additional features such as mechanical properties and cell seeding can be explored as a result of this project.

Primary Area: Tissue Engineering

Primary OS: Windows

Primary Technology: Java



Title: Ballbot control
Name: Colm Bowden
Email: colm.bowden4@mail.dcu.com
Programme: Mechatronic Engineering
Supervisor: Jennifer Bruton



Project No 20

The Ballbot, a dynamically stable robotic platform has being the focus of much research in recent years. The unique characteristics of the platform, when sufficiently developed, allow high manoeuvrability and unobtrusive operation in peopled environments. For such operations a highly capable control system is required.

This project examines the control issues associated with the control of a Ballbot by first developing a planar model of the system and then modelling and simulating this planar model using MATLAB and Simulink.

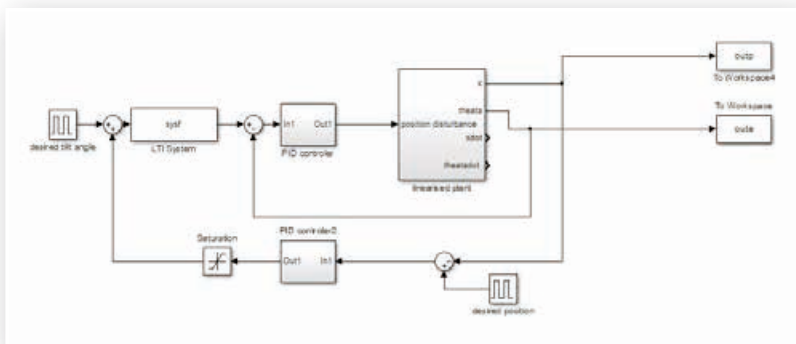
Control schemes are designed to control the tilt angle and the position of the Ballbot. These control schemes are based on Linear Quadratic Regulator (LQR) and Proportional Integral Derivative (PID) methods and examined with respect to the problem of balancing and station keeping and then adapted to include position tracking.

The LQR method is found to give the best response overall and requires the least amount of time to design. The Model of the system is verified by direct comparison with previous works.

Primary Area: Control systems and system modelling

Primary Technology: Matlab

Secondary Technology: Simulink



Title: An ARM'ed Inverted Pendulum
Name: Ross Byrne
Email: ross.byrne42@mail.dcu.ie
Programme: Mechatronic Engineering
Supervisor: Dr. Derek Molloy



Project No 21

Current research is on-going in the field of ball balancing robots (ballbot). These robots are very flexible since they can any direction without first having to turn and then actuate. The simplified model of a ballbot constrained to one plane of motion resembles an inverted pendulum.

This project required the design of the mechanical and electronic systems that will form an inverted pendulum test device. The main aim of this project is to quantify the use of a low power and low cost embedded system with MEMS (Micro Electro Mechanical Systems) accelerometers and gyroscopes to address the traditional inverted pendulum control problem. This project also required the design of the mechanical test apparatus using a CAD package called SolidWorks. This was used to design the framework that would be fabricated by the school's workshop.

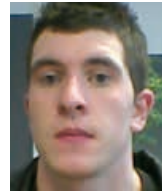
Embedded systems or microcontrollers are used to target specific problems, whether it is measurement, computation or control. Microcontrollers have become so popular and accessible in recent times that many companies are providing hobbyists with accessible development or evaluation platforms. An ARM M4F processor from Texas Instruments was used as it is a low cost device with huge functionality. It achieves 100 Million Instructions per Second (MIPS) at 80 MHz. Code Composer Studio was used to develop the C code for the microcontroller.

The accelerometers and gyroscope used were internal on a device called an ArduIMU. This Inertial Measurement Unit (IMU) is an Arduino based device; it was initially developed for an open source autopilot or drone application. It features 2 accelerometers (combined x-y direction accelerometer and an independent z direction accelerometer) and a three axis gyroscope to achieve 6 degrees of freedom. The ArduIMU also has a processor onboard (Atmega328 at 16 MHz) to do some signal processing such as ADC and sensor fusion before presenting a serial output to the Microcontroller. The IMU was tested against a rotary encoder to quantify its measurement.

Primary Area: Embedded Systems
Secondary Area: Software Development
Primary OS: Windows
Primary Technology: C/C++
Secondary Technology: SolidWorks



Title: MediFind: An online medical booking system
Name: Seán Glennon
Email: sean.glennon3@mail.dcu.ie
Name: Thomas Whelehan
Email: thomas.whelehan2@mail.dcu.ie
Programme: Enterprise Computing
Supervisor: Joe Morris



Project No 22

This project is based on the concept of booking a medical service such as a doctor online and through a mobile app. We hope to prove that this is a feasible and potentially lucrative system.

The system will allow you to search for a medical service (a doctor, a physiotherapist, a dentist etc.) that is located close to your location. You must also choose the medical service that you would like and also input your symptoms for the search. You will then be presented with a result list of chosen doctors or dentists etc. You can click on the chosen result and will be brought to their real-time calendar page. On this page you can then click an available time-slot and create a booking.

While the main component of the system is the web application, there will also be an app available on the Android and iOS platforms. On the app you will be able to view your bookings, make bookings and also search for the closest medical services to your location just like on the web app. The app will be simple in features and what it can do as we want it to be a quick and efficient experience for the users. The system will be launched in the Irish market at first and then we will look at expanding into the English market and other European markets.

The MediFind system will benefit practices that are very busy with bookings. It will also help practices that are struggling to get patient bookings for whatever reason. Having a presence online will help to advertise these practices and potentially create more business for them. The main objective of the MediFind system is to help make the medical services industry more profitable in Ireland and other markets.

Primary Area: Web Application
Secondary Area: Mobile App
Primary Technology: SQL
Secondary Technology: PHP



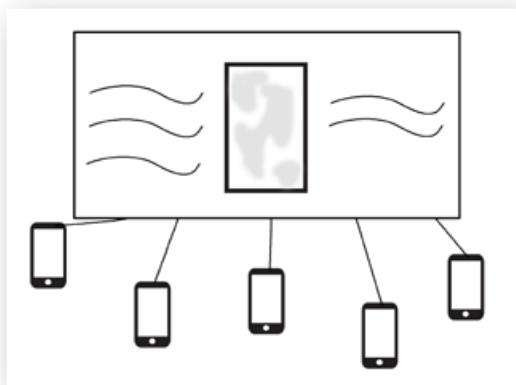
Title: TouchSwarm
Name: Killian Carroll
Email: killian.carroll5@mail.dcu.ie
Programme: Software Engineering
Supervisor: Kevin Casey



Project No 23

TouchSwarm is a tool that allows mobile developers to generate a crowdsourced heatmap of their mobile applications based on where their users have been interacting. Developers are provided with an Android API which, once implemented with a deployed version of their application, tracks user gestures and sends them to a RESTful web server. This web server, hosted on an instance of the Google App Engine, aggregates the data and generates a heatmap based on user gestures and touches. From their browsers, developers can view this information and are given a vital insight into how their users are utilising their products. It provides an accurate gauge on the usability of their product and assists them in tweaking GUI design to maximise limited mobile screen space. An Android API, designed to be implemented quickly and cleanly, posts data to RESTful web service at intervals configurable by the developer. The service then stores the data from any device with the TouchSwarm API active and updates the heatmap at regular intervals.

Primary Area: Web Application
Secondary Area: Mobile App
Primary OS: Google App Engine, Android
Primary Technology: Java
Secondary Technology: REST



Title: Streamy - Screen Capture & Broadcasting
Name: Sam Halligan
Email: sam.halligan2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr Donal Fitzpatrick



Project No 24

Streamy is a desktop application capable of recording the contents of a users desktop, encoding them in the real time, and sending the output to a live streaming website like twitch.tv or justin.tv.

Streamy can also capture video from any attached webcams, and it can capture system audio, as well as audio from attached microphones.

While Streamy captures input, it muxes audio and video together, and encodes the output on the fly. The output can then either be written to a local video file, or broadcast to a live streaming server via RTMP.

The motivation behind Streamy stems from the massive growth in livestreams over the past few years. A lot of this growth can be attributed to competitive gaming(e- sports). Games like Starcraft 2, League of Legends, Dota 2 and Counter-Strike have led the surge of interest and boom in viewer numbers.

Thousands of people broadcast themselves playing these games every day, and even more tune in to watch them.

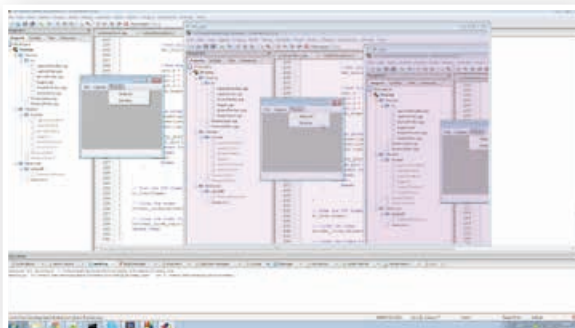
Streamy allows users to capture and live stream their play.

Primary Area: Image/Video Processing

Secondary Area: Network Applications

Primary OS: Windows

Primary Technology: C/C++



Title: Tweetone
Name: Stephen Hynes
Email: stephen.hynes8@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. David Gray



Project No 25

Tweetone is a Windows 8 application designed to provide statistical analysis based on the sentiment of tweets from Twitter. Users can search for a hashtag to view what the current sentiment is towards that topic, whether it is positive or negative in tone. The user has a choice of graphical displays to view this information such as comparing lists of sorted by sentiment tweets, a chart displays and finally a world display.

At its core Tweetone is concerned with establishing whether a tweet is positive or negative in tone, this is achieved by searching if a series of keywords are present in a tweet. User can add and remove to this set of keywords to customize their searches. Users also can be suggested a series of trending topics from the last 24 hours.

Primary Area: Mobile App
Secondary Area: Statistical Analysis
Primary OS: Windows
Primary Technology: C#
Secondary Technology: XAML



Title: Cloud Academy
Name: Carl Nolan
Email: carl.nolan44@mail.dcu.ie
Programme: Software Engineering
Supervisor: David Gray



Project No 26

Cloud Academy is an application aimed towards secondary schools. The system allows teachers, students and administration staff to carry out much of their day-to-day activities on an Android tablet and through a website

The application allows schools to organise timetables, class groups, subjects, lessons, homework, attendance, exams, grades and student progress

Administration staff first set up the system using a website where they can input pupil and staff details, photographs, permissions etc. They can then arrange timetables, class groups and subjects

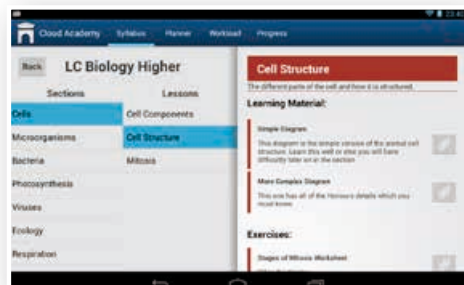
Teachers can upload their lesson material through the website and arrange their course into sections, lessons and exercises.

Students use the Android application to access lesson content in-class or at home along with their timetable, exam results, homework and graphs of their progress over the school year.

Teachers can use the Android application for accessing content and their timetable too, however they can also arrange their lesson plans, take attendance, assign homework, schedule exams, input exam grades and view class progress.

The aim of the project was to develop an application which would be easy to use for students but also for teachers who might not be accustomed to the Android platform. It also attempts to incorporate many aspects of common school tasks so that using the system in the place of the normal paper-based approach would actually be realistic.

Primary Area: Mobile App
Secondary Area: Web Application
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: PHP



Title: Hawkeye
Name: Philip O'Reilly
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Programme: Software Engineering
Supervisor: David Sinclair



Project No 27

Hawkeye is a web application for monitoring large numbers of IP camera feeds from different sites. It addresses the bandwidth issues associated with multimedia streams. Hawkeye provide client side transcoding of the raw IP camera streams to minimise the load on the web application. This gives for a scalable service that could monitor hundreds of cameras simultaneously.

It provides motion detection and alert generation. Each frame in the stream is compared to the previous one and if the change is over a certain threshold and alert is created. These alerts can be viewed in real time from the web application. The alert can then be dealt with by making an embedded Skype call to the site owner or police station.

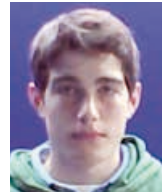
The cameras location can also be viewed on a map with police stations and other relevant data. This data is used for things like determining the nearest police station to a site where there is an intruder.

The web application was developed using ASP.NET, JavaScript and Ajax. The transcoding, streaming and motion detection are done using the open-source VLC and AForge libraries. The client application is written in C# and the solution is deployed to the Microsoft Azure Cloud.

Primary Area: Web Application
Secondary Area: Image/Video Processing
Primary OS: Multi-platform
Primary Technology: C#
Secondary Technology: JavaScript



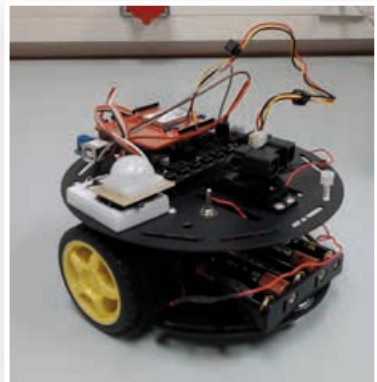
Title: Internet Controlled Security Robot
Name: Ronan O'Driscoll
Email: ronan.odriscoll2@mail.dcu.ie
Programme: Electronic Engineering
Supervisor: Derek Molloy



Project No 28

A robot that can connect to a WiFi access point has beneficial implications for domestic and commercial security applications. There are three states to the internet controlled security robot that was developed in this project. The robot is autonomous: meaning that it can drive by itself, it can be manually driven: meaning that it can be driven online with a video games controller and it can be in a standby state, whereby the robot can be activated upon detecting motion in the area. When the robot is autonomous it uses an IR distance sensor mounted upon a servo motor to scan a number of distances from the robot to walls or objects. From this information it can make a decision of where to travel. When the robot is manually driven, a WiFly module is used to connect to the WiFi in the area and using a computer, the controls of a Playstation 3 controller can be mapped to send packets of data to the robot to drive it. The project uses an open source programming environment called Processing and a library called ProControls to map the PS3 buttons to code. The project uses a UDP library to send UDP packets to the robot. This is a connectionless protocol which means instant control of the robot with fast response from the controller. Also used was a PIR (Passive Infrared) sensor as a motion detector. When the robot is in standby as soon as there is movement it triggers the robot to connect to the WiFi and giving alert to a security guard to get on the controls. When the user is controlling the robot, packets of data are sent back from the robot based on the IR sensor's distances. In Processing there is a drawing application that displays the orientation of the robot in a plan view.

Primary Area: Security
Secondary Area: Wireless Technology
Primary Technology: C/C++
Secondary Technology: Java



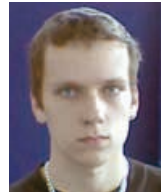
Title: Inventory Management in Multi-Product Lean Manufacturing Environments

Name: Josef Kunik

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Programme: Manufacturing Engineering and Business

Supervisor: John Geraghty



Project No 29

The aim of this project is to analyse and compare the performances of inventory management policies in multi-product lean manufacturing environments. The creation of hybrid Kanban - CONWIP models is extremely popular in the field of operations research. This project undertakes the analysis of newly created BK-CONWIP D-KAP and BK-CONWIP S-KAP models against the HK-CONWIP model and tests the influence of the decoupling of demand signals and production authorization.

Comparative tests against previously tested models are done on a two product line with 3 stages in series. The lines are then increased to 3 products to test for flexibility and robustness of the models in question. In order to fully understand the behaviour of the hybrid models, an approach that uses a multi-objective genetic algorithm was then undertaken for the models' retests.

In a two product environment, initial tests suggested that the BK-CONWIP S-KAP and HK-CONWIP D-KAP were equal performers in terms of satisfying 95% satisfaction levels with the least amount of work-in-progress. Further analysis with the multi-objective genetic algorithm showed HK-CONWIP D-KAP to be the most efficient performer of the three. In a three product environment, with high demand variability, the BK-CONWIP models outperformed the HK-CONWIP. BK-CONWIP models are suitable for environments with a high number of variables and high amount of risk due to the decoupling of demand information from production authorization.

It has also been found through sensitivity analysis that mutation rate affects the solution space searched and the accuracy and precision of the non-dominated solutions created by the Pareto Optimiser. The number of replications has an effect on the number of solutions produced, although it is at a cost of high simulation time. The right combination of mutation rate and number of replications is desirable for efficient and effective testing and analysis.

Primary Area: Modelling of production systems

Secondary Area: Discrete event simulation

Primary Technology: ExtendSIM 8



Title: Application of Air Injection in Solar Water Disinfection
Name: Michael Nolan
Email: michael.nolan27@mail.dcu.ie
Programme: Biomedical Engineering
Supervisor: Dr. Yann Delaure



Project No 30

Solar Water Disinfection (SODIS) is a simple, low-cost method of disinfecting water. The SODIS method requires minimal supplies and uses solar energy that is free and abundant in many developing countries where there is a scarcity of safe potable water. There are several limitations to the traditional SODIS method however.

This project investigates the viability of air injection in the traditional SODIS process. Potential benefits of air injection in the SODIS process include improved efficiency, reliability and applicability of the SODIS method for large and turbid volumes of water. Air injection and the proceeding formation of gas bubbles aids in increasing mixing in the water, increasing dissolved oxygen content in the water and increasing UV penetration in the water volume, all of which increase the efficiency of the SODIS process.

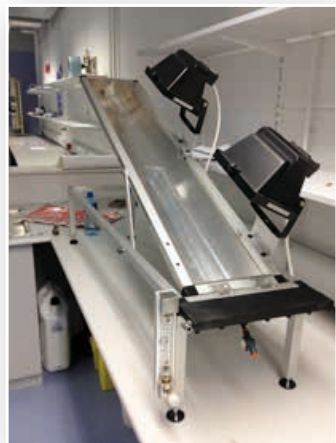
In order to study the effects of air injection in SODIS a SODIS reactor with an incorporated air injection system was designed and manufactured. The reactor includes treatment vessels to carry 2L of water and a solar reflector to maximise levels of UV and thermal radiation reaching the treatment vessels. The reactor is ideal for hydrodynamic, thermodynamic and microbiological testing of SODIS with air injection. A wind turbine also developed through the course of this project can power the air injection system.

The application of air injection in SODIS is an entirely new concept and this project successfully opens the doors to further research into this area.

Primary Area:

Secondary Area:

Primary Technology:



Title: Redesign of parts feed device at station C of the FMS Rig
Name: Conor Lynn
Programme: Mechanical and Manufacturing Engineering
Supervisor: Dr. Paul Young



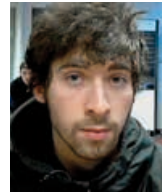
Project No 31

The aim of this project was to rectify a problem encountered with a parts feed device at station C of the Flexible Manufacturing System which is used by Dublin City University for teaching and demonstration purposes. Station C is the point of the process where the axis is placed into the assembly by an automated robot arm and the goal of the project was to provide a reliable and cost effective device for the supply of parts to the robot collection point. The project was broken down into sections to complete the aims of the project successfully. Planning and research into Flexible Manufacturing Systems was the starting point and this followed onto the concept design stage where possible solutions were generated. After many concept and design meetings with the project team it was decided that the most viable option would be to redesign the parts feed device at station C of the FMS Rig. A detailed design of the indexing table shown in the picture was then completed and the design was submitted to the workshop for the fabrication of the various components. Phase two of the project consisted of the build phase, programming, testing and the completion of the project. Stage two involved the successful completion of the project which aspired to its aims and provided an effective, reliable and low cost solution for the delivery of parts to station C of the FMS Rig. The Project was a complete design and build process with the concepts designed and modelled using Solidworks 2012. The project also included electrical design and implementation, the design and implementation of a program to control the device through the existing PLC Equipment and overall ethics of engineering.

Primary Area: Mechanical Design and Build Project
Secondary Area: 3-D Modelling
Primary Technology: PLC Control/Programming



Title: Documentary Heaven
Name: Daniel Grimes
Email: dannygrimes89@gmail.com
Programme: Software Engineering
Supervisor: Jane Kernan



Project No 32

This project is in essence a website dedicated to the distribution of independent online documentary films.

Documentary Heaven is a site that was created in the summer of 2009, currently it is simply just an index of freely available documentaries online and its workings are very minimalistic. A non-user based site that is manually updated regularly with fresh material, however this concept is becoming stale, as many new sites have popped up which simply copy this idea and post similar if not the exact same content. The goal of this project is to make Documentary Heaven into something more, a self-preserving online community.

The site itself currently gets about 3 million pageviews a month and has quite an active community base. The goal of this project is to design a backend system based around the Wordpress CMS currently in place that allows for far more functionality such as, User memberships, automatic documentary submissions via a Portal that will allow user to upload their own documentaries on the fly, a voting system to ensure quality control, Broken link replacement system i.e web crawler to find replacements to documentaries that no longer work, website redesign, ability for users to post projects and seek funding.

Primary Area: Web Application
Secondary Area: Web Design
Primary OS: Multi-platform
Primary Technology: PHP
Secondary Technology: HTML



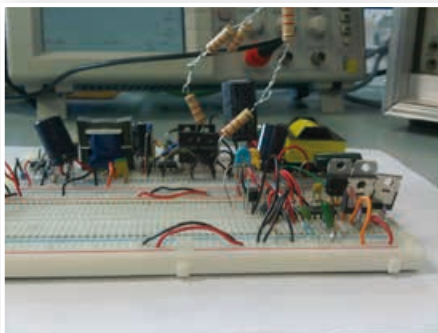
Title: Off-Grid Solar Inverter
Name: Najib Malki
Email: najib.malki2@mail.dcu.ie
Programme: Electronic Engineering
Supervisor: Dr. Stephen Daniels



Project No 33

With the massive jump technology took in the past decade, energy became part of our everyday life, we depend on it to keep us going, it's an essential for our everyday tasking, but with this humongous demand on energy there is a price to pay, starting with pollution, greenhouse gases and the list goes on, on top of that we are running out of the crude that powers our power plants, an alternative is needed. One of the solutions that have been presented is to use renewable energy to help supply the demand for energy; with this in mind this project proposes a way to convert the energy of the sun using solar panels to power our everyday applications at home. The idea is simple the power we get from the solar panels is DC and in order for us to use this harvested power we need to invert it to AC, that's where the name 'Solar Inverter' came from. After a lot of research, design and effort put in this project it was able to take the 12 volts DC input from the solar panels and invert it to 230 volts AC output, this allows the output to act as a mains plug, although the power output is low, but for different solar panels the inverter can go up to 150 watts. This involved stepping up the voltage using a DC - DC converter circuit and then inverting it to AC using an DC to AC inverter, proving the concept of being able to use solar panels to power household electronics, and we can depend on this type of energy technology to partially power our houses, leading a start towards leaving the conventional energy production and moving to a clean energy.

Primary Area: Renewable Energy
Secondary Area: Industrial Electronics
Primary Technology: Power Electronics



Title: Exploring the benefits of Dynamic Value Stream Mapping
Name: Eoin Carroll
Email: eoin.carroll2@mail.dcu.ie
Programme: Mechanical and Manufacturing Engineering
Supervisor: John Geraghty



Project No 34

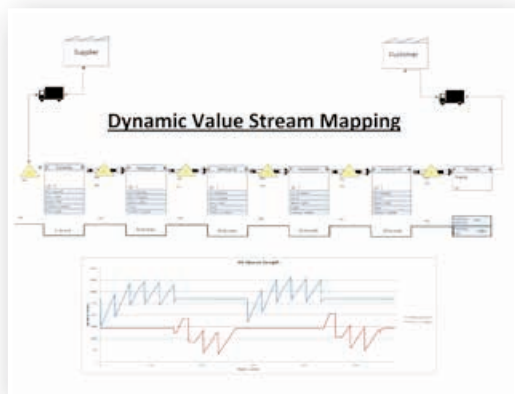
This project was undertaken to determine the benefits of merging a traditional lean manufacturing technique called value stream mapping with dynamic computational software. To achieve this, a dynamic value stream map model was created in a software package. A case study was conducted on a traditional value stream map by using the dynamic model to experiment with dynamic simulation. A number of tests were performed on the case study model to assess any benefits that could be found. The model provided dynamic outputs representing inventory queue lengths and wait times. These outputs were graphed and examined in order to implement improvements on the production line.

In addition to the case study, a market survey was circulated to obtain information on the current use of value stream mapping and the interest in a dynamic value stream mapping package. Value stream mapping was found to be a widely used tool in the organisations who responded and there was a largely positive response to the proposal of a dynamic value stream mapping tool.

Overall there were a number of benefits found during the project such as increased value stream accuracy and dynamic output data. Implementation of dynamic value stream mapping was deemed to be limited by time, knowledge and cost constraints within organisations. This would create a large barrier especially for small businesses where a simple traditional value stream map would be more suited.

Primary Area: Software Development

Primary Technology: ExtendSim8



Title: Simulation of Memristor-based Circuits
Name: Alan O'Connor
Email: alan.oconnor73@dcu.ie
Programme: Electronic Engineering
Supervisor: Dr. Marissa Condon



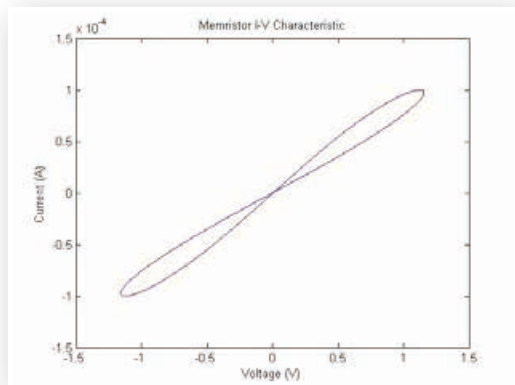
Project No 35

It is over forty years since the fourth fundamental component of electronic circuit theory, the memristor, was proposed in theory by Leon Chua. The device remained a theoretical item until recently when HP developed a physical device made from TiO₂.

The aim of this project is firstly to examine the physical properties, the operation and the I-V characteristics of the device that result in it having memory. Secondly, different models of the device, each with their own advantages and disadvantages, are examined and compared. Nonlinear exponential models are the most closely related to the real-world properties of the physical device. Finally, a memristor based ultra wide-band (UWB) receiver which utilises the memory properties of the devices is simulated showing a unique application of the device. This is advantageous as it avoids the problems with analogue to digital converters at very high operating rates.

This project presents the reader with a solid introduction to memristors and provides evidence of how its unique behaviour can be utilised in solving problems that resistor, capacitor and inductor circuits have not been able to resolve.

Primary Area: Circuit Modeling
Secondary Area: Communications
Primary OS: Windows
Primary Technology: Matlab



Title: Flights Capture
Name: Kin Hang Tang
Email: kin.tang2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. Mark Roantree



Project No 36

Airline Capture is a data mining application that allows the user to execute queries on the captured live flight information from airports. The harvested flight information is outputted into a structured XML format and stored in a native XML Database(Exist-db). While the harvested data is accessible, no system facilitates the use of mass storage of this information for public use. The public haven't got the flexibility to ask statistical questions or to query facts about airlines, airports or certain flights. xQuery is a query and functional programming language designed to query collections of XML data. The application provides the submission of xQuery query expressions through the web interface. The submitted queries are evaluated before retrieving XML result- sets from the XML Database collection. Queries can be submitted to be used for making comparisons, predictions and end user data manipulation. The retrieved results is displayed on the web interface for the user to view and downloadable. Latest flight information retrieved from the application can be view via the web interface. Users will be able to make informed travel decisions based on results shown. Airline Capture was developed exclusively using open source frameworks and technologies, including Exist-db, Scrapy Framework and Django Framework.

Primary Area: Data Mining
Secondary Area: Databases
Primary OS: Unix/Linux
Primary Technology: Python
Secondary Technology: XML



Title: MyBalCheck

Name: Luke Middleton

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Name: Louisa Mulholland

Email: louisa.mulholland2@mail.dcu.ie

Programme: Enterprise Computing

Supervisor: Dr. Gareth Jones



Project No 37

MyBalCheck is a mobile application which consolidates users online account balances to facilitate centralised account monitoring. MyBalCheck displays bank, bookmaker, mobile phone and utilities account balances in one single application.

MyBalCheck was born from the frustration of managing multiple online accounts on the go. It became clear that this was a cumbersome process and mobile interface size was a distinct debilitator here. From this, the idea of a centralised login for accessing a user's online accounts was born. MyBalCheck builds upon centred design guidelines to create an interactive and manageable interface.

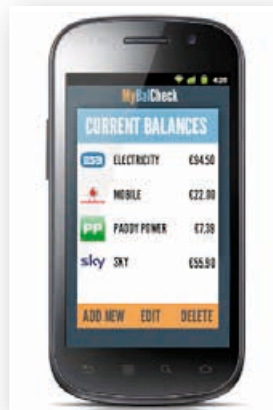
With over 71% of the Irish population owning a smartphone, there is a market for an application like MyBalCheck. MyBalCheck gives users what they want when they want it by making account balances available at the touch of a button on mobile devices. Through its simplistic design, MyBalCheck saves time for users on the go by allowing them to easily access their accounts, keeping them updated and informed on their current financial situation. This service is desired by users for many reasons, primarily their attitude in regard to their financial awareness in light of tough economic climates. MyBalCheck allows users to quickly analyse and use account information to make efficient and fiscally responsible choices when deciding to manage their funds in an immediate time frame.

Primary Area: Mobile App

Secondary Area: E-Commerce

Primary OS: Android

Primary Technology: Java



Title: Automation of an Environmental Dust/Sampler
Name: Conor O'Quigley
Email: conor.oquigley2@mail.dcu.ie
Programme: Mechatronic Engineering
Supervisor: Dr. Lorna Fitzsimons



Project No 38

This project began years ago from funding from the EPA. The project was developed successfully up to a point. Work on the project ceased for years. It re-emerged this year in an attempt to improve environmental monitoring. The continuation of this project integrates mechanical design elements and electronic control using a microcontroller to produce an automated sampler. The report discusses the importance for the constant need for environmental monitoring by research conducted into the existing methods. The existing method is time consuming and requires extensive preparation. An alternative method of analysis, XRF (X-Ray Fluorescence) is discussed with respect to accuracy and speed. This project's aim is to develop a soil sampler that can, in future works, incorporate XRF analysis into a fully automated dust/soil sampler. The mechanical design aspect of this project was to improve on an existing design of a filter changer used for collecting dust samples. The new design's intent is successful in holding an XRF analyser in a position suitable to analyse dust samples. To embrace the new design, modifications of the existing design are used to assist the integration of the new design and the old design. The electronic control of this project combines microcontroller programming along with power management. The microcontroller controls two stepper motors and a micro- pump. It controls each of these in a way to present samples onto a stage where an XRF analyser can sample.

Primary Area: Mechanical Design and Microcontroller
Primary Technology: C/C++
Secondary Technology: Solidworks - 3D printing



Title: Re-routing Food Waste

Name: Louise Barry

Email: louise.barry23@mail.dcu.ie

Name: Niamh Gibbons

Email: niamh.gibbons2@mail.dcu.ie

Programme: Enterprise Computing

Supervisor: Prof. Alan Smeaton

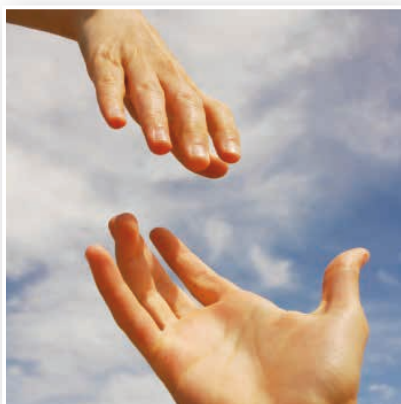


Project No 39

The service provides a solution for rerouting of food waste through a web application. It allows restaurants to donate food that is of good quality and allows charities to avail of this food at no cost. Restaurants and charities have accounts on the web application and use these accounts to advertise (restaurants) and accept (charities) food. We want to take the stigma away from charities having to almost beg for food, by using our web application they are choosing from food that is being offered to them in a respectful manner.

Primary Area: Re-routing Food Waste Service

Primary Technology: None



Title: Digital Guitar Tuner
Name: Cillian Donlon
Email: cillian.donlon2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. Alistair Sutherland



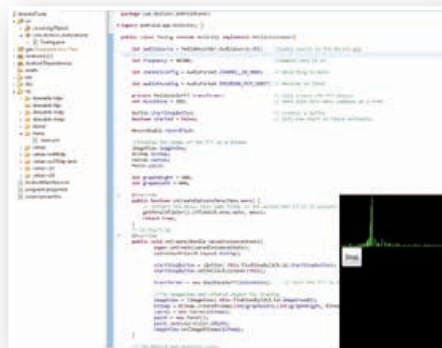
Project No 40

The goal of this application is to provide a portable and accurate instrument tuner to guitarists on the Android platform. The Tuner is designed to accurately calculate the frequency of a note using the inbuilt microphone in android smartphones and tablets. Using this frequency, the app will then compare this with the frequency of a correctly tuned guitar string and display the differences as either sharp or flat on a gauge.

The application uses the Fast Fourier Transform (FFT) algorithm to calculate the given microphone sample into its frequency in Hz. The Graphic User Interface displays the peaks of the notes on an FFT graph in real time as well as calculate its relative proximity to a set note frequency. The app also displays the differences accurately on a gauge, giving the user a clear indication how in tune a given played note is.

The tuner automatically detects the closest correct note to the played note and displays the difference. An option to tune a guitar against an exact note is also provided within the settings.

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Java
Secondary Technology: Fast Fourier Transform



Title: Electronic and Mechanical Control of a Horizontal Axis Wind Turbine

Name: Maurice Nugent

Email: maurice.nugent8@mail.dcu.ie

Programme: Mechatronic Engineering

Supervisor: Dr. Yann Delaure



Project No 41

There is a need in isolated rural areas for small wind turbines that can generate a modest amount of energy for battery recharging etc. Online communities share their experience and expertise to help enthusiasts build their own prototype turbines. The common objective is continuous improvement as small turbines exist in the shadow of large commercial wind farms. Ideas from commercial turbines and aerospace are being redesigned for easy incorporation into the small homebuilt turbine and one of these ideas is variable pitch. Variable pitch promises lower cut-in wind speed, better aerodynamic performance, and good speed control to reduce noise, vibration and long term stress on the turbine. This project will investigate what problems variable pitch is trying to solve and how it solves those problems. During the course of this project the same problems encountered by small prototype builders when they tried to incorporate variable pitch were encountered. Judging by the lack of small wind turbines with variable pitch the same conclusions were arrived at as well.

Primary Area: Renewable Energy Technology

Primary OS: Arduino

Primary Technology: 3D Modelling

Secondary Technology: Motor Control



Title: Commissioning of a Sectioned Petrol Engine for Engineering Display Purposes

Name: Muhammad Shakeel Qamar

Email: muhammed.qamar2@mail.dcu.ie

Programme: Mechanical and Manufacturing Engineering

Supervisor: Dr. Joseph Stokes



Project No 42

This basic need for the engine display was to make it as easy to understand as possible. As the author had already worked on the engine display for INTRA, he was in a good position to set the needed goals. Some of the aims of the project included making the display safe by designing and installing a protective cover, making an information DVD with animations of the engine, making posters and installing an interactive real-time lighting system to help users distinguish between each stroke in each cylinder. The cover and the DVD were made very early on in the project and the lighting system was built by the use of a LabJack and LabVIEW software controlling switches and different coloured LEDs. The combustion chambers in the engine now house bright LED that circulate between red, blue, green and white colours according to what stroke is taking place in the particular cylinder. The information on what colour signifies which stroke is given on a poster on the display.

Primary Area: Educational

Secondary Area: Software Development

Primary OS: Windows

Primary Technology: LabVIEW



Title: Who's There?
Name: Michael Ryan
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Programme: Software Engineering
Supervisor: David Gray



Project No 43

Have you ever wondered who has called to your house when you weren't in? Using a simple fingerprint scanner, some Java, PHP and your mobile phone, you can! Making use of an open source fingerprint scanner API, this project has created a system which allows a User to receive a notification when somebody 'rings' their doorbell. When a caller scans their fingerprint, it is checked against a database. If it is present, the name of the owner and their picture is sent to any listening android devices over the web. If it isn't present, the callers picture is taken and then sent to any connected devices.

This project could be applied in several real scenarios such as employees clocking into work, hotel room doors or even at point of sale. The cost of the equipment would be cost effective and the design of the system allows fingerprints /images to be taken on embedded systems (A Raspberry Pi for example.). All the software is written in Java (utilizing Java Native Interface bridges to the fingerprint scanner and web-cam) and PHP. The project as a whole provides a demonstration of how some completely different technologies can be brought together to create an elegant, functional system.

Primary Area: Software Development
Secondary Area: Mobile App
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: PHP



Title: TDE Game Engine
Name: Neil Donnelly
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Programme: Software Engineering
Supervisor: David Sinclair

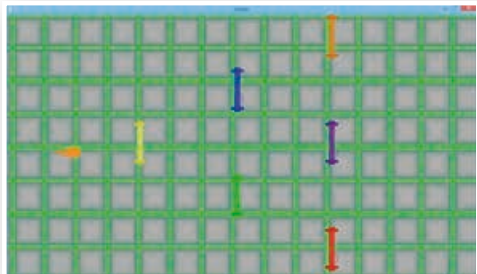


Project No 44

The TDE Game Engine is a framework designed to allow developers to quickly build 2D game prototypes. The engine was built using C++ with support from OpenGL and SDL. The aim of the project was for the engine to be versatile and robust enough for any type of 2D game to be created from top-down strategy to fluid side- scrollers. As an example of this, two games were built to demonstrate the versatility of the TDE Engine. The engine offers support for quickly adding textures, building animations, playing music and sounds, drawing texts from any provided font and offering easy to use input interfaces from mouse and keyboard.

The graphics portion of the engine supports multiple image formats such as PNG, JPEG, BMP and others, using the SDL_image library and uses OpenGL to draw the images to the screen. The engine also supports the use of texture atlases utilizing a texture atlas packing tool provided with the engine developed using Python. Similarly, the fonts and animations are collected by SDL libraries and then drawn using OpenGL textures. The engine supports the use of any TrueType Font provided by the user. Animations can be created using images already stored by the engine, or breaking a single composite image into its individual frames. The audio supports formats such as WAV, MP3, Ogg Vorbis and MIDI.

Primary Area: Gaming
Secondary Area: Multimedia
Primary OS: Windows
Primary Technology: C/C++
Secondary Technology: OpenGL, SDL



Title: Accelerometer-Graph: A Smartphone Application to Capture Accelerometer Data

Name: Brian Tyrrell

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Programme: Mechanical and Manufacturing Engineering

Supervisor: Dr. Bryan MacDonald



Project No 45

Accelerometer-Graph is an Android smart phone app that allows the user to access data from the on-board accelerometer sensor. Two interfaces were developed. The first interface shows the raw data from the accelerometer as series of three bars (one for each axis). The second interface is more complex and graphs the outputs from the accelerometer sensor against time in real-time. The second interface also allows for writing of the accelerometer output to a csv file for later analysis by the user. The developed app is intended for use by engineers who may need to take accelerometer readings in the field or who may require some coarse data for analysis before sourcing a specialist stand-alone accelerometer.

Primary Area: Mobile App

Primary OS: Android

Primary Technology: Java

Secondary Technology: Eclipse



Title: EasyOrder
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Email: kevin.conlan3@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. Kevin Casey



Project No 46

EasyOrder is an Android mobile application designed for use in a pub/bar which serves food. Currently when in a bar looking to order food the customer would find a table and wait for a waiter/waitress to approach their table to take their order. Usually when the waiter/waitress approaches the table the customer would not be ready to order and the waiter/waitress would go off and come back a short time later. Why can't you order food using your Android smartphone? There are many thousands of apps doing all sorts but none for ordering food in a bar! With EasyOrder the customer can now in their own time create their own order using their Android powered smartphone. All the user has to do is scan a QR (Quick Response Code) which is located next to each menu item and this data is added to an order on the EasyOrder application. When the user has completed scanning their order he/she can simply submit this order to the bar when the food is prepared. When an order is submitted the order will become visible to staff behind the bar on the EasyOrder web application sitting on a web browser or tablet web browser.

Primary Area: Mobile App
Secondary Area: Web Application
Primary OS: Android
Primary Technology: Java
Secondary Technology: PHP



Title: Mobile Alert Management System
Name: Szymon Zielinski
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Programme: Software Engineering
Supervisor: Prof. Joseph Morris



Project No 47

Standard Android applications allow for very little control over how the phone should respond to phone calls, text messages and emails; everything has to be micro-managed by the user. This application will resolve a portion of that problem. The user will be enabled to define a set of rules/filters once, and after that the handling of the incoming calls that fall within those rules will be automated by the application.

This project involves writing an Android application that allows the user to manage how they are alerted when their mobile devices receive a call, an SMS text message, or an e-mail. It will allow fine control, including recognising the sender and the nature of the incoming information.

For example, the user will be able to specify that the phone should use its silent mode for any incoming calls at a certain time of day. The application will also be able to look at text messages from particular senders and search for user-defined keywords which dictate how it should behave. E.g., text messages from Person A with the word "emergency" might play a sound notification regardless of the time of day or location.

The target user group includes all Android smartphone owners who use the silent mode periodically, have different set ups for different callers (e.g. different ringtones), or who have the need to use more sophisticated caller control options.

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Java
Secondary Technology: XML



Title: CS One Online
Name: Keith Curtis
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Programme: Software Engineering
Supervisor: John McKenna



Project No 48

This project teaches basic computer science concepts to novice programmers. It is deployed as a HTML5 web-based application introducing the learner to basic concepts such as variable creation and swapping, if statements, looping and a basic introduction to recursion. The application features a parser developed in JavaScript to accept basic commands and execute them, showing the resulting variables on screen. The user is incrementally introduced to the parser, building up their knowledge as they progress. The application also features a web forum for learners to start their own topics and communicate with other learners. The functionality and tutorial plan of this project was guided by research into the most common problems novice programmers experience.

Primary Area: Web Application
Secondary Area: Educational
Primary OS: Multi-platform
Primary Technology: JSP/Servlets
Secondary Technology: HTML5



Title: Spaci - Geo-Location iOS Application
Name: Stephen Kerr
Email: stephen.kerr2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. David Gray



Project No 49

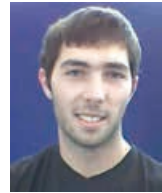
Spaci is a discovery application for users, it is used to help users find interesting things nearby, whether it be a location or a product a space sells. The network revolves around geographical locations known to the network as spaces. A space can be anything, from a local school to a nearby park, these spaces contain information such as products, locations and tagged items. A space is open and can be modified by any logged-in user. Users have their own profile and can follow spaces and other people, by following a space they will get the latest updates and news associated to those spaces, by following a user they will learn about contributions and reviews a user has made to the network. The application consists of a couple of areas, such areas are the explore section where users can learn about what is nearby, they can easily change the coverage area which will change the results the user will see. Next we have the News Stream, it contains updates and news about whats nearby and subscribed people and spaces.

Users can easily find what spaces are nearby by clicking the nearby button in the top right of the application, they will be presented with a map with a number of markers based around their location, these markers represent spaces. A space also contains products that users can easily add to a space, they can take a photo of the product, add a description and post it to the network. Users can review these products and rate the product by clicking either love or unlike. A space also contains locations, locations are sub-locations of the space, these would be a room inside an office building or a school. A user can click on a location and learn more about it, locations can also be placed on different floors, a user can easily go up or down floors. A user must be in a space in order to add a location as the location is based on their current geographical location. The iOS application was built using Objective-C and the Xcode environment, the server was built using PHP and for the database MySQL was used.

Primary Area: GPS/GIS
Secondary Area: Social Networking
Primary OS: Mac_iOS
Primary Technology: Objective-C
Secondary Technology: PHP



Title: Spillage Sensing Device
Name: Ciaran McCann
Email: ciaran.mccann8@mail.dcu.ie
Programme: Mechanical and Manufacturing Engineering
Supervisor: Dr. Tamas Szecsi

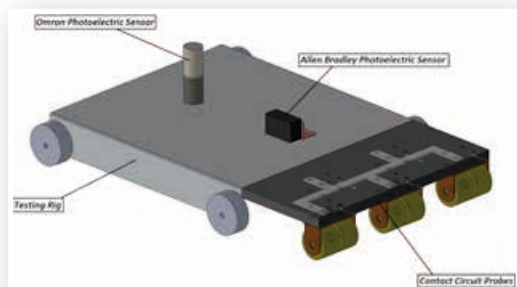


Project No 50

This project outlines the conception of a number of sensing methods for the design of a spillage sensing device that will be used in conjunction with a fleet of autonomous hospital robots in a hospital environment in the EU-funded IWARD project. A number of European universities were tasked with developing each part of the robot, with DCU being assigned the module development. As part of this module development, specifically in conjunction with the cleaning module, a spillage sensing device needed to be developed. This project outlines the testing of conceptual sensing ideas for such a device, utilizing photoelectric sensors and electrical conductivity sensors.

The photoelectric sensors are used to measure surface reflectivity. When the sensor is moved over a spill, the light reflected off that spill will be different to the light reflected by the floor. The electrical conductivity sensor works in a similar manner, except it monitors the electrical conductance between two probes in contact with the floor. When a conductive material crosses both probes (e.g. water), a signal is sent to a robot that a spill has been detected. It was found after extensive testing, that two different types of photoelectric diffuse sensors (infrared and visible light) were capable of detecting a number of liquid spills on two different floor types (matte floors and shiny floors). Also, the conductivity sensor was able to detect a number of liquid spills on the same two floor types, in addition to many other electrically conductive materials. It was concluded that the sensing methods outlined in this report were successful at detecting liquid spills, and therefore could be carried on for further development of the spillage sensing device.

Primary Area: Sensor Technology
Secondary Area: Artificial Intelligence
Primary OS: Multi-platform
Primary Technology: Java



Title: Kellcam Feedback Reaction Test
Name: Maebh Kelly
Email: maebh.kelly89@mail.dcu.ie
Name: Owen Campbell
Email: owen.campbell2@mail.dcu.ie
Programme: Enterprise Computing
Supervisor: Professor Alan Smeaton



Project No 51

This project is to determine if a person's reactions can improve depending on the type of feedback that they are given. This was done through the creation of a game that asks the user to hit targets at random, over a period of 60 seconds. The aim of this project was to determine what is the best way to distribute feedback to users, and show how much of an impact this has on how quickly they will improve at the game. In order to do this the idea of the Batak test was used and a version of this was built. This was then connected to a Makey-Makey invention kit, and a program was created that provided the user with commands which they must complete.

The Makey-Makey invention kit provides the ability to use any object to replace a keyboard function. This allows this reaction test to be customizable with any conductive object being used as an interface with the reaction test. With advice from members of the School of Health and Human Performance staff, a number of different test groups were used to conduct the tests. The groups received different types of feedback which had an impact on their ability and rate of improvement. This project aimed to show the importance of ecological learning and how feedback is important in improving performance. Each group received a different type of feedback, for example; one group received feedback after every test; one group received feedback after every session of tests; one group received no feedback; the final group received corrupted feedback.

Primary Area: Sensor Technology

Primary Technology: C/C++



Title: Smart Phone Energy Saver
Name: Reenu Rani
Email: rani.reenu2@mail.dcu.ie
Programme: Info and Communications Engineering
Supervisor: Dr. Sean Marlow and Dr. Hrishikesh Venkataraman



Project No 52

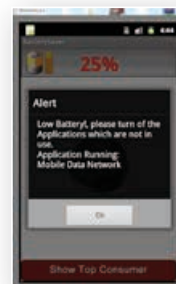
The "Smart Phone Energy Saver" is an Android application to manage the battery power of Android-based Smartphones. Today's mobile phones are not just used for making and receiving phone calls, but also to listen to music, watch videos, GPS navigation, web surfing, updating software, playing games and much more. They have become small PCs in our hands. A big problem in the mobile world is that the devices are battery powered, and the battery technologies do not match the required energy demand of compute-intensive applications.

The aim of this project is to find an efficient way to increase battery life. In order to do this, the first step is to evaluate the power consumption of the various phone components and applications, and their effect on battery life. Based on the data collected, we developed an app to inform users of the top contenders for energy drain, allowing them to choose those applications which are easier on the battery. It also allows configuration changes to the device and its screen that prolong battery life, such as image adaptation, and innovative playback schemes that seamlessly vary the screen brightness, thereby optimising the energy consumption.

Once our app is started it runs in the background. It gives a warning popup message if the battery level is reduced to 25%. It automatically reduces the brightness of the phone and changes the wallpaper to black background. It also provides a list of applications responsible for most battery consumption, allowing them to be turned off if they are not required. If the battery is not charged and further reduces to 10% of total power, it again shows a reminder to stop all of the out-of-use applications that are consuming power. If phone users use the app with the simple battery saving setting, the phone is a lot less likely to die on them when they need it most.

In the course of the project I gained lot of knowledge on Android-based Smartphones. I learnt about different display technologies, and operating system features and programming for mobile devices. I had fun in developing the application, encountering bugs and then rising to the challenge of debugging them.

Primary Area: Mobile App
Secondary Area: Software Development
Primary OS: Android
Primary Technology: Java
Secondary Technology: Eclipse



Title: Non-linear Analysis of Digitally Controller
Power Electronic Converters

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Programme: Mechatronic Engineering

Supervisor: Dr. Marissa Condon



Project No 53

The aim of this project is to investigate the occurrence of limit cycles in a digitally controller buck converter with a view to elimination of limit cycles.

A buck converter converts voltage on one level to voltage on another level. It finds applications in a wide range of sectors such as communications, consumer electronics and the health sector. A controller is required for load regulation to maintain the output voltage at a desired level. Traditionally, analog controllers were used. However, digital control techniques are superior owing to lower sensitivity, reprogrammability and the possibility for more sophisticated control techniques. Yet, the occurrence of limit cycles prevents its widespread adoption.

Limit cycles are oscillations of the regulated output under steady state conditions. They occur due to quantization in the digital controller. They are cycles or oscillations of the regulated output. They are generally undesirable as they degrade the output performance. This research aims to address these issues and aid the widespread adoption of digital controllers.

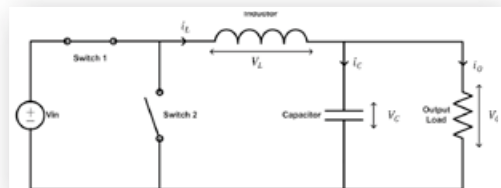
Firstly, the research examines the occurrence of limit cycles in an ideal buck converter. Extra elements are then added to bring the model closer to real world models. The research investigates their effect on the occurrence and nature of limit cycles. The research establishes that, as the equivalent series resistance increases the amplitude of the limit cycle decreases until the limit cycle is eliminated.

The research then proceeds to study the effect of frequency on the amplitude of the limit cycles. Bounds are established for each frequency. The effects of the controller parameters are then examined. The occurrence of limit cycles was found to be dependent on each of these values.

Finally, filtering is explored as a method for the elimination of limit cycles. Two filters were considered; a notch filter and a comb filter.

Primary Area: Power Electronics

Primary Technology: Matlab



Title: Development of a Smartphone app to assist in pre-surgical planning

Name: Jordan Cahill

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Programme: Biomedical Engineering

Supervisor: Dr. Bryan MacDonald



Project No 54

Orthopaedic surgeons commonly use bone-plate-screw constructs to fix fractured bones which facilitates healing. For each clinical case several possible combinations of plates and screws exist. The surgeon will commonly calculate the area moment of inertia (AMI) of each construct in order to determine which construct has the most favourable bending behaviour. These calculations can be quite distracting for the surgeon who doesn't have a background in engineering or mathematics. The main objective of this final year project was to develop a Smartphone app that will automatically calculate the area moment of inertia of a bone-plate construct based on input values from the user. The app takes in user values for the dimensions of the plate and bone and uses these to calculate the combined AMI of the construct. The app has been developed to a basic level which will be built upon in future final year projects to include different implant types and a more graphical user friendly interface.

Primary Area: Mobile App

Primary OS: Android

Primary Technology: Java

Secondary Technology: Eclipse



Title: Web portal with searchable document retrieval and knowledge base

Name: Ronan Hughes

Email: ronan.hughes24@mail.dcu.ie

Programme: Enterprise Computing

Supervisor: Stephen Blott



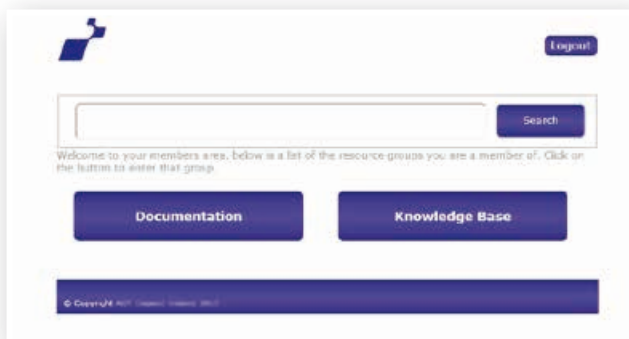
Project No 55

A web portal containing a members area, within the members area there are various resource groups. Registered users are allocated to one or all of the resource groups available. The members area is totally scalable with the administrator having ability to add/delete resources as required. Resource groups can be added by creating pages within the resource group and each article originating from the child pages created underneath. The groups within the members area can be published or unpublished in whole or in part. The portal was developed using the ModX content management system using various add-ons such as Wayfinder, GetResources, Articles and Cliche. The knowledge base was written using PHP and incorporating template variables to enhance the functionality and ease of use of the portal. MySQL was used to build the knowledge base database structure with new knowledge items being added from within the portal using the ModX FormIt addon. Each knowledge item is searchable by keywords with a list of possible items being returned.

Primary Area: Web Application

Primary OS: Unix/Linux

Primary Technology: Modx and PHP



Title: OrderBuddy Restaurant Ordering System
Name: Conor Gleeson
Email: conor.gleeson8@mail.dcu.ie
Programme: Enterprise Computing
Supervisor: Dr. Joe Morris



Project No 56

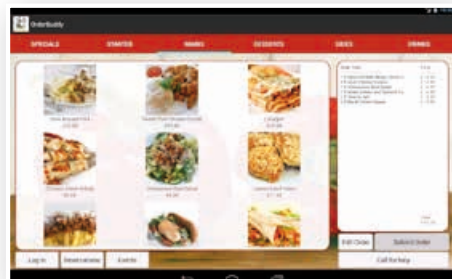
OrderBuddy is a multi-channel ordering system, offering in store self service and online ordering functionality. OrderBuddy's innovative in store solution introduces self service ordering in restaurants by providing customers with a handheld device where they can view and order menu items. This Android based application provides a level of control which will ensure that misinterpreted orders are a thing of the past whilst normalising resource utilisation, especially during peak periods.

This ordering model was developed in response to changing consumer priorities and technical capabilities in recent years. Studies have shown that casual diners place a greater emphasis on service efficiency and value for money in lieu of personal service. OrderBuddy facilitates this by reducing operational costs and reducing the per-customer transaction time. Service efficiency is further improved with OrderBuddy's 'on the move' ordering system which allows customers to order their food online in advance of arrival. OrderBuddy breaks down communication obstacles between restaurants and customers while eliminating language barriers with its multilingual capabilities.

OrderBuddy provides a management portal for updating in store menus, online menu catalogs and digital menu boards simultaneously. This information updates with immediate effect which helps to prevent customer dissatisfaction. This portal can also assist automated calorie count calculations.

The system provides restaurant customers with a common log in, allowing them to benefit from special offers and rewards schemes, whilst providing a platform for data mining and reporting for the restaurant. OrderBuddy is designed to reduce required implementation and maintenance efforts as menu information is stored in a self implemented cloud environment and user accounts can be created from social network accounts, through the OAuth protocol.

Primary Area: Mobile App
Secondary Area: Cloud Computing
Primary OS: Android
Primary Technology: Java
Secondary Technology: Openstack Swift
Object Storage
Platform





This project has been designed to analyse bibliographic data to identify relationships between data which has common characteristics and to display this analysed data in a variety of visual models and graphs, allowing a user to interpret the data in an intuitive manner. The application is designed to be a valuable tool for the quick and automated analysis of bibliographic data by the target users (Academics, PhD researchers and undergraduate students). The project aims to illustrate the relationships between data sources to identify important authors, years, journals or topics of a field of study along with providing interactive ability to create a unique demonstration within presentations to further indicate the importance of certain areas. The application came from a personal experience of having a wide ranging collection of references while seeking to understand what topics or authors were important and the difficulty involved in relating the references to each other. A key focus for this project was to deliver visual displays of data which provided affordance making them instantly interpretable for the user.

Primary Technology: PHP



Title: Controlled Drug Release from Polymeric Micelles Using HPLFU

Name: Rory Gibney

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Programme: Biomedical Engineering

Supervisor: Dr. Garrett McGuinness



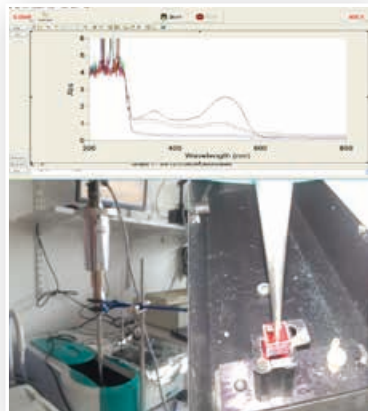
Project No 58

This project was the first of what will hopefully be multiple projects in the School of Mechanical & Manufacturing Engineering, investigating controlled drug release from polymeric micelles using high-power low-frequency ultrasound (HPLFU). Pluronic F-127 was used as the raw material for the polymeric micelles. Pluronic micelles have gained much interest in drug delivery applications because of their ability to form micelles, to encapsulate hydrophobic drugs, and to avoid opsonisation and clearance by RES (reticuloendothelial system). Similar studies have been performed many times elsewhere using fluorescent dyes or drugs with fluorescent properties (fluorophores) which are often toxic and highly expensive. As an alternative to these, a mixture of analytical techniques was used to characterise the release of the non-toxic, inexpensive hydrophobic dye, Oil Red O, from polymeric micelles using HPLFU. The micelles were characterised and measured using dynamic light scattering. Neither vision from the naked eye, UV-vis spectrophotometry nor fluorescence spectrometry was successful in characterising the release of the dye from micelles. This was not to say that the dye was not being released but rather there was little observable change in its absorption between the hydrophobic core of the micelles and the aqueous solution. Therefore it was concluded that Oil Red O is not an appropriate non-toxic alternative to fluorophores for characterising the release of the contents of micellar hydrophobic cores using HPLFU.

Primary Area: Biomedical engineering

Primary Technology: Ultrasound

Secondary Technology: UV-vis spectrophotometry



Title: CAO like Database Application using SAP HANA
Name: Eoin Ffrench
Email: eoin_ffrench2@hotmail.com
Programme: Software Engineering
Supervisor: Ray Walshe



Project No 59

The Central Applications Office (CAO) is responsible for issuing most of the undergraduate placements in Ireland. Every year it receives several thousand applications and from prospective students, therefore the processing of these applications takes a considerable amount of time. The CAO require a lot of information from students including an array of documentation. Some of which needs to be submitted by applicants via the postal service in paper form. These files need to be sorted and sent to the appropriate colleges. My project aims to help with the complexity of the overall system while cutting out the middleman. The CAO automates the applications from Leaving Certificate students but still relies on the postal system to receive documentation from all other applicants such as mature students. My system uses a SAP HANA database to decrease the computing time of issuing places while allowing applicants to upload important documents which the existing CAO database does not have the facilities to do at the moment. This should greatly increase the turnaround time of issuing placements to students while reducing costs to both applicants and administrators alike.

Primary Area: Databases
Secondary Area: Document Processing
Primary Technology: SQL
Secondary Technology: Ruby



Title: Taxi Assistance Driver's Application
Name: Karen Kuras
Email: karen.kuras2@mail.dcu.ie
Name: Rachel Bohan
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Programme: Enterprise Computing
Supervisor: Prof. Alan Smeaton



Project No 60

The Taxi Assistance Driver's Application (TADA) is an android smartphone application that provides taxi drivers and taxi companies with information on the locations in which they are most likely to find customers. It also provides a 'mobile office' for taxi drivers, incorporating a range of features aimed to improve their productivity and profitability.

Locations of possible job fares are displayed in a list and map format ranked by time and proximity to the driver. These possible fares are based on information gathered through a number of integrated APIs and includes;

- Event start and end times
- Flight arrival times,
- Train & DART arrival times,
- Bus Eireann service arrival times.

Extensive market research was carried out to define the features that would be of most benefit to our target market. These features include:

- Job Bursts: The system shall allow users to create and share job bursts to notify other taxi drivers in the area of large groups of people awaiting a taxi service.
- Fare Calculator: This feature shall allow users to input a destination and calculate the approximate cost of the taxi fare to the destination from the user's current location.
- Taxi Drivers Forum: This feature shall provide a chat forum for users to communicate and share information with each other.
- Traffic Information: This feature shall provide traffic alerts for areas nearby the user's location.

The application is targeted at both taxi drivers and companies initially within the Dublin region and has potential for expansion both nationally and internationally. Providing this type of insight will reduce the waiting times between fares that are currently experienced by the majority of taxi drivers thus increasing their productivity and profitability.

Primary Area: Android Development
Secondary Area: Enterprise Application
Primary OS: Android
Primary Technology: Java
Secondary Technology: Python, XML, MySQL and PHP



Title: Finite Element Analysis of Fracture Fixation
Name: Katie Hughes
Email: katie.hughes6@mail.dcu.ie
Programme: Biomedical Engineering
Supervisor: Dr. Bryan Mac Donald



Project No 61

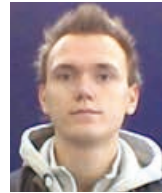
This project aims to help reduce the incidence of non-unions in fracture healing. It aims to do this by finding the optimal distance to fix two bone fragments together which will promote bone healing. Two different bone fixation materials; stainless steel and a Kevlar/BCP composite, with Young's Moduli of 200GPa and 27.7GPa respectively, are simulated at different thicknesses using finite element analysis. FEA allows the prediction of the interfragmentary strains experienced at the various gap sizes, from the displacements at the fracture gap. The optimal interfragmentary strain for bone healing is between 2-10% such that certain fracture gaps and material thicknesses may not be suitable. The simulations are carried out on a model of the human tibia with forces representing the patient standing on one, and both legs.

It was found that Kevlar/BCP composite was the best material to promote bone healing, with a fracture gap size of 3mm as under these conditions the most favourable strains were experienced. It was found that a plate thickness of between 4-6mm was suitable for use with this material and fracture gap size.

Primary Area: Finite Element Analysis
Secondary Area: Orthopaedics
Primary Technology: ANSYS



Title: Chess World for the World Wide Mind
Name: Dmitri Lerko
Email: dmitri.lerko2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Mark Humphrys



Project No 62

This project is based on World Wide Mind framework (bitly.com/PEJ5RL). Project implements a fully functional instance of the 'Chess World'. This will allow students to implement their own Artificial Intelligence minds (chess engines) and compete with others. World will also allow for the use of 3rd party Minds. It will be possible to use open source chess engines as 'Chess World' will have an open source standard interface support for xBoard compatible chess engines (bitly.com/7NcTMj). Chess World will have an appealing Graphical User Interface where chess desk will be clearly represented along with the current state and important game information (e.g. move number, predictions, past moves, etc).

Users of the system are expected to have a prior knowledge of the Java and basic understanding of the chess gameplay. User can edit a supplied 'skeleton' sample Mind to develop and expand its functionality. It is also possible to combine number of existing Chess Minds by creating a new mind which trigger other minds under certain conditions. Such an approach will ultimately allow for creation of a superior Chess Minds that only play to its strength.

Chess World also allow for non-standard interface engines to be used, however user will have to implement an interface that either compatible with xBoard or Chess World own native communication protocol.

Learning Challenges: - Creation of fully functional chess engine with move validation. - Analyze AI of the most advanced open-source engines and closed source leading engine Houdini when played against each other. - Adapt WWM based World for work with 3rd party Chess Engines by means of connectivity, communication, management of the game events and graphical representation of the chess game. - Allow for AI competition as a measure of AI sophistication.

Primary Area: Artificial Intelligence
Primary OS: Multi-platform
Primary Technology: Java



Title: An Internet Controlled Embedded Linux
Smart Security Camera

Name: James Reilly

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Programme: Digital Media Engineering

Supervisor: Dr. Derek Molloy



Project No 63

Last year in Ireland alone there were 27,774 burglaries and related crimes, the vast amount of these going unsolved. Gathering good evidence is key to catching the culprit.

This project, code named 'Peeping Penguin,' is a low-cost, low-power, extensible surveillance system. Made from commodity hardware, and being modular by design, it can adapt to the wants of the user. It can handle numerous cameras, both mobile and static, can interface with existing alarm systems, will alert the user upon intrusion and footage can be viewed at any time over the web.

The system is based on the Raspberry Pi platform and uses Python as the primary programming language.

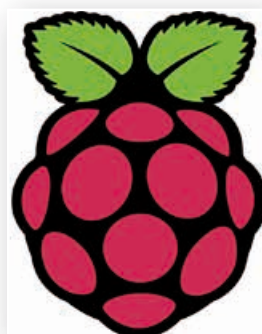
Primary Area: Security

Secondary Area: Embedded Systems

Primary OS: Unix/Linux

Primary Technology: Python

Secondary Technology: Raspberry Pi



Title: Music On The Move
Name: Thomad Downes
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Programme: Software Engineering
Supervisor: Dr. Monica Ward



Project No 64

Music On The Move is a project consisting of a website written in PHP and making use of HTML5 and also an Android app. It allows users to upload their music onto their personal accounts and to listen to them from any HTML5 compatible browser or the Android app.

The user can sign up with an email or log in through facebook. On the website users have the option to upload and rename audio files just as they would in a conventional music library. Music can be played back through the site which uses HTML5's built in audio player. An Android app has also been created that allows users to log into their account and play back their audio files on their device.

HTML5 is a relatively new mark-up language but is supported by the latest versions of all mainstream browsers. It allows audio playback without any software needed on the computer as well as many other advantages. Mobile data speeds look set to improve dramatically this year with the state selling 4G licenses and the mobile network '3' have announced they intend to launch a 4G service in August.

Primary Area: Web Application
Secondary Area: Mobile App
Primary OS: Multi-platform
Primary Technology: PHP
Secondary Technology: Java



Title: SyncFS - A Synchronous Distributed Filesystem
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Programme: Software Engineering
Supervisor: Stephen Blott



Project No 65

This project aims to provide the user with an alternative to Dropbox, Google Drive and other cloud storage and backup solutions. SyncFS uses the FUSE library in order to create a filesystem that the user has complete control over as well as freeing them from storage limits and other such restrictions. The user is free to run the server wherever it is convenient for them and connect as many clients as they choose.

This filesystem has been developed with programmers in mind. Often other cloud systems synchronise everything in a particular folder, however this is often unnecessary for a programmer as binary files can be generated easily by compiling the source code again. This project gives them a simple way of ignoring such files if their source code is present.

Primary Area: Filesystems
Secondary Area: Distributed Systems
Primary OS: Unix/Linux
Primary Technology: Python
Secondary Technology: FUSE



Title: ESP: Security Plugin
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Programme: Software Engineering
Supervisor: Renaat Verbruggen



Project No 66

ESP: Security Plugin is a static analysis tool for the Eclipse IDE, which focuses on finding potential security vulnerabilities in Java code. It was designed to run in real time as developers work, to provide immediate feedback about any issues as they're introduced.

ESP runs silently in the background, only activating after developers stop typing so as not to disturb their normal workflow. ESP is also highly configurable, with scanning rules externalised in simple XML files. This lets support for new libraries and any custom internal packages a company may use to be deployed easily. Warnings generated by ESP integrate with the look and feel of Eclipse, appearing like syntax markers within the editor window. The messages displayed by these warnings can be customised in a similar way to scanning rules.

Created in Java, ESP leverages the Java Development Tool API provided by Eclipse to create an Abstract Syntax Tree which can then be analysed for patterns that indicate security bugs.

ESP is released under the MIT License. More information on the project, including source code and an installation site for Eclipse, is available at <http://www.espsecurityplugin.com>

Primary Area: Security
Secondary Area: Software Development
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: XML

ESP: Security Plugin



Title: MoneyJar
Name: Declan Grogan
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Programme: Software Engineering
Supervisor: David Gray



Project No 67

MoneyJar is an android application that aims to help users make a difference in their lives and the lives of others. People giving up habits or getting into an exercise program sometimes need motivation, this app aims to provide just that. MoneyJar allows the users to set out their weekly plan, if the users don't keep to their plan they will be prompted to donate money to a charity of their choice using paypals android sdk. If they are sticking to their plan they do not have to donate. This application is mainly aimed toward people with disposable income and a charitable disposition. The application has been built using the Android SDK, Java and XML.

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Java
Secondary Technology: XML



Title: Anois - An e-marketing Smartphone Application

Name: David O'Brien

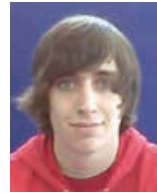
Email: david.obrien57@mail.dcu.ie

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Programme: Enterprise Computing

Supervisor: Dr. Cathal Gurrin



Project No 68

'Anois' is a location based e-marketing smartphone application for iPhone and Android devices. The application builds a user profile on a shopper and will send notifications of retail outlets which are of close proximity that sells goods and services which the shopper has indicated they have an interest in. Upon download and installation the Anois system uses the GPS location of the shoppers smartphone and searches for retail outlets which sells goods or services suited to the user that are close to them.

The application will send a notification message to a user's smartphone, informing the user of a product or service that they have a genuine interest in, that is physically close to their location.

Anois also aims to tackle the inconveniences which shoppers regularly have to deal with in terms of deal notifications. Various deal applications often inform users of 'deals' which are of little or no interest to them. Through the establishment of the user profile, shoppers will be enabled to receive deal notifications which are more suited to their taste and more likely to purchase.

The value of this product can be seen when a potential customer is walking through town or a shopping centre. Though gps location, and the phone accelerometer, when a user is judged to be most likely shopping close to a store with products included in our database, they will be made aware of the availability / closeness of the product.

The user will not be bombarded with many products that they may or may not have a real a interest in. The best matched product and most likely for future investigation from the user will be sent.

Through the development of an application such as this one it is hoped that it will act as a bridge between the physical and digital worlds. Due to the decrease in sales from physical outlets as a result in growth from online shopping this application when installed on a user's device may trigger an impulse for the customer to make a purchase from a physical retail outlet.

Primary Area: E-Commerce

Secondary Area: Mobile App

Primary OS: Multi-platform

Primary Technology: Objective-C

Secondary Technology: Java



Title: Redesign of the Chemical Storage Area in the Xtratherm UK Plant

Name: Corinne O'Connell

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Programme: Biomedical Engineering

Supervisor: Dr. John Geraghty



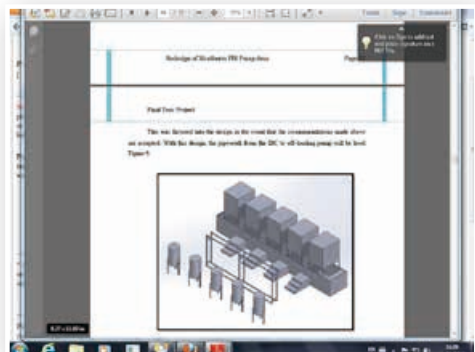
Project No 69

This project is a design project for the chemical layout and chemical storage area in the Xtratherm factory based in Chesterfield, UK. The report will look at the current chemical layout, assess the risks and design a new layout which will minimise the risks and provide a better working environment. The project will focus on the layout of the wet end of the production process and aim to improve health and safety in the area. The new layout will provide better access to the pump sets, IBCs and emergency shower. The ATEX room will be extended in order to improve access to the equipment which will provide a safer working environment while carrying out any tasks on the equipment such as repair, service or calibration. The report takes Project Management theory into account and makes recommendations on the best way to manage the project. It will also review the applicable Health and Safety regulations ensuring that the area is fully compliant with all requirements. This includes the insurance guidelines as well as the regulations and legislations as outlined by the UK Health and Safety Executive. An ethical review was undertaken to ensure that the project takes all ethical aspects into account. It will be concluded that the new layout will provide a better working area for all and eliminate or reduce risks where possible. It will increase the health and safety of the area which is of the utmost importance considering the chemicals in the area.

Primary Area: Redesign

Secondary Area: Health and Safety

Primary Technology: Solidworks



Title: Industrial Chiller Efficiency and Financial Cost Analysis
Name: Kieran O'Neill
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Programme: Mechanical and Manufacturing Engineering
Supervisor: Dr. Brian Corcoran



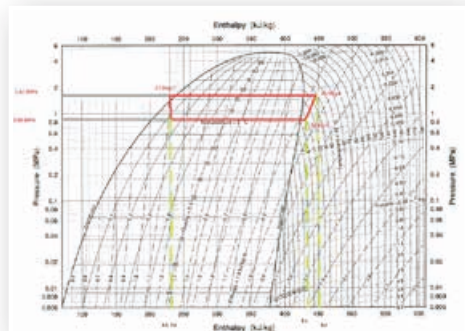
Project No 70

There is a growing interest in appliance and building efficiency and the financial cost of any system inefficiency. Sustainable and green energy is beginning to play a more prominent role in modern industry, as people begin to realise that the world's fossil fuel based approach cannot last forever. This report set out to investigate the thermodynamic efficiency and financial cost of an industrial chiller based at the National Metrology Laboratory. In order to calculate these values, a number of measurements needed to be taken. These include measuring the temperature at different points along the refrigeration cycle, noting pressure values at different points on the cycle and measuring the electrical power input to the chiller during normal operating conditions. The temperature values were measured using a data-logging software package called Pico. This was installed on the author's laptop. Applying the temperature and pressure values to the refrigerant's pressure-enthalpy chart allowed the calculation of the chiller's coefficient of performance. This was calculated as 9.75. The chiller's maximum coefficient of performance was calculated as 10.03. The electrical power input to the chiller was measured using a clamp-on wattmeter. This power input in kW was converted to kWh and an approximate financial value was calculated using information from the NML's monthly electricity bills. The approximate yearly cost of the chiller to the NML is €14,240. The proximity of the chiller's coefficient of performance to its maximum coefficient of performance leads to a belief that the chiller is operating as well as possible. This is a likely outcome, as the chiller is relatively new, having been installed in 2007.

Primary Area: Thermodynamic
Performance and
Energy Usage

Primary OS: Windows

Primary Technology: Pico Data Logging
Thermocouple



Title: Identifying and Analysing Natural Hand Gestures for TV Motion Control

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Programme: Enterprise Computing

Supervisor: Dr. Alistair Sutherland



Project No 71

Our project is aimed at identifying a Universal Set of Natural Hand Gestures for Television Motion control. We have interviewed participants from both the Western European and Asian Demographics and identified a common trend for the various controls which are necessary for Smart TV navigation. We have analysed the associated stress levels for participants while performing our Natural Set of Hand Gestures and compared them against the set of hand gestures currently being implemented by market leaders in the Smart TV Industry. All of the data we have captured through the various interview processes has been analysed and documented in our final report for the television industry.

As part of our project, we have researched the Smart TV market and analysed its forecasted growth over the next few years. We have gauged user sentiment on a standardised set of hand gestures across various TV brands and established what effect this could have on consumer buyer behaviour.

We have analysed various potential markets which could implement hand gesture controls in the future and how the development of a Universal Set of Hand Gestures for the potential devices would benefit the manufacturers of these products. The identification and analysis of the hand gesture controls for Smart TVs will serve as a use case for the potential development of motion control within other markets.

Primary Area: Sensor Technology

Secondary Area: Television

Primary Technology: Motion Sensor



Title: Analysis of the Effects of Sintering on a Vitallium Femoral Knee Implant

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Programme: Biomedical Engineering

Supervisor: Garrett McGuinness



Project No 72

This project was undertaken with the support of Stryker Orthopaedics. The purpose of the project was to analyse the femoral component of a total knee replacement system following a sintering process. This particular sintering step is designed to attach tiny beads to the bone-implant surface thus providing improved fixation as the bone cells merge with the surface of the implant. The main focus of the project is to establish the mechanical differences between the parts that have been beaded and standard implants and to analyse their behaviour during manufacturing.

The sintering process requires that the implants be subjected to 3 extra heat cycles in comparison to the average implant. The maximum heat reached during the sintering cycle is above the cobalt-based alloys recrystallization temperature which consequently leads to an effect on the implants microstructure.

The project consisted of two main sections: tensile testing to establish the material properties of both the sintered and non-sintered implants and finite element analysis representing a particular process step within the Stryker production line. The purpose of the FEA was to establish whether or not the sintered parts were more likely to fail under the constraints of this particular process step.

Tensile testing established that sintering has no effect on the Vitallium yield strength or on the Young's Modulus. It does however increase the implants plasticity, with an increase in both failure strain and ultimate tensile strength.

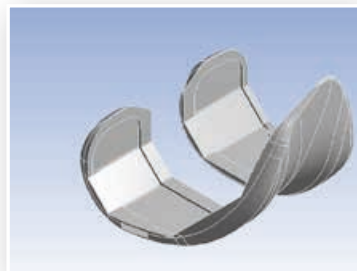
FEA verified that sintered implants are more susceptible to failure during manufacturing than the standard implant. It also verified that the lateral half of the implant experiences a higher stress than the medial. The FEA analysis had many drawbacks however; poor mesh quality and a software coding error inhibited the results.

It was concluded that the sintering process has a definite effect of the material properties of Co-Cr-Mo implants. The true extent of this effect has not been established within this report but has been indicated. Further works in microstructural analysis would clarify the physical changes experienced by the alloy following heat treatment while repeat tensile testing with a larger sample size would remove ambiguity from the results obtained during this project.

Primary Area: 3-D Modelling

Primary OS: Windows

Primary Technology: Ansys Workbench 14.0



Title: TeamPlus - Sports Team Management Application

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Programme: Enterprise Computing

Supervisor: Jennifer Foster



Project No 73

TeamPlus is a Sports Team management application which leverages modern computing and mobile technologies to allow managers to manage their players at a detailed level, providing amateur-level managers with the level of control associated with professional teams.

TeamPlus achieves this fine-grained approach to team management through the provision of a wide variety of features, each of which focuses on improving a core aspect of team management. TeamPlus enables a team manager to comprehensively and effectively manage their teams' exercise regimes, dietary requirements and rehabilitation routines. It allows managers to enter statistics for team viewing, share vital tactics with their team and provide team members with feedback. TeamPlus provides a video feedback functionality to cater for both team and individual performances. The application also allows the manager to monitor team member availability and provide notifications of training/match times.

TeamPlus is comprised of two separate components. The first is a web application which the manager uses to manage and communicate with a team or multiple teams. The second component is a mobile web application plus Android / iPhone application which the player uses to receive and respond to communications from the manager. TeamPlus provides the following benefits:

- The ability for the manager to allocate exercise regimes, assign dietary requirements, communicate match/training times and manage statistics at a team and individual level.
- The ability for the players to view items which the manager has assigned or communicated to them (via their smartphone).
- Assistance in team feedback and physical preparation off the pitch which is particularly important to improve performance on the pitch.

TeamPlus has been designed so that it can be applied to more than one sport. While the initial implementation of TeamPlus will focus on creating an application which is primarily designed around the needs of G.A.A. and soccer teams, the application will be easily and efficiently adaptable to a wide variety of team sports.

While other team management solutions are available in the marketplace, there is no other solution which provides as comprehensive a set of features as TeamPlus.

Primary Area: Web Application

Primary OS: Multi-platform

Primary Technology: PHP, MySQL

Secondary Technology: HTML, HTML5, CSS



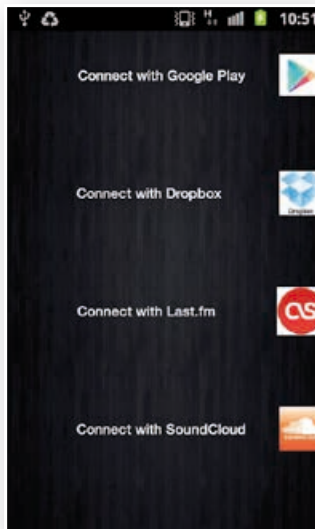
Title: JaM Player - An Android Music Player
Name: Niall Mohan
Email: niall.mohan2@mail.dcu.ie
Programme: Software Engineering
Supervisor: Dr. Darragh O'Brien



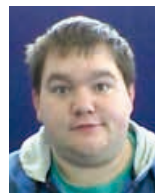
Project No 74

The concept of JaM Player is to combine multiple ways that Android users connect with their music into one application. Most people nowadays have ever expanding collections of music, with many carrying a portion of these collections in their phones, either locally or on some server stored in the 'cloud'. A prime example of this is Google's music service. This sparked the original idea for the project, to in essence extend Google's music service with other storage options such as Dropbox which is not made for music streaming and combine these into one application that streams music from these sources over the network, or music that is stored locally on a user's phone. The original concept enabled me to expand the application to support other services such as providing streaming support for SoundCloud and 'now-playing' notifications to the Last.fm music recommendation service. JaM Player makes use of multiple API's related to these cloud services to get streamable url and metadata information, some third-party and some directly developed from the service vendors. The use of Dropbox presented some interesting challenges in forming metadata efficiently for mp3s which required research into online music database services, notably Gracenote, which JaM Player uses to form Gracenote search queries based on filenames and Pulse-Code Modulation.

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Java
Secondary Technology: XML



Title: WOWit
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Name: Desmond Brodie
Programme: Enterprise Computing
Supervisors: Cathal Gurrin & Alan Smeaton



Project No 75

WOWit is a new mobile app that allows users to browse, socially discover and purchase admission to any event/night-club/gig they want, all in a few easy taps using their smartphone. WOWit allows promoters to sell tickets/admission to their events as well as promoting those events in the app using user-targeted promotions and bidding for placement on searches.

There is a large emphasis on the social aspects of discovering and sharing events. WOWit acts as a way of bringing social networks of friends together, easily allowing them to discover what events their friends are attending. The social stream of the mobile app links in with the Facebook API allowing users to view what events their friends are attending as well as suggested events and offers that promoters are pushing out.

Promoters will be able to target specific demographics using the analytical data available to them with special offers and deals that will encourage users who have been to their events before to come back again as well as users who have been to similar events.

As WOWit will have a database of users information, it can be anonymised and passed onto promoters. We can tell promoters where their customers came from, what college they go to, gender, age groups and even anonymous social circles. This analytical data will be invaluable to the promoter. For example, WOWit will notify the promoter when birthdays are approaching allowing the promoter to offer that person special offers. There will also be a WOWit API where we can pass anonymised data onto third-parties like taxi companies. Information such as how many people are in a venue and where they live is invaluable information to a taxi driver.

WOWit will also provide promoters with analytical data to let them see anonymised details on whoever comes to their events. WOWit focuses on the long tail of the market, targeting promoters who otherwise would not be able to sell tickets to events very easily online. WOWit aims to be so simple and easy-to-use that setting up a new event is a completely fluid, simple experience.

Primary Area: E-Commerce
Primary OS: Multi-platform
Primary Technology: Java, PHP, XML
Secondary Technology: HTML, CSS, Javascript



Title: Sensor Fusion Data Processing
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Programme: Mechatronic Engineering
Supervisor: Jennifer Bruton



Project No 76

This project presents a solution to sensor fusion for position control of a self- balancing robot on a ball (Ballbot). Due to the balancing nature of the Ballbot, position control is not a trivial task. The outputs of the sensors need to be reliable and accurate enough to ensure the positioning of the Ballbot is unobtrusive in a human environment. The feedback from sensors must also be capable of rectifying the position of the Ballbot should it experience external forces.

The sensors selected for the application are a gyroscope and an accelerometer. Through the use of digital filtering techniques in MATLAB software, the disadvantages of both sensors can be attenuated while maintaining the advantages.

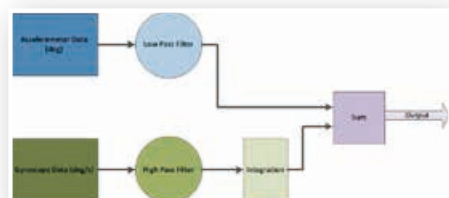
A Complementary filter technique with high-pass and low-pass filters was employed to perform sensor fusion of the accelerometer and gyroscope data.

Low-pass filters were utilised to remove high frequency noise from the accelerometer while high-pass filters removed the low frequency drift experienced by the gyroscope. Initially, basic first order high-pass and low-pass filters were designed and implemented in MATLAB. It was observed that some smoothing occurred. However by implementing the Butterworth variation of low- pass and high-pass filters, the smoothing effect improved.

Higher order filters were implemented for both the basic and Butterworth filter types. It was found that the smoothing effect for Butterworth filters improved significantly as the filter order increased, however, this increase in order also caused a time lag.

For use in a robotic application, it was concluded that a compromise between smoothing and time lag would have to be defined.

Primary Area: Sensor Technology
Secondary Area: Digital Signal Processing
Primary OS: Multi-platform
Primary Technology: Matlab



Title: Programming for Beginners
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Programme: Software Engineering
Supervisor: Dr. Monica Ward



Project No 77

This web application is aimed at promoting programming skills to teenagers. The idea is to allow students to get a grasp of these skills before entering college. Students can view tutorials to learn new material and then test their knowledge with assessments. They have a profile page to encourage interaction and competition between users. Also they have access to a forum where they can go for help and support.

Teachers can effortlessly add new tutorials and assessments through the web interface. This means content is constantly growing and ensures users are kept up to date. The application is localised and currently supports English, Irish and Czech. Additional languages can be added easily which eliminates language barriers and broadens the target market. This application has also been optimised for mobile so users can enjoy the same experience on their mobile phones or tablets as they can on their desktop.

This web-application was built using the Spring MVC framework. It was developed and deployed using an array of open source technologies such as PostgreSQL, Tomcat, Hibernate, Maven, Ubuntu Server, Bootstrap and jQuery. Comprehensive testing has been performed using junit for unit tests and Selenium for automated User Acceptance Tests. User testing and evaluation by transition year students has pinpointed weaknesses in the application and led to a vastly improved user experience.

Primary Area: Web Application
Secondary Area: Educational
Primary OS: Multi-platform
Primary Technology: Java, PostgreSQL, Tomcat
Secondary Technology: Spring, Maven, Hibernate, JPA, Javascript, Senenium



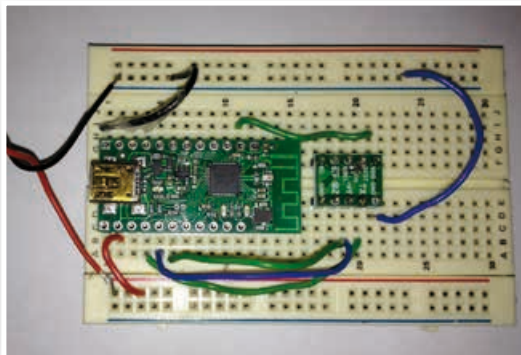
Title: Sensors In Sport
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Programme: Mechatronic Engineering
Supervisor: Brian Corcoran



Project No 78

The use of technology is continuously being applied in sport. A range of sensors are now available to assist with personal training and to improve sport performance. The purpose of this project was to develop a device to enhance the performance of football players by placing a sensor inside a football boot. Relevant research was carried out to determine what type of sensor is suitable to carry out this task. The sensor is capable of capturing the movement of a player and wirelessly transmitting the data to a receiver connected to a computer. Extensive testing was carried out using the sensor to establish a threshold between the different stages of motion such as walking and jogging. The use of this threshold is used in the development of a small piece of coding in Microsoft Excel. The programme developed is capable of detecting different events a footballer would endure during a football match from the data retrieved by the sensor. The collected data is then used to identify performance aspects which the user of the boot can improve.

Primary Area: Sensor Technology
Secondary Area: Wireless Technology
Primary OS: Windows
Primary Technology: C#
Secondary Technology: Microsoft Excel



Title: The 'My Deals' Application
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Email: patricia.mclaughlin2@mail.dcu.ie
Programme: Enterprise Computing
Supervisor: Monica Ward



Project No 79

This project is a proof of concept for an android based application. With many deals websites emerging everyday, the idea was to create an application which can link them to. The application will search these deal websites via a custom made crawler and return the relevant information to the server.

The application will use the GPS from an android phone to find the user's location (via its longitude and latitude). Then a script file will run to compare the location, to that of stored deals in the database. The deal which is nearest the users location will then be returned to the user. The user has the option to choose to get the directions to the deal, and the relevant information will be set up in the maps application.

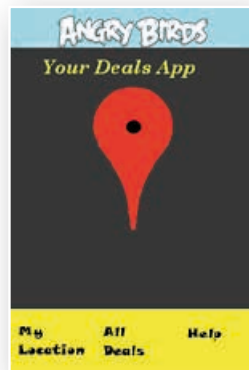
There will be only 3 options on the homepage to keep the program easy to use. The 3 options are:

My Location - Here, the user finds their location, and the offers which are available in their area.

All Deals - Here, the user see all of the offers which are stored in the database. If this option is chosen a string will be returned to the user containing all the relevant deals and offers. The user can select one, and get the directions to the location of the deal.

Help - this will be a general help section, informing the user about the application and how to use it.

Primary Area: Mobile App
Secondary Area: GPS/GIS
Primary OS: Android
Primary Technology: Java
Secondary Technology: HTML



Title: Review Technology
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Programme: Enterprise Computing
Supervisor: Dr. Monica Ward



Project No 80

Our final year project is a proof of concept project called Review Technology. It is a software application that will sit on websites that contain online user reviews. The aim is to provide an overview of all reviews for the product/service, through the use of graphics. The goal is to combat the issue of biased reviews or reviews based on a once off negative experience, as this may affect the opinion of those reading reviews, even when they may not actually be an accurate portrayal of the product/service. Opposed to the user having to read through all the past reviews to get an accurate idea of the overall view of the product/service, they will be able to view a summary of all reviews in different forms of visualizations. The visualizations our project will be focusing on are; word clouds, trend graphs and graphs containing basic statistics of all past reviews and sentiment analysis graphs. The final feature we propose is a search function, which will allow users to search all reviews and filter them to show ones containing a keyword or words. Through this users can look at reviews for a specific topic in relation to that product or service.

The word cloud will show users key words that have been mentioned frequently in reviews, so they will have an idea of key topics discussed about this product or service. The word cloud is able to filter out pronouns and conjunctions so that irrelevant words are not displayed in the final cloud. In our proposed functionality, the words will be hyperlinked to a page which will display some statistics of the use of that word in reviews and listing all reviews that word is listed in. The trending topics graph will show frequently talked about topics and over what time span they were talked about for. This will then be able to take into account reviews covering a topic that was only relevant for a short period of time. Graphs with Sentiment Analysis (Positive or Negative Feedback) will be a feature of the software. Using Sentiment Analysis Algorithms, our software will be able to distinguish positive reviews from negative reviews. We will then use the results to provide a summary of the opinions of all reviewers. The final feature we propose is a search function, which will allow users to search all reviews and filter them to show ones containing a keyword or words. Through this users can look at reviews for a specific topic in relation to that product or service.

Primary Area: E-Commerce
Secondary Area: Software Development
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: JavaScript



Title: Automated Weighing Device
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Programme: Mechatronic Engineering
Supervisor: Dr. Harry Esmonde



Project No 81

This project report outlines the steps taken to automate and modernise the Mass Comparator component of a Mass Calibration System for the National Standards Authority of Ireland. The report provides insight into the considerations required to develop the solution to this problem, the steps and reasoning behind each approach taken by the author and a detailed analysis of the features included in the final product. Though full control could not be achieved for the Mass Comparator, each approach taken in the attempt to reach communication is outlined and a possible solution is considered. A program designed in LabVIEW to automate the calibration process is detailed with each step and feature of the development process described.

Primary Area: Software Development
Secondary Area: Calibration
Primary OS: Windows
Primary Technology: LabVIEW

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Programme: Software Engineering
Supervisor: Alistair Sutherland



Project No 82

The project is a zero-player game similar to Conways Game of Life or Langton's Ant, where a simple set of rules generates a complicated behaviour. However, this system differs in that it takes the approach of applying its simple set of rules to a tangible free moving physical environment, i.e. not a grid of cells turning on and off but instead a soft body physics engine is the board, 2D vector meshes are the cells and the rules are a simplified model of the forces that govern microscopic life. The project is a learning tool. The game world's evolution is determined by its initial seed state that the user sets. The system provides a GUI for the user to set the seed state and then observe the world and also allow for intervention in the world's state. The system is a practical study aid for anyone with a general interest in computer science and or microbiology.

Primary Area: Zero-Player Game
Primary OS: Multi-platform
Primary Technology: C/C++
Secondary Technology: OpenGL

Artificial Life

Title: Weight Manager

Name: Paul McGrath

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Name: Shauna Lewis

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Programme: Enterprise Computing

Supervisor: Monica Ward



Project No 83

This is a proof of concept project. The project focuses on an android application which can be used by people on weight management plans in order to track their weight. The application provides the capability to assist weight loss by using the Weight Watchers Pro Points system. The application utilises a database, which is stored on the cloud, to store nutritional information on various foods, along with point values. The application provides the functionality to scan barcodes on products in order to view their points values. Users can also enter details of a new food item and, using an algorithm, the application will calculate the Pro Points value for this food item. Once a new food has been calculated, the points value is then stored in the database for use. The application allows users to track the food which they eat each day, also displaying a points value for each item. The application also allows users to input their weight weekly and to view their progress visually on a chart. There is also integration with exercise apps for calculating activity point bonuses. The application contains a forum in order for users to have discussions and share tips with each other. Through the application, users can also create shopping lists as they find items which they need. There is also the possibility to link this shopping list to a partner retailer's online store in the future. The application also provides users with the capability to add and share recipes and to rate recipes to provide feedback for other users.

Primary Area: Mobile App

Primary OS: Android

Primary Technology: Java



Title: LMS (Landlord Management System)
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Programme: Enterprise Computing
Supervisor: Rory O'Connor



Project No 84

LMS is a unique web application that looks to solve a common problem for many individuals whilst leasing a property. Traditionally information between a landlord and a tenant is not well documented or stored in an efficient manner. This leads to potential ambiguities between the two parties, something which can be avoided by using LMS. Our dedicated web application is intended to take the stress out of leasing, not only for the landlord but also for their tenants, and does so in a variety of ways. It centrally stores all the documentation associated with leasing a property, from tenant information forms and inventory lists to utility readings and maintenance procedures. Our application is built around flexibility, allowing all parties of a lease agreement to login and check certain details that are contained within the application. For example a landlord can have the ability of logging into the system and checking what properties in his portfolio are currently occupied, the contact information for the tenants and what bills associated with the lease are currently outstanding. A tenant is also afforded the opportunity to login to the system and have access to information on the property they are currently leasing. A tenant is capable of checking what rent is due, when the next house inspection is scheduled for and the landlord contact information. The main reason for using such a web application is the fact that either party can access the system at any time, from any location and from any device, be it mobile, desktop or tablet connected to the internet. As a result neither party is restricted by the other party, and can find out information regarding the property with click of a button. LMS has also incorporated additional functionality into the application, which allows users to request maintenance work for a property. The user submits the nature of their request through the online submission form, and a list of approved tradesmen quote prices for the job. The user can then pick the tradesman for the job and schedule the work.

Primary Area: Web Application
Secondary Area: Databases
Primary OS: Multi-platform
Primary Technology: PHP
Secondary Technology: HTML



Title: Magneto-Rheological Fluid Damper Design In Shear Mode
Name: Brendan Mackey
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Programme: Mechatronic Engineering
Supervisor: Dr. Abdul Ghani Olabi

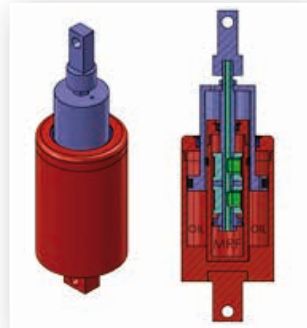


Project No 85

Magneto-Rheological Fluid (MRF) dampers are one of the most promising devices for smart and effective vibration control. These devices have a large force capacity, fast response time, high dynamic variety, mechanical simplicity and low power requirements making them interesting and useful new components in modern suspension systems. This project is carried out to produce a new concept design of MR damper which combines the workings of existing conventional dampers with those of an MR damper. The aims of this study are as follows:

- i. To improve conventional damper efficiency and reliability by applying MR fluid technology to the design.
- ii. To reduce the cost of MR damper design by reducing the MR fluid amount in the design.
- iii. To improve the damper safety in case the magnetic field ceases operation, since the damper can be work by all abilities of a conventional damper. The aims of this project were achieved through investigative modelling and examination of MR fluid material (MRF-140 CG) produced by Lord Corporation for characterising a new MR fluid damper. The Finite Element Method Magnetic (FEMM) software package was used to simulate the damper and the magnetic circuit design. The MR damper technology presented in this project has shown a great development in cost reduction, geometry size and proven results that it is capable of carrying a large amount of damping force. The manufactured prototype damper and all its design considerations are discussed in detail as well as the ethics that accompany these design decisions and the testing and implementation of the design for practical applications.

Primary Area: Automotive Technology
Primary Technology: FEMM



Title: Google Authenticator Server-side Security Framework
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Programme: Info and Communications Engineering
Supervisor: David Molly



Project No 86

Two-factor authentication is becoming increasingly more common in the web applications that we use every day. Online banking is one of the most common places we meet the two-step login process, but with increased user awareness, demand for a more secure login on web applications, such as email and social networks, is increasing.

Google have created a smartphone application, "Google Authenticator" that will generate codes to be used for the second stage of the login process. The source code for the application is open source, enabling developers to incorporate it into their application.

The aim of this project is to develop a secure framework that uses "Google Authenticator" in its authentication process.

The result of this project is a web service and client application that use the 2-step process. The web service allows multiple applications that use the same user set, to manage their user creation, login and authentication. The client application is a simple website that uses the web service to handle its user authentication. The client site also implements several other methods of securing user data, such as password encryption and TLS.

Primary Area: Software Development
Secondary Area: Security
Primary Technology: JSP/Servlets
Secondary Technology: WSDL



Title: Performance Enhancing Proxy for TCP over lossy connections
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Programme: Software Engineering
Supervisor: Darragh O'Brien



Project No 87

The aim of this project is to improve the quality of experience for users connected to Internet via wireless networks. As for now, most of our Internet usage rely on a protocol designed nearly 40 years ago for wired networks: TCP. It has numerous drawbacks when used over a wireless networks, as segments can be lost randomly and the delay can vary significantly. Research teams have been working on alternatives or modifications to the TCP protocol in the past 15 years. Usually protocol modifications can only be simulated, as we need a wide acceptance in the Internet infrastructure for them to be really used.

The goal with this project was to design and develop a proxy infrastructure -- allowing a real-world use --, in conjunction with a new network protocol: Coded- TCP. This new protocol has been proposed in 2012 by a team at MIT to solve the low performances problem of TCP over packet-erasure networks. The protocol has been implemented and the system has been deployed to the proxy system. It can now be used to enhance performances of mobile devices such as phones or laptop connected to packet-erasure networks like some 3G networks or WiFi hotspots.

Primary Area: Network Applications
Secondary Area: Wireless Technology
Primary OS: Unix/Linux
Primary Technology: C/C++



Title: IntelliFarm
Name: Troy Cronin
Email: troy.cronin3@mail.dcu.ie
Name: Joshua Lamb
Email: joshua.lamb2@mail.dcu.ie
Programme: Enterprise Computing
Supervisor: Dr. Rory O'Connor



Project No 88

IntelliFarm - Farming Made Easy

Farming is an industry of mass importance in nations all over the world. This is due to its responsibility in producing food for the world and the significant economic benefit that it gives to various work sectors. IntelliFarm is an android based application that provides users in the farming industry with a range of different tools that assist with various farm management activities.

IntelliFarm provides readily accessible tools that relate to key farming activities of:

Livestock management (Dairy, Beef, Sheep, Pig Farming)

Crop management (spray, yield, sowing rates) Feed Management (Feed rations, fodder etc.) Grass Measurement (Calculation of grass available) Nitrates Calculator (to assure compliance with the nitrates directive).

Our application houses the operational capability to record key livestock management statistics (i.e. medication, AI dates), feed and crop details. In conjunction with these recording tools there are also grass and nitrates calculation facilities.

Monitoring farm activities can prove to be quite a difficult challenge for farm owners and operator personnel therefore adequate time and task management is of the upmost importance. The mobile application market directed at agricultural industries around the world is vast and highly competitive. IntelliFarm as an android application boasts a multifunctional set of helpful farm management tools delivered within one app. Current mobile applications aimed at agricultural farming industries are broad in terms of functionality but are lacking different tools in one application. The majority of farming apps charge users for separate functional tools released in separate apps. This is not the case with IntelliFarm as cross functional management tools are housed essentially 'under the same roof'. IntelliFarm functions off the notion of simplicity but follows the concept of a dynamic utility making it an appealing choice to anyone working on a farm. As the world of farming operations continues to move away from the concept of recording important details with a pen and paper a mobile management application is not only viable but a universally attractive prospect.

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Java
Secondary Technology: XML



Title: Vowel Tutor Android App
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Programme: Software Engineering
Supervisor: John McKenna



Project No 89

Vowel Tutor is an Android app that guides language learners on the pronunciation of vowel sounds. This is achieved by tracking formants of the learner's speech. The app provides graphical feedback on actual and target tongue positions of the vowel that is being pronounced. Target tongue positions are derived from native speakers' speech and have been adjusted for gender and height; the assumption being that height correlates with vocal tract length.

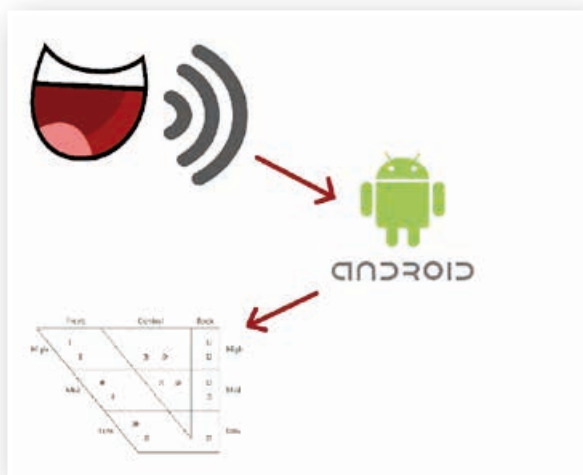
Primary Area: Digital Signal Processing

Secondary Area: Mobile App

Primary OS: Android

Primary Technology: Java

Secondary Technology: XML



Title: Mobile App to assist Blind Users
Name: Kaylee Cherry
Email: kaylee.cherry2@mail.dcu.ie
Programme: Digital Media Engineering
Supervisor: Prof. Barry McMullin



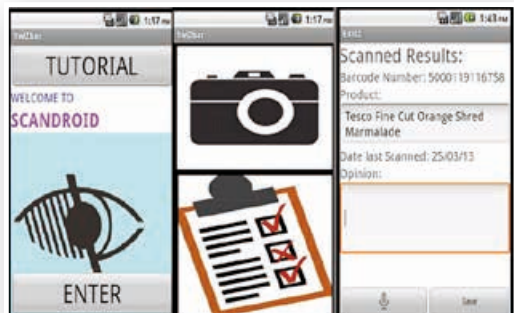
Project No 90

Every time a blind person goes shopping they are faced with the problem of trying to identify products based on how they feel or left asking for assistance. This Android mobile application is designed to resolve this issue. Nearly all products available can be identified by their barcode. Using integrated libraries I have created a unique barcode scanning app. Unlike barcode scanners which are already available on the Android Market that need to be positioned perfectly along a red scan line, in this app a barcode will be detected and analysed regardless of position or rotation.

The corresponding barcode number is extracted from the product. An internet search is then done on this figure, checking first for a match on the UPC database, followed by a Google search if no result is found. HTML parsing is then used to retrieve the product's title. This information is read out to the user using built in Text-to-Speech technology. The user then has the option to enter their opinion of this product using Speech-to-Text and the mobile's microphone. This information is then saved to a database which is stored locally on the phone. This means that the next time this same barcode is scanned the user will not need an internet connection and the information will be retrieved from the database.

This is a fully functioning mobile app which is in line with Android accessibility guidelines to allow blind users navigate and use the app with confidence and ease.

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Java



Title: Golfy
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Programme: Enterprise Computing
Supervisor: Darragh O'Brien



Project No 91

Golfy is an all-in-one golf website and android mobile application. Our vision for this project is to create an online location, to which golf fans can interact with, and use, to find bio's, stats and other relevant information for all of the major golf tournaments, courses and professional players. The latest golfing news and scores from live events will also be streamed on our platforms. The availability of a mobile application will provide a competitive advantage for this product. The incorporation of social interaction, where users can interact via social networking sites (Facebook and Twitter), provides a unique differentiation from existing Golf websites. This feature will enable users to comment, in real time, on live golf events around the world and to 'check-in' i.e. to show that you have or will attended an event via the mobile application.

The web application was developed within the Joomla framework. It has been built on a responsive web design allowing for enhanced viewing on mobile and tablet devices. It displays all player, course, news and tournament information on the front end of the website. It is also used as the platforms backend to input entity data into the database, add new news articles and modify different modules and elements of the site. A webservice currently provides information from the database to the mobile application. The android mobile application can be used for location based services such as checking in via facebook to a tournament.

Primary Area: Mobile App
Secondary Area: Web Application
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: PHP



Title: Network Traffic Analyser
Name: David Kernan
Email: david.kernan4@mail.dcu.ie
Programme: Software Engineering
Supervisor: Brian Stone



Project No 92

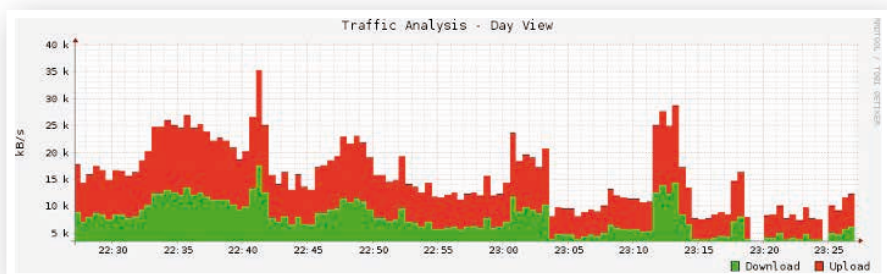
This software allows a user to Remotely access and monitor a hosts Network Activity. This includes the retrieval of Network Traffic data via Network Capture. The Software is accessed via a Web Portal build upon the Django Web Framework. From here the user can access statistical information including common hosts, traffic to and from the host, times of high traffic, times of low traffic. The software can be configured to alert a specified email address on high traffic or at regular set intervals.

The user can view associated network data that can be derived for a typical packet. The backend is a Daemon process written in Python.

The Software is mostly useful for users who wish to monitor their servers remotely. Because the software runs on a Web Server through the HTTP Protocol, the user will be able to access through any internet device with a capable web browser.

The Graphing engine and Time Series databases are powered by RRDtool.

Primary Area: Network Applications
Secondary Area: Web Application
Primary OS: Unix/Linux
Primary Technology: Python
Secondary Technology: RRDTool



Title: TravelPal - A feature rich mobile application using NFC Technology

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Programme: Enterprise Computing

Supervisor: Mr. Brian Stone



Project No 93

TravelPal is a mobile application targeted at the Irish Tourism Industry. TravelPal provides a feature rich information system to the end user empowered by Near Field Communication (NFC) technology. TravelPal provides seamless access to extensive tourist attraction information through one core entry point replacing the necessity for brochure stands within hotels, attraction sites and airports.

Within an Irish attraction site today, Point of Interest [POI] content is generally presented in English to the visitor via information boards. By use of NFC tags positioned on these boards or in close proximity to the POI, a visitor may scan the tag using their mobile device and TravelPal will present Point of Interest information through multiple content forms by way of Text, Image, Audio and Video in the language of their choosing. TravelPal allows visitors from both overseas and domestic markets to fully immerse themselves in Ireland's heritage along with strongly enhancing the attraction experience for visitors with reading disabilities or the visually impaired. TravelPal further provides users with an option to locally store all POI content prior to attraction site arrival in order to avoid costly data roaming charges along with location based recommendations and social network integration.

Through mobile application usage, TravelPal captures real time data on each visitor to an attraction site. This data is then presented to attraction site management via an interactive real time analytics dashboard facilitating data driven business decisions. Unique data such as total visitors, gender analysis, nationality analysis, age analysis, POI analysis, throughput analysis, date range analysis, promotional analysis and much more is provided allowing management to gain a unique competitive insight into their site, for example, determine the top 10 POI and promotional offer success. Although, TravelPal is primarily developed for the Irish Tourism Industry, the underlying concept can be channelled into other markets such as the Hospitality, Retail and Corporate sector.

Primary Area: Data Analytics

Secondary Area: Mobile App

Primary OS: Android

Primary Technology: Java / .NET

Secondary Technology: SQL



Title: Procedural Content Generation Game
Name: Christopher Boyle
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Programme: Software Engineering
Supervisor: Dr. Martin Crane



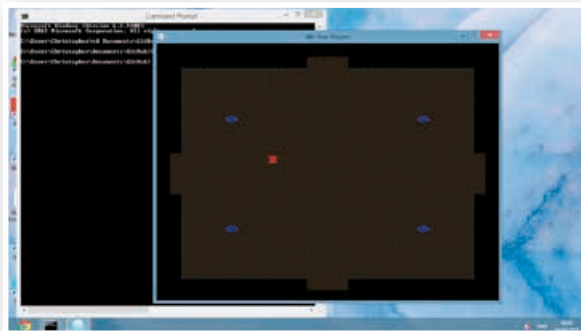
Project No 94

PCG Game, is a top-down 2D sprite based game designed to demonstrate the use of procedural generation of content in a game setting. Developed using the Lua Love Framework, it is primarily for the Windows platform.

The dynamic generation of content is primarily focused on the terrain of the game world, and it uses a variation of the dungeon generation algorithm to achieve this generation. The games objective in simple terms is that you must take control of the player character, and guide it through the procedurally generated maze avoiding any AI enemies or traps you encounter on the way.

The camera of the game focuses on the current room the player inhabits. Adjacent rooms will be generated as the player continues through the maze and stored in memory until the determined room limit has been reached. Each room is generated from a template, and then the overall game world is constructed in such a way as to not provide any scenarios which the player cannot complete.

Primary Area: Gaming
Secondary Area: Software Development
Primary OS: Windows
Primary Technology: Lua
Secondary Technology: Lua Love Framework



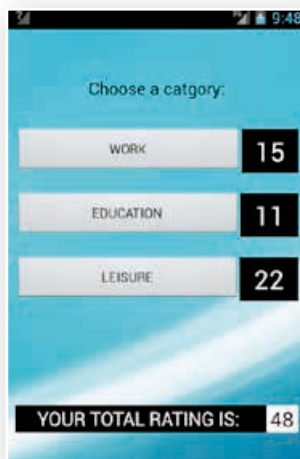
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Name: Radoslav Kissiov
Programme: Enterprise Computing
Supervisor: Cathal Gurrin



Project No 95

The idea of the project is to develop a simple Social Networking Application for Android-based mobile devices and tablets. The purpose of the application is to facilitate communication for users with similar interests. The core idea of the application is to rate people according to their activities and interests in particular areas, and to automatically generate lists of other users with similar interests. When a person has accomplished an everyday activity (such as finished a project at work, went to a movie, participated in an event), he/she then records the activity in the application and gets a +1 score in the particular area. The score accumulates each time a user records an activity. That provides the basis to determine the user's areas of interests. The application is going to automatically select users by their score ratings and recommend them to each other. Each time user logs into the application, new buddy requests are generated. The user can then scan through the profiles of the proposed users and decide whether to connect to the user or not. When the users are connected, they become buddies and can leave comments on activities of each other.

Primary Area: Social Networking
Primary OS: Android
Primary Technology: Java
Secondary Technology: XML



Title: On Cue - Web Based Reminder Service
Name: Stephen Lynam
Email: stephen.lynam23@mail.dcu.ie
Programme: Software Engineering
Supervisor: Darragh O'Brien



Project No 96

On Cue is an interactive web based email (JavaEE JavaMail API) reminder service, created using Java Servlets, using Javascript/JQuery coinciding with Twitter's Bootstrap responsive HTML5/CSS3 library, sitting on a backend consisting of Enterprise Javabeans (through JNDI), EJB Timers and corresponding Timer Service and MongoDB document driven database.

The application runs on Jboss' application server and EJB container, which holds and retains timer service references

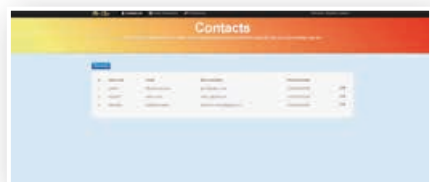
Even with the switch to newer technologies, Enterprise Java is still widely used in industry today. The system is aimed at providing a lightweight, straight- forward and user friendly alternative to existing reminder based services, and to demonstrate the application of Java Enterprise Edition principles and implementation. The application is mostly focused towards ease of use, making use of the 'use it, forget it' mentality that is essential to any reminder service.

After registration, each user is presented with their own individual list of contacts and reminders. Reminders are fully customisable and contain settings to vary the reminder's usability, such as single use and repeat reminders.

Each reminder also contains references to contacts contained in that user's contact list, to enable the creation of group based, multi-contact reminders.

Upon the creation of a reminder, a timer is created on the application server, its timeout settings determined by the times entered by the user as part of reminder creation. Once the reminder expires, a backend processor is used to parse, compile and send email reminders to each contact included.

Primary Area: Web Application
Secondary Area: Software Development
Primary OS: Windows
Primary Technology: Java
Secondary Technology: Java Servlets,
Enterprise Java Beans,
MongoDB



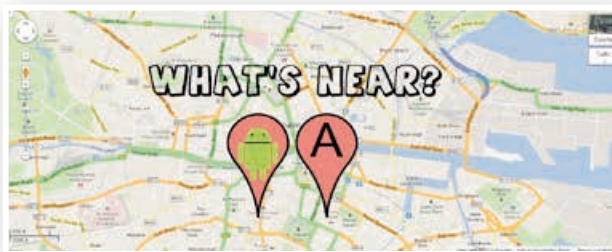
Title: What's Near - Android Location Based App
Name: Ryan McCloskey
Email: ryan.mccloskey3@mail.dcu.ie
Programme: Software Engineering
Supervisor: David Gray



Project No 97

What's Near is a location based mobile application for Android devices. The application prompts a user to specify an address, select the amenities which are of interest to them (e.g. Restaurant, Cinema, airport), choose a range/radius and then view the returned amenities within the selected radius. The user is able to view details about the amenities displayed, such as: contact, address, distance from location, images, or directions. This application enables users that are unfamiliar with an area to discover locations/services of interest surrounding the selected address e.g. a person that is new to an area may want to know where the nearest restaurant is, if there are any filling stations within a 3 kilometre radius or how to get to the nearest ATM. As well as this, it could be used to gauge how convenient their current location is in relevance to places they may need to visit i.e. College, Bus/ Train Station, City buses, Work, Cinema. The What's Near Android App provides the user with a convenient way to check the surrounding amenities which are of interest to them, no matter where they are!

Primary Area: Mobile App
Primary OS: Android
Primary Technology: Eclipse
Secondary Technology: Java



Title: Where Am I?
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Programme: Software Engineering
Supervisor: Cathal Gurrin



Project No 98

The aim of my project is to investigate tracking a person, and to implement a simple and cost effective positioning system using the Bluetooth sensors that many mobile devices support. Outdoor tracking can be done with GPS and has a very high accuracy rate. The same cannot be said for an indoor tracking system.

Android devices in particular are very popular on the market today and provide an API for dealing with Bluetooth connections. Low cost Bluetooth dongles can be placed in fixed locations around a building for mobile devices to search for. Using signal strengths and machine learning, we can calculate the location of the device within the building. This approach provides a versatile system that can be trained to work within any building. It also allows for different levels of accuracy to be achieved depending upon the needs of the user.

This project aims to demonstrate the functionality that simple Bluetooth devices can serve and to provide a basis for a cost effective way of increasing security or recording a persons movements. Some examples include luggage tracking in airports, movements in shopping centres or security in residential homes.

Primary Area: Sensor Technology
Secondary Area: Mobile App
Primary OS: Android
Primary Technology: Java



Title: System dynamics modelling of global sustainability

Name: Abdelrahman Ibrahim

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Programme: Info and Communications Engineering

Supervisor: Barry McMullin



Project No 99

This project is about global sustainability a study concerned with the sustainability of human society and is it in harmony with nature and the carrying capacity of the earth.

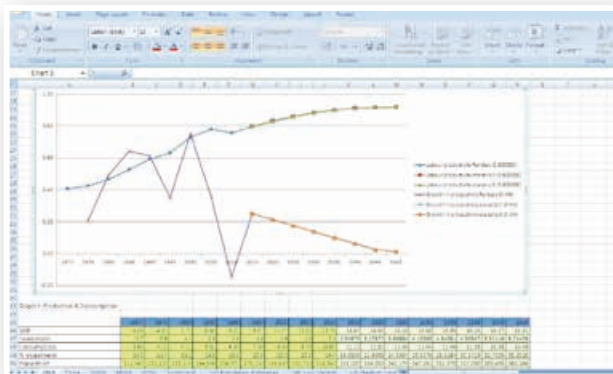
As population keeps growing the human race is faced with a variety of problems like global warming caused by greenhouse gas emissions which are in turn caused by fossil fuel burning; also the depletion of resources faster than they can be replenished.

Statistical data was gathered and analysed in order to predict future patterns of growth and interactions between human society and the environment and the ecosystem of the earth.

Five major variables came into play: population, GDP, emissions, food production and footprint. They influence each other and that relationship were modelled in a spreadsheet.

Primary Area: Statistical Analysis

Primary Technology: XML



Title: Python as a client side language
Name: Owen Corrigan
Email: owen.corrigan5@mail.dcu.ie
Programme: Software Engineering
Supervisor: David Sinclair



Project No 100

The aim of this project is to investigate the possibility of using alternatives to JavaScript as client side languages. JavaScript has historically been the language of the web, however a diversity of languages would have many benefits. Developers could learn a single language to develop both the back and front end of a web application with. JavaScript also has many flaws that have not been addressed such as a lack of namespace features and lacking object orientation features

Because python shares many similarities with JavaScript such as being lightweight, interpreted, dynamic and weakly typed it is ideal to act as a replacement for it. To demonstrate how this might be achieved, a browser was developed which has the ability to run python as the client side language.

Addressing security issues, as well as how this might be extended to more languages are discussed in the project documentation

Primary Area: Web Application
Secondary Area: Software Development
Primary OS: Multi-platform
Primary Technology: Python
Secondary Technology: JavaScript



Title: Bug Prediction Model
Name: Nathan Ford
Email: nathangj.ford@gmail.com
Programme: Software Engineering
Supervisor: Kevin Casey



Project No 101

This application was developed in order to analyse existing information sources relating to source code repositories, and the projects stored within them, to predict the future occurrences of defects within the specific software project. To accomplish this the application analyses a projects revision history and infers predicts about files based on their past revisions. Source code metrics pertaining to the structure and complexity of each file are also retrieved in order give possible reasons for the apparent bugginess predicted by the model.

Having this kind of information about a project's source code would be an asset as it would potentially allow software defects to be incorporated into the development life cycle, allowing production teams/management to make informed decisions concerning resource allocation as well as release schedule.

It can also be used as a developer aid supplying them with feedback about the state of a branch, warning them about a potentially 'buggy' area of code where more care would need to be taken when adding or changing the code. Overall this could allow the bug fix process to be a proactive step rather than a reactive one.

Bug Prediction Model is written in Java supported by XML. It utilises several open source frameworks and libraries including Maven for management, testing and deployment, Spring for dependency injection, Vaadin for UI framework as well as SVNKit and JGit for communication with source code repositories.

Primary Area: Information Retrieval
Secondary Area: Statistical Analysis
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: XML



Title: DASH - Web-based dashboard system.
Name: Shane Stacey
Email: shane.stacey@redbrick.dcu.ie
Programme: Software Engineering
Supervisor: Monica Ward



Project No 102

DASH is a web-based dashboard system that can be accessed from any modern web- browser.

The aim of this project is to provide a framework which can be used to store, manage, retrieve and share dashboards which contain a number of dashboard widgets. These widgets can be customized by the end-user and have the ability to display a visual representation of information provided from a number of back-end resources.

The idea behind this system is that an user would add widgets to a dashboard for information they care most about. The dashboard would then be left open on a second screen or in another tab of their web-browser. Instead of spending time going to each resource individually they can simply glance over at the dashboard to see if anything of interest has changed.

The application attempts to impose no limitations on the type of data that be can be shown on a dashboard. Due to this it has a wide range of potential uses for both consumers and those in a business setting.

For instance; Sharing content (Favourite urls, images, software, etc...) Monitoring (Financial, Application Metrics, etc...) Real- time information (RSS Feeds, etc...)

The application is built using a client server architecture and provides access to the data using a RESTful API. The server is written in Java, while the front-end for the application is written in Ruby using the Sinatra web application framework. HTML5, CSS, Javascript and a number of JQuery modules are used for the user interface.

Primary Area: Web Application
Secondary Area: Cloud Computing
Primary OS: Multi-platform
Primary Technology: Java
Secondary Technology: Ruby, Javascript



Supervisor: Dr. Gabriel-miro Muntean



High Definition (HD) high frame rate video is shot in real-time at the Dollymount beach using Full-HD camera. The live footage is then streamed via a 7 km microwave link to Dublin City University (DCU). At DCU, the received video stream is forwarded to a virtual server in the Cloud and then distributed to other users using Peer-to-Peer video streaming technology. Why? How? Proof of concept, use of the latest technologies and lots of other interesting aspects, plus the full story on www.miroslavduniev.ie/typ

Secondary Technology: FFMPEG&VLC,BM_SDK,C++,EC2,WebRTC,P2PVideo,SSL_VPN,RAID0



Title: Deals for Days
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Programme: Enterprise Computing
Supervisor: Darragh O'Brien



Project No 104

The primary aim of our final year project is to successfully deliver a location based deal advertising mobile application platform for both customers and vendors. With the aid of GPS location tracking and a deals database we aim to successfully deliver relevant offers to the users mobile device based on their proximity to deals within a specific range. GPS location awareness has recently gained an advantage within mobile applications as users are willing to have their location monitored for social media purposes. Because of this, we believe our application will be successful as GPS location services allow us to display proximity based advertising. Following an extensive market research, we identified potential to exploit an area of the SmartPhone market which will benefit both retailers and customers. However, users of the application will not be forced to enable GPS to effectively use the application, but they will also have the ability to search for a specific deal genre regardless of location. Throughout this document we will provide a detailed description of the Deal\$ 4 Day\$ application. The technical areas which are covered are; software specification, hardware requirements, system architecture, database structure, system functionality, user interface, specific areas of coding, and a fundamental walkthrough of the systems main interface. Non-technical areas of the applications infrastructure which are also explored are; market analysis, market competitors, marketing strategy, pricing, potential pitfalls, and overall benefits of the application. The use of emails to advertise deals from these sites is a flawed system as we found that an email at about deals will be forgotten and will not attract the attention of the users. Deals should be available on demand and with direct information about location and directions. With this application it will be easier to give your user base more access to deals that are closer and relevant to them.

Primary Area: Mobile App
Primary Technology: Java



Title: To Standardise a Daily Preventative Maintenance Procedure
For a Leading Manufacturer of Medical Devices

Name: Jason John McGlynn

Email: jasonjohn.mcglynn4@mail.dcu.ie

Programme: Mechanical and Manufacturing Engineering

Supervisor: Dr. John Geraghty



Project No 105

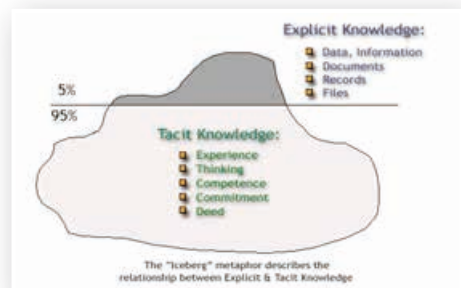
In the field of engineering, there is a constant need for higher standards of quality. To maximise the performance of employees within a company, clear guidelines and documentation procedures are necessary. This project was unique in that the author dealt with an engineering company who is leading the way in the manufacture of medical devices. The project researched many topics including, plastic injection moulding, tacit knowledge, standardisation, preventative maintenance, standard operating procedures and work instructions. Every manufacturing engineering company has a daily preventative maintenance procedure when dealing with the production of medical device components. This PM procedure may include the cleansing, greasing and visual inspection of a machine to ensure maximum performance and prevent contaminated product or tool damage. The aim of this project was to create a work instruction manual that a leading manufacturing company of medical devices can follow and adhere to on a daily basis in performing the PM procedure mentioned above. The importance of converting experienced employees' skilled tacit knowledge into explicit documentation was the core basis of this project. Understanding the daily PM procedure, converting tacit knowledge to explicit documentation and communication between departments are only some of the steps involved in the development of this project. With multiple employees performing the same PM procedure every day, the importance of a standardised procedure is not only vital but a requirement if any company aims prosper in an ever competing environment of manufacturing engineering.

Primary Area: Standardisation in Engineering

Secondary Area: Converting Tacit Knowledge to Explicit

Primary OS: Windows

Primary Technology: Microsoft Office



Title: Design & Automation of Lid Placing Process
Name: Andrew O'Byrne White
Email: andrew.obyrnewhite4@mail.dcu.ie
Programme: Mechatronic Engineering
Supervisor: Harry Esmonde



Project No 106

The aim of this project was to design a prototype system for Irish Distillers to automate the process of placing lids onto tubes used for the packaging of their premium whiskeys. The design was developed for one case format (3x2, 700ml Powers) but allows for modifications for other formats. This project was carried out as a part of a major investment by Irish Distillers to automate and increase the efficiency of bottling of their premium whiskeys. This involves moving production from an external contractor to their main bottling site in Dublin. The project aims to reduce the number of manual operators required to carry out lid application while increasing the speed substantially. The design used electromagnets to lift the steel lids. These had to be specially designed for the application. Electromagnet theory was investigated and prototypes were developed and tested. Due to supply issues, build of the overall machine is still underway.

Primary Area: Manufacturing Engineering
Primary Technology: Simatic S5
Secondary Technology: Solidworks



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Senior Executive Aidan Grogan is a judge for the Accenture prizes and is a graduate of the BSc. In Computer Applications degree.



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