Joshua Jennings

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Personal Summary

I am a currently undertaking my third year as an Electrical and Electronic Engineering student at Imperial College London. I enjoy programming as well artificial intelligence. My goal is to work in an area where I can further my understanding of software engineering and how to implement it in commercial or industrial environments.

Education

Imperial College London, MEng Electrical and Electronic Engineering (October 2016 – Present)

- Mathematics, Artificial Intelligence, Machine Learning, High Level Programming, Deep Learning, Embedded Devices, Digital Signal Processing.

Boston Spa School (September 2009 – June 2016)

- **A Levels:** Mathematics (A*), Further Mathematics (A), Physics (A)
- **GCSE:** 10 Grade A to C, including 4 A*
- **Other:** OCR Level 2 National First Certificate in ICT (Distinction)

Work Experience

SensUs Competition 2018 (January 2018 – September 2018) – Imperial College London

Worked with the Department of Chemistry at Imperial College London to develop a biosensor that could detect the Vancomycin concentration in blood plasma for an international competition which came third place.

Duties:

- Led the engineering subgroup, managing both electrical engineers and biomedical engineers during the development process.
- Worked closely and liaised with chemists from the Department of Chemistry.
- Worked in android application development and implemented an image processing neural network for use with Lateral Flow Assays.
- Negotiated with sponsors for funding.
- Represented Imperial College London internationally.
- Pitched the biosensor to a panel of professionals.
- Ran a stand to promote and explain the biosensor to the public.

Technical Skills

- **Programming** – Proficient in object-oriented programming in C++ and functional programming in FSharp. Have worked with Java in the development of android applications. Experience in working with Keras and TensorFlow in the development of Machine Learning applications and Neural Networks in Python. Proficient in working with both Linux and Windows. Have also worked with ARM Assembly, Java, and MATLAB. Adept in the use of Microsoft Office as well as LaTeX.
- **Hardware** – Experience in PCB design as well as Arduino development.

Projects

Custom Neural Network API in C++ (Personal Project)

- Implemented a basic library for Neural Network design using only C++ Standard Library functions.
- The networks are scalable to any number of layers and inputs or outputs.
- The networks support multiple types of activation functions such as Sigmoid and ReLU functions.
- Tested with the MNIST handwriting recognition library, learning to play a snake game, and learning to play the 2048 game.

Smartphone Based Biosensor Application (Developed for SensUs Competition 2018)

- Developed, using android studio, an application for smartphones that could find and extract intensity of a coloured line from an image.
- This took real time images from the phone's camera and converted the relevant areas of the image to the HSV colour space to allow the splitting of colour and intensity. A colour histogram was then created, filtered, and fed into the machine learning neural network.
- The neural network had two hidden layers and was built with Keras and ran on the smartphone.
- This application was used in conjunction with lateral flow assay membranes designed by the chemists to detect Vancomycin concentrations in blood plasma and went on to win third place in the SensUs 2018 competition.

Smart Bike Lock (2nd Year Group Project)

- Managed a group project to design a weatherproof device that could be attached to bicycles and function as an alarm to prevent the bike from being stolen.
- The device was able to communicate with a smartphone application to control whether the bike lock was activated as well as being able to send a message to the phone if the alarm was going off.
- Designed the circuitry for the motion sensor as well as programming the Arduino.

EEE Rover (1st Year Group Project)

- Worked in a group with other students to design and build a small rover that was capable and differentiating between fake rocks that emitted various infra-red, magnetic, and radio signals.
- Designed the radio circuitry.
- Assisted in the development of the Arduino code that was used to control the rover remotely over an internet connection.
- Was the primary editor for the report at the end of the project.

Additional Interests

Imperial College Students for the Exploration and Development of Space (ICSEDS)

- Working on the ICSEDS CubeSat project.
- Developing a communications ground station for Imperial.

Game Development

- Designing and making video games.
- Working with android studio to develop phone games.