Robert Hardwick

robhardwick.me
linkedin.com/in/robertmhardwick/
29 Granby Road, Stretford, Manchester, M32 8JL
+447709650498
robertmhardwick@gmail.com

Education

- **University of Sheffield** — Sheffield, UK
  MComp in Artificial Intelligence and Computer Science (First Class w/Hons) — *2009 – 2013*
- **Altrincham Grammar School for Boys** — Altrincham, UK
  11 GCSEs (A-A), A Levels (A-B) in Mathematics, Further Mathematics, Physics and Computing* — *2002 – 2009*

Experience

- **Mindtrace.ai** — Manchester, UK
  AI Software Engineer — *Feb 2018 - Present*
  - **Seed-Level Startup Experience**: Played a central role in shaping the company's culture and technology stack having been one of the earliest employees of the company. In addition, the role has required being adaptable to the ever-changing company needs and working to very tight deadlines.
  - **AI Model Development**: Selected, trained and evaluated a number of convolutional neural network models for a variety of visual tasks.
    * Trained a UNet segmentation model on real customer data for an industrial inspection application. This involved careful understanding and preparation of the data and running multiple training iterations to search for optimal model hyperparameters and collaborating with other team members who are testing other improvements such as augmentation strategies.
    * Trained an EfficientDet model with both object detection and semantic segmentation output from scratch on COCO dataset for use in a demo.
    * As part of a project to build a Dynamic Vision Sensor person detector, investigated the use of different types of image augmentation in combination with the SSD object detector model in order to improve the domain transfer between RGB images and DVS-event output images.
    * Investigated the use of semi-supervised learning approaches to image classification for an industrial defect classification use case.
  - **Android App Development**: Developed an Android application in collaboration with another colleague, using Tensorflow Lite, to showcase the company's 'few-shot learning' technology being developed by the company's research team.
  - **AI on Edge Devices**: Deployed and profiled a prototype pedestrian detector based on DVS input data, on Raspi4 and Google Coral dev board devices. Developed simple web app for streaming live output of optimized model to a web monitor, demonstrating the potential use of the technology in an IP camera.
  - **Neuromorphic Computing**: Developed considerable knowledge in neuromorphic computing, both in terms of processing hardware (SpiNNaker) and event-based vision algorithms.
    * Developed a working proof of concept of a real-time event-based optical flow algorithm running on the SpiNNaker platform. Input was not a conventional video feed but instead an event stream from a Dynamic Vision Sensor. Was required to write a front-end in C++/Qt which parsed the resulting optical flow data from a UDP stream and displayed it in real-time.
    * Development of an SDK for mapping certain graphical algorithms to unique SpiNNaker architecture to enable a common framework for prototyping new algorithms. Involved close communication with the SpiNNaker tools team at Manchester University and resulted in fixing some bugs in their open source code.
    * Prototyped algorithm code on SpiNNaker's ARM968 cores which involved writing code in an event-driven paradigm. Development cycle involved writing algorithm code with fixed point arithmetic and with limited instruction memory (32kb), debugging ARM exceptions, profiling algorithm execution and optimizing algorithm code by use of compiler flags and other techniques.
    * Acquired good working knowledge of Dynamic Vision Sensors (Celepixel / Inilabs). Developed various internal tools for analysis and general use of the DVS data stream and kept up to date with the latest developments in the space, both in terms of hardware and algorithms.
- **Revector** — London, UK
  Reseach Software Engineer — *Aug 2017 - Oct 2017*
  - **Network Packet Trace Analysis**: The fixed-term role was to find a novel approach to detect fraudulent phone calls made on the Viber app and involved researching recent literature regarding the viber protocol, reverse engineering the protocol and developing tools to compare the UDP/TCP packet traces of multiple phone calls side by side in order to identify common and anomalous patterns.
- **IBM** — Manchester, UK
  Backend Software Engineer — *Sep 2013 - Mar 2017*

- **IBM Spectrum Virtualize**: Designed and developed features for frequent software releases for the IBM Storwize and IBM FlashSystem product families. Made a substantial contribution towards successful launch of IBM FlashSystem V9000 product and provided technical support for customers thereafter including investigating and fixing urgent field bugs. Responsible for developing and maintaining internal tools to aid developers in adding new commands to the system.
- **Distributed Teamwork**: Experience working for a large company with a geographically distributed engineering team (UK, Israel, US and India). Delivered a workshop via conference call to a team of software engineers in India. Used Agile methodology across a number of project and used a variety of collaborative software tools such as Git, JIRA and RTC to improve team efficiency.
- **Graduate Scheme**: Joined on a Graduate Scheme and progressed to Software Engineer after approximately 18 months. Quickly developed working knowledge of enterprise storage system concepts such as storage virtualization, thin-provisioning and clustered system architecture.

University Projects

- As part of masters course took part in a small machine learning research project that involved modelling formula one racing driver's lap times in order to gain a strategic advantage for a certain team. The involved close work with Machine Learning professor and presenting results to F1 Team Head Strategist.

Additional Courses

- **Coursera - Deep Learning Specialism** : Jan 2020
- **Coursera - Machine Learning by Stanford University** : Dec 2015

Skills

- **Languages**: Python, C, C++, Java, Bash
- **Technologies**: Tensorflow, Keras, PyTorch, Numpy, Git, JIRA, ARM968, Event-driven Programming, Digital Vision Sensors, Neuromorphic Computing, SpiNNaker, Linux, Android, Storage Virtualization, Raspberry Pi, Google Coral Dev Board, Deep Learning, Semi-Supervised Learning

References available upon request.