

Keir Simmons

MACHINE LEARNING · RESEARCH ENGINEER · JAPANESE SPEAKING (N2+)

UK citizen | Tokyo (Japan) resident

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Summary

As a Research Engineer Team Lead at *Ascent Robotics*, I have worked on and led numerous advanced machine learning-based projects with the overall goal of developing fully autonomous vehicles for Japanese roads. These projects have included work within adversarial search, computer vision, and deep reinforcement learning, using a plethora of real world data to ensure generality and transferability across various domains. Prior to *Ascent Robotics*, I completed a research internship at the internationally-renowned *AI Research Center* & AI energy company *Informetis* in Tokyo, been awarded the prestigious *Daiwa Scholarship*, and hold Master's degrees with the highest possible merit from three top 10 universities around the world. My passion is to improve everyday-life via automation by pushing and challenging the frontiers of machine learning research and application. With over 15 years of daily development experience in a vast array of languages, an exemplary background both academically and in industry, I hope to further aspire towards these goals throughout the rest of my personal career.

Experience

Ascent Robotics

Tokyo, Japan

RESEARCH ENGINEER TEAM LEAD

Apr. 2019 - Feb. 2020

RESEARCH ENGINEER

Nov. 2018 - Apr. 2019

INTERN

May 2017 - Aug. 2017

- Heading the *Adversary* team which focuses on validating the effectiveness of our autonomous vehicles over all possible scenarios through the use of simulation and advanced adversarial search techniques.
- Exposed and proposed solutions to incapacabilities in the vehicle AI during simulation before proceeding to in-car testing via an array of advanced Bayesian Optimisation-based adversarial search methods in our main project, *DOJO*.
- Led multiple end-to-end machine learning-based projects specifically with the goal of training our vehicles to adopt a human-like behaviour. The results of these projects have been used in publications at leading conferences worldwide.
- Created a full end-to-end stack which clusters driving behaviours of vehicles on Japanese roads from raw 4K HD top-down drone video data. This data has been converted to an API and used in various other projects within the Adversary and vehicle AI team.

Informetis

Tokyo, Japan

RESEARCH ENGINEER | UCL MASTER'S THESIS

June. 2018 - Sept. 2018

- Solved the *peak-demand* problem where the electrical grid cannot generate enough energy during peak times, completion of which formed my Master's thesis at UCL for the MSc in *Computational Statistics & Machine Learning* and earned the highest possible classification.
- Tackled the problem through the use of peak-shifting; using reinforcement learning (PPO) to find an optimal control policy of purchasing and storing energy in a battery to shift consumer's demand for energy outside of peak times.
- Achieved perfect peak-shifting and a reduction in energy consumption and cost of utility bills by over 20%.
- The code and full thesis is available on *GitHub*.

AI Research Center - National Institute of Advanced Industrial Science & Technology

Tokyo, Japan

MACHINE LEARNING RESEARCHER | COURTESY OF THE DAIWA SCHOLARSHIP

Oct. 2016 - Mar. 2017

- Completed a research placement as the only non-doctorate ever to be admitted on the team, solely based on my academic performance.
- Learned and implemented fundamental machine learning algorithms, covering supervised, unsupervised and reinforcement learning. This included reproducing Google DeepMind's results from their Atari paper, and performing hyperparameter optimisation to improve the results.
- Led a seminar in reinforcement learning with a vision of enabling other researchers to apply it to their own field of research.

The Daiwa Anglo-Japanese Foundation

Tokyo, Japan

DAIWA SCHOLAR

Aug. 2015 - Mar. 2017

- An extremely competitive one-of-a-kind scholarship programme for potential leaders in their field with a strong academic background, consisting of an intensive language course and relevant work placement. Approximate value of 11,000,000 JPY.
- Selected as 1 of 6 scholars for the 2015-2017 programme from an initial pool of approximately 300+ candidates to represent the UK in the machine learning and artificial intelligence field.
- Conducted a research placement at the *Artificial Intelligence Research Center* after achieving business-level fluency in Japanese (JLPT N2).

National University of Singapore

Kent Ridge, Singapore

UNDERGRADUATE RESEARCHER

Jan. 2014 - Jun. 2014

- Programmed a bespoke sound pressure level meter application for Android devices using Java to allow monitoring of aircraft engine noise. Included a real-time graphical frequency analyser adhering to aviation industry standards, and a settings panel to allow for adjustment of the weighting parameters and data exportation for further analysis.

Volunteering

London, UK

WEB DEVELOPER

Jan. 2007 - Dec. 2014

- Created over 100 advanced open-source modifications in JavaScript and PHP for use with the popular message-board services *Invision Power Board* and *ZetaBoards*, including one that was used by over 1,000,000 people. 20% of these projects have now been ported to *GitHub*.

Education

University College London (UCL)

London, UK

MSc COMPUTATIONAL STATISTICS AND MACHINE LEARNING (CSML) | **DISTINCTION**

Sept. 2017 - Sept. 2018

- Taught by leading *DeepMind* researchers including *David Silver* on the *Advanced Deep Learning & Reinforcement Learning* course.
- Completed large-scale projects in NLP, reinforcement learning and machine vision, including advanced language modelling, sentence ordering for coherence, biomedical feature extraction and augmented reality tracking, using Python and TensorFlow.
- Developed a strong mathematical foundation in statistical modelling and machine learning, which I applied in my thesis and numerous projects throughout the degree, resulting in achieving the highest possible classification.

Imperial College London

London, UK

MEng AERONAUTICAL ENGINEERING WITH A YEAR ABROAD | **FIRST CLASS**

Oct. 2011 - Jun. 2015

- Achieved a strong 1st class with honours (80% average) with a final grade in the top 5%.
- Specialised in computational methods, achieving 100% credit in *Computational Fluid Dynamics* and *Numerical Analysis* coursework.
- Completed my Master's thesis titled *Design Synthesis of Small Unmanned Aircraft*, focusing on numerical optimisation in Matlab for appropriate selection of aerodynamic properties of an autonomous drone, resulting in a staggering 9% weight saving of the final design.

National University of Singapore (NUS)

Kent Ridge, Singapore

MEng AERONAUTICAL ENGINEERING WITH A YEAR ABROAD | **FIRST CLASS**

Aug. 2013 - May. 2014

- Achieved the highest ever received grade of 4.5/5.0 as the first student to be selected for this exchange programme based on academic merit.
- Self-taught Java in order to take two advanced MIT-based modules in *Programming Methodology (A)* and *Data Structures and Algorithms (A-)*.

Professional Development

Deep Reinforcement Learning Bootcamp

UC Berkeley, USA

On-site: intensive lectures and labs delivered by leading professors and industry experts in RL.

Aug. 2017

Convolutional Neural Networks image for Visual Recognition (CS231n)

Stanford, USA

Online course: mathematically-rigorous course covering state-of-the-art methods for visual recognition.

Feb. 2017 - Mar. 2017

Introduction to Reinforcement Learning

UCL, UK

Online course: solid mathematical formulation of state-of-the-art RL algorithms and practices.

Dec. 2016 - Feb. 2017

Machine Learning

Stanford, USA

Online course: learned the fundamentals of machine learning, completing all assignments with 100% credit.

Sept. 2016 - Dec. 2016

Skills

TECHNICAL

Expert  Python, JavaScript, jQuery, HTML

Proficient  PyTorch, Tensorflow, OpenCV, AWS, Google Cloud, Matlab, MySQL, git, PHP, LaTeX, CSS, Kubernetes, MS Office

Familiar  C++, R, Java, FORTRAN, ROS, Gazebo, Unreal Engine

MISCELLANEOUS

Core Related Skills Machine learning, end-to-end deployment, computer vision, adversarial search, NLP, reinforcement learning

Natural Languages English (native), Japanese (conversational; N2)

Honours & Awards

Junction Tokyo Hackathon (Winner of both Softbank Robotics & IBM BlueMix paths) - 400,000 JPY

Tokyo, Japan

Hacked SoftBank's Pepper robot into a smart personal sales assistant using machine learning (image recognition & recommendation systems). Asia's largest international hackathon.

2017

Aeronautics Scholar - Imperial College London

London, UK

Achieved a 1st class result every year throughout the 4 year degree.

2011-2015

SumoBot Champion - National University of Singapore (CS1101S Contest)

Kent Ridge, Singapore

Designed, built and programmed a small robot with the purpose of battling competitors in a sumo-style ring, relying solely on on-board sensors against 100 other computer science students.

2013

Best AS Student & Best A2 Student - The Hollyfield School & Sixth Form Centre

Surrey, UK

Achieved the best A level grades in the college's history (A*A*AA, 520 UCAS points).

2011

Excellence in Mathematics & Excellence in Physics - The Hollyfield School & Sixth Form Centre

Surrey, UK

Achieved the best A level grades in Mathematics and Physics in the college's history (A*A*).

2011