Aryaman Reddi

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Education

University of Cambridge, Integrated M.Eng. Information and Computer Engineering　　　　　**2017 – 2021**

M.Eng: Achieved Distinction (top 23rd percentile)
- **Modules:** Deep learning and structured data • Probabilistic machine learning • Computational statistics and machine learning • Practical optimisation • Software engineering and design • Statistical signal analysis • Computer systems
- **David Thompson Scholarship:** Scholarship for academic achievement by Homerton College

B.A. Engineering: Achieved 2.1

Lab work:
- Used **Gaussian processes** for large dataset inference in Matlab
- Implemented **Gibbs sampling** and **message passing** algorithms for probabilistic ranking with **TrueSkill system** using Matlab
- Implemented **Bayesian modelling** and **Latent Dirichlet Allocation** for document modelling using Matlab
- Compared **MCMC sampling** algorithms such as **Gaussian Random Walk Metropolis-Hastings** and **preconditioned Crank-Nicholson** for latent space sampling on noisy datasets of crime data using Python
- Implemented **linear programming, gradient descent,** and **line search** methods in Matlab for unconstrained optimisation
- Investigated the computational efficiency of stochastic function minimisation methods such as **simulated annealing** and **Tabu search** using Matlab
- Implemented **thread-safe concurrency** methods using C++
- Integrated Design Project: programmed an Arduino Mega for a prototype industrial robot built in a team of six

Research Experience

M.Eng Project - University of Cambridge　　　　　**2020 – 2021**
- Year-long research project supervised by an academic of the Cambridge University Engineering Department
- Applied deep reinforcement learning methods to a number game and an unsolved multi-agent control problem
- Implemented deep RL methods such as **double deep Q-networks** and **prioritised experience replay**
- Implemented deep learning methods such as **LSTM neural networks, CNNs,** and **model pruning**
- Achieved novel findings of heuristically optimal strategies that aligned with game theoretic model
- One of **6%** of self-proposed projects – gained experience in transforming an idea to a research question with supervisor – findings currently under conference review

Undergraduate Researcher - Cambridge University Eco Racing - University of Cambridge　　　　**2018 Summer**
- Research experience through the undergraduate research opportunity program over a two-month period
- Collaborated in a student team to design and build an electric solar car for the World Solar Challenge in 2019
- Used CAD and FEA for mechanical design and simulation of aerodynamically efficient wheels and suspension
- Collaborated with researchers by conducting mechanical experiments and rapid prototyping

Professional Experience

Graduate Software Engineer – Arm Machine Learning – Cambridge　　　　　**2021 – Present**
- Developing an open-source tool to optimise neural networks for inference on NPUs
- Researching implementation of TFLite network operators on NPU cores
- Researching model pruning/clustering for efficient compilation and conversion between neural network formats
- Employing data engineering and statistical techniques with Pandas and NumPy to produce actionable experimental feedback
- Employing Python unit testing and Jenkins CI pipeline for scalable integration

Hardware Verification Summer Internship – Arm – Cambridge   **2020 Summer**
- Twelve-week internship investigating asynchronous signal crossing in an Arm CPU bridge
- Conducted formal verification of Arm Cortex-R82 CPU using JasperGold to rectify failures in signal pathways
- Employed automation and CI workflow for verification using Jenkins and tcl scripting
- Identified and rectified **16%** of the faulty asynchronous pathways within the Cortex-R82 top-level architecture

Machine Learning Summer Internship – Arm – Cambridge   **2019 Summer**
- Twelve-week internship on using machine learning to improve processor verification of Arm Cortex-A56 CPU
- Developed API using Python for the integration of clustering models from scikit-learn into verification testbench
- Achieved **13%** increase in verification coverage for Cortex-A56 Instruction Fetch Unit testbench using clustering
- Implemented data engineering techniques such as PCA, ICA, and feature scaling
- Enhanced the Arm class-A verification testbench by developing testbench constraints using SystemVerilog

Cambridge University Robotics Society - Project Leader   **2019 – 2021**
- Led a team of 8 students to design and build autonomous drones for ground object visual mapping
- Built **4** lightweight modular drones using Solidworks, electronics, and 3D printing
- Harnessed TensorFlow Object Detection API in Python for object localisation and tracking

Computing and Engineering Projects

Personal projects
- [Game theory project](#) in population dynamics exploring genetic learning and strategy optimisation using Python
- Publishing a website exploring mathematically significant chess positions using HTML and CSS
- Submitted 4 unique strategies to compete in an online tournament for the Prisoner's Dilemma using Python
- Machine Unlearning: made a [Chrome extension](#) to sarcastify overused tech buzzwords using JS
- Made a [web bot](#) using selenium and Python to humorously disrupt an extremist blog forum
- Created a [remote-controlled robotic hand](#) using an Arduino Mega as a project in prosthetics
- [Created a guide on building drones](#) using my self-designed quadcopter with 60,000 views

Competitions
- **Hack Cambridge 2021:** created a Chrome extension to implement parental controls for sensitive content using JS and Python
- **Arm Hackathon 2020:** published a website to creatively visualise renewable energy usage across the globe using HTML and JS
- **Oxford Hack 2019:** used Microsoft Azure and OpenCV in Python to develop an [emoji generator](#) in 24 hours and won **MLH award**
- **Hack the Midlands 2019:** used OpenCV to develop an accessibility app with gesture control and face tracking
- **BAE Capture-The-Flag 2019**: cybersecurity challenge where I solved 10 security problems by employing various web and Windows application exploits
- **Google Hash Code 2019**: coding challenge involving dataset parsing and optimisation using Python
- **Hack Cambridge 2019**: developed a binaural audio and face tracking system using OpenCV in C++
- **Siemens Mindsphere 2018**: creatively used an Arduino and mechanical parts for a data visualisation art piece

Skills

- Used **Python, C++**, **Git, Gerrit,** and **Matlab** throughout course and work opportunities
- Used **Pandas, NumPy**, and **TensorFlow** throughout course for data engineering and machine learning applications in labs and projects (especially during Master's year)
- Used **Matplotlib, Plotly,** and **Seaborn** throughout course and work for presentation and effective communication
- **Mechanical prototyping**: used Solidworks, FEA, 3D printing, laser cutting, and practical electronics for hardware-related coursework and society work

Others

- **Sports:** Cambridge Varsity Men's Tennis, Homerton College Tennis and Badminton Captain, 2018-20
- **Libertas Society Secretary:** organised speakers for Cambridge's first Free Speech Union, 2020-21