Oliver Cassidy

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EDUCATION

Imperial College London — London, UK
MEng in Electronic and Information Engineering — Expected May 2027
Predicted First-Class Honours; Dean's List 2024; Ranked 2nd in the year

The Manchester Grammar School — Manchester, UK
A Levels – Mathematics A*, Further Mathematics A*, Physics A*, Electronics A*; Winner of the Paton Electronics Prize — Jun 2023

CONFERENCE PUBLICATIONS

ReducedLUT: Table Decomposition with "don't care" conditions — London, UK
Paper accepted to the ACM/SIGDA International Symposium on Field-Programmable Gate Arrays 2025 — Aug 2024 – Present

- Lead-author of a paper focused on reducing the physical lookup table (P-LUT) utilization of L-LUT based neural network (NN) models for ultra-low latency applications by introducing extra similarities within the data to allow for more effective decomposition
- Reduced the P-LUT utilization by over 38% with a maximum test accuracy drop of 0.01%: https://github.com/ollycassidy13/ReducedLUT
- Presented the paper to leading academics in the CAS research group at Imperial College London, and due to present at FPGA

PROFESSIONAL EXPERIENCE

Imperial College London Undergraduate Research Opportunity — London, UK
Ultra-low Latency ML FPGA Research — Jun 2024 – Sep 2024

- Investigated research papers such as NeuraLUT, LogicNets, CompressedLUT and Yukio Miyasaka's paper on BDD's gaining a concrete understanding of deep neural networks on FPGA devices, LUTs and how don't care conditions can be leveraged
- Modified CompressedLUT's code to be lossless in the context of NNs' train and test accuracy
- Adapted the toolflow of NeuraLUT to integrate CUDA for LUT based testing, Verilator testing of the Verilog model and synthesis of the model using Vivado by modifying oh-my-xilinx to perform a suitable synthesis allowing for multiple models to be tested in parallel
- Implemented a new toolflow to integrate the use of the lossless CompressedLUT, and then ReducedLUT to the NeuraLUT models

Private 1:1 Tutoring — Jan 2021-Sep 2024

- Used social media to market my own tutoring business and attract clients, leading to a full client roster and a waitlist
- Tutored over fifteen students at GCSE and A level in preparation for their examinations, leading to an increase in grades

Adelphi Automation — Stockport, UK
Robotics Placement — Jun 2022

- Designed adapters to attach a suction cup and pump to a robotic arm using Solidworks before machining the parts by hand
- Programmed the a KUKA arm to automate the transfer of materials, leading to a 15x increase in the speed of the transfer

ACADEMIC PROJECTS

Sparse AutoEncoder Project — Nov 2024-Present

- I created and trained a SAEs using PyTorch, and then trained them based on open-source transformers to identify sparse features
- I worked on fine-tuning LLMs as classifiers and techniques to reduce their bias by removing spurious features
- I'm currently investigating the use of different strategies to allow for more effective SAE usage in unlearning applications

Network Intrusion Detection System — Jul 2024

- I created and trained a FNN model in PyTorch based on the CIC-IDC2017 dataset which contains data for 15 types of attack
- I used a raspberry pi zero as an edge device to implement a real-time visual guide

Remote Control Car from Logic — Dec 2022-Mar 2023

- Designed and built a remote control car using a RF transmitter/receiver pair, logic gates, counters and motor drivers
- Built the RF unit using a crystal oscillator to generate the desired carrier frequency, and ASK modulation to transmit the information

ADDITIONAL

Programming Proficiencies: Advanced in C++, Python, PyTorch, JavaScript, HTML/CSS, CUDA, Verilator, Tcl, Git; Proficient in C, SQL, Java, Verilog, React, Electron, Basic, Assembly languages, Flask
Awards: Dean's List (2024), Paton Electronics Prize (2023), Gold Crest Award, Gold Kangaroo in the Senior Maths Challenge, Silver in the Physics Olympiad and Silver Industrial Cadets Award (2022)
Interests: 5K competitive track running for The Thames Valley Harriers (2023-Present), Raced nationally for junior cycling development teams and trained with British Cycling (2020-2023)