Oscar Sun *Second Year Engineering Science Student*

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Summary

Ambitious second-year Engineering Science student currently pursuing an Electrical and Computer Engineering degree with an Artificial Intelligence minor. Passionate about hardware acceleration of machine learning, autonomous vehicle technology and solving complex engineering challenges.

Education

University of Toronto — Toronto, Canada

Bachelor of Applied Science and Engineering (B.A.Sc) in Engineering Science + PEY *2023 – 2028*

- Relevant Courses: Introduction to Computer Programming (algorithm efficiency), Advanced Programming and Data Structures (software engineering design), Digital and Computer Systems (digital circuits, microprocessor systems)
- Scholarships & Awards: U of T Engineering International Scholar, ESROP-UofT Research Award

Experience

University of Toronto Formula Racing Team (UTFR) — Toronto, ON

Perception Engineer *Sept. 2024 – Present*

- Simulated the perception stack focusing on the integration between hardware (LIDAR and cameras) and software publisher and subscriber nodes in ROS.
- Improved pre and post-processing speed of deep learning pipeline by vectorizing image scaling and performing batch operations on non-maximum suppression.
- Researched Hungarian matching algorithm for LIDAR point cloud and camera image comparison; applied Synthetic Minority Oversampling Technique (SMOTE) to oversample orange cones in training datasets for better confidence in cone recognition.

University of Toronto Robotics Association (UTRA) — Toronto, ON

Software Developer, Autonomous Rover Team *Sep. 2024 – Present*

- Integrated ROS to process sensor data, generate motor commands, and streamline autonomous navigation algorithms, resulting in more efficient route planning.
- Contributed to the deep learning perception pipeline by benchmarking inference times for simulations and real-life camera data, and training a YOLOv8 model for ramp identification using images labelled with roboflow.

Director, UTRA Hackathon *May 2024 – Present*

- Hired and led a team of 30 to organize a robotics hackathon for an estimated 450 high school and undergraduate participants.
- Oversaw internal affairs such as game design development and logistics planning, communicated with external organizations for sponsorship and outreach efforts.
- Revolutionized hackathon culture by strategically leading EDIA and learning-focused initiatives, consulting with UofT subject matter experts to make the hackathon more accessible and inclusive.

Applied Optimization Lab (AOL) — Toronto, ON

Student Researcher *May 2024 – Sep 2024*

- Applied Python optimization packages (Gurobi, HiGHS) and matrix techniques (Compressed Sparse Matrix) to plan for Automated External Defibrillator (AED) placements in Scotland based on geographical data of past cardiac arrests.
- Investigated the efficacy of existing clinical isocenter placement heuristics using knowledge-based planning (KBP) pipeline for gamma knife radiotherapy treatments.
- Developed and implemented in Python a novel optimization-based isocenter placement algorithm to achieve desired dose distributions evaluated with measured metrics of coverage and selectivity.

International Genetically Engineered Machine (iGEM) Toronto — Toronto, ON

Hardware Engineer *Apr. 2024 – Present*

- Optimized wetlab workflow by developing an Internet of Things (IoT) fridge management application, enabling efficient tracking and management of wetlab samples and improving operational efficiency.
- Programmed Arduino microcontrollers to interface between sensors, python GUI endpoint, Message Queuing Telemetry Transport (MQTT) server, and cloud database (MongoDB).
- Created management protocols and established contracts between key Hypertext Transfer Protocol (HTPP) endpoints of the system (microcontrollers, RFID reader, and Python UI), ensuring consistency in coordination between devices and users.
- Built a hardware knowledge base by conducting research on microcontrollers and past projects, improving team access to shared knowledge and hardware documentation.

Skills

- **Technical Skills:** Python (PyTorch, OpenCV), C, Java, MatLab, SystemVerilog, Assembly, ROS, microcontroller programming
- **Developer Tools:** Git, Linux, Jupyter Notebook, Latex
- **Professional Skills:** Adaptability, Problem-Solving, Critical-Thinking, Collaboration, Time Management, Leadership