

# (Seyed) Ardavan Alaei Fard

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## Education:

University of Toronto | Computer Engineering - Bachelor of Applied Science + PEY Sep 2021 - Apr 2025

- Cumulative GPA: 3.75
  - Natural Sciences and Engineering Research Council Award (\$6000) | Dean's List for all semesters
  - Courses: Algorithms & Data Structure | Circuit Analysis | Linear Algebra | Signals & Systems | Software Engineering
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## Skills:

Software: Python | C/C++ | Java | Git | Windows | Linux | Machine Learning | Deep Learning

Libraries/Tools: NumPy | Pandas | Plotly | ROS | PX4 | Scikit-learn | PyTorch | TensorFlow | Gazebo | COMSOL

Mechatronics: Electronics | Soldering | Wiring | Sensor Integration | Arduino | AutoCAD | SolidWorks

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## Technical Experience:

Avionics Engineer | University of Toronto Aerospace Team | Toronto, ON, Canada Oct 2022 - Present

- Developed an **algorithm** in order to apply a **Geo-fence** for aircraft's landing mission using **ROS noetic**
- Increased the accuracy and precision of **autonomous landing** from approximately **1 m to 30 cm** by parameter tuning
- Simulating and researching about different landing approaches using **Gazebo** to find the optimal method
- Migrating a portion of the packages along with their launch files from **ROS1** to **ROS2**
- Wiring and assembling avionics components including the **Pixhawk**, **GPS**, **LiDAR** and various servos
- Testing and analyzing the accuracy and precision of **aircraft's localization** while using **Real-Time Kinematics (RTK)**

Research Assistant | Diller Microrobotics Lab | Toronto, ON, Canada May 2023 - Aug 2023

- Researched about **Electromagnetic Navigation Systems (ENS)** for controlling surgical tools and microrobots
  - Undertook **electrical debugging** and **cabling** tasks to configure the system effectively
  - Produced training dataset through simulations on **COMSOL** software using **MPh API** for process **automation** in **Python**
  - Developed deep learning models (**MLP**, **ResNet**, **DenseNet**, and **LSTM**) in order to calibrate the system for different positions on the coil table, lowering the margin of error to **7.1 mT** within a 3D workspace
  - Tested the models with empirical data from the system, collected via a novel **sensor array** joint to **Franka Emika** arm
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## Projects:

### Sensor Array

- Designed a **sensor array** for collecting surrounding **magnetic flux density** using **Solidworks** for my research
- Engineered the **electrical design** of the device consisting sixteen **MLX90393** magnetometers, two multiplexers, a microcontroller (**Arduino UNO**), and **I2C** as the connection protocol between the components
- Troubleshooted and modified the magnetometers to reach **precision** level of **97%** using Helmholtz coils
- Automated the data collection procedure by developing script using **Python Serial Port Extension**

### City Map Application

- Developed a map specifically for commuters and travelers using a predeveloped API based on **OpenStreetMap** in **C++**
- Programmed **A\* algorithm** and a customized heuristic based on Euclidean distance as our path finding algorithm
- Applied extra features for the map including but not limited to **location-wise weather prediction**, information about street closures, and **subway paths** with real-life color coding to improve the usability of our map

### Triple P (Pointillism, Parametric Equations, Programming)

- Programmed an abstract art generator, inspired by **parametric equations** and pointillism technique of painting, in **Java**
- Utilized **Abstract Window Toolkit (AWT)** library for rendering graphical objects
- Developed an **algorithm** to modify the size of the dots based on the **instantaneous rate of change** in the equation