Mohammad Sareeb Hakak

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INTRODUCTION

I am a Control Systems and Robotics engineer in the process of mastering both hardware and software skills through a long journey of building personal projects, researching, graduate school and eventually working in the industry.

I am currently seeking full time opportunities in the field of autonomous systems, robotics or control systems.

I am a master's student specializing in Robotics and Control at North Carolina State University. My present work as a graduate researcher focuses on finding autonomous flying solutions for UAVs. I am currently developing full stack software for autonomous flying and software testing of UAVs which will used by the 5G Communications Lab to test their product in the air. It will also be used be used as a reference test bed platform by students of the graduate course – ECE 592 Autonomous Aerial Robotics.

NCSU and the 5G Communications & Drones Lab received a 24 million dollar grant for the research and implementation of 5G networks through UAVs. The software development work and algorithms for autonomous navigation that I have implemented in my Master's Research work will be used by NCSU for the project.

I am passionate about the autonomous systems field including Robotics, Mechatronics, Control Systems, Deep Learning, and Reinforcement Learning. I have been consistently learning new skills and implementing algorithms for autonomous systems ranging from deep learning through tensor flow, state estimation, sensor fusion to developing non linear controllers for UAVs etc. I am currently pursuing the Udacity Autonomous Flight Engineer program while having completed their Intro. to Self Driving Car program.

Being a consistent academic performer throughout my Education and Research career, I leverage strong fundamental knowledge with a persevering attitude to resolve engineering problems. I possess a penchant for perpetual learning and an insatiable intrigue to find new ways to resolve engineering challenges.

EDUCATION

Master of Science in Electrical and Computer Engineering Anticipated May 2020
GPA: 4.0/4.0
North Carolina State University, Raleigh, NC, USA

Bachelor of Technology in Mechanical Engineering July 2013 – June 2017
GPA: 8.514/10.0
National Institute of Technology, Srinagar, India

Coursework

Master's :
ECE 592 - Autonomous Aerial Robotics
ECE 555 - Autonomous Mobile Robotics
ECE 726 - Optimal Control
ECE 542 - Machine Learning & Deep Learning
ECE 309 - Object Oriented Programming & Data Structures in C++
ECE 516 - System Controls Engineering
ECE 455 - Industrial Robotic Systems
ECE 535 - Design of Electro-Mechanical Systems
ECE 763 – Computer Vision*
MAE 511 - Advanced Dynamics

Bachelor's:

Mechatronics
CAD/CAE
Industrial Automation

Udacity:

Udacity's Intro to Self-Driving Cars *Oct 2018- Mar 2019*
AI for Robotics (Udacity)

SKILLS

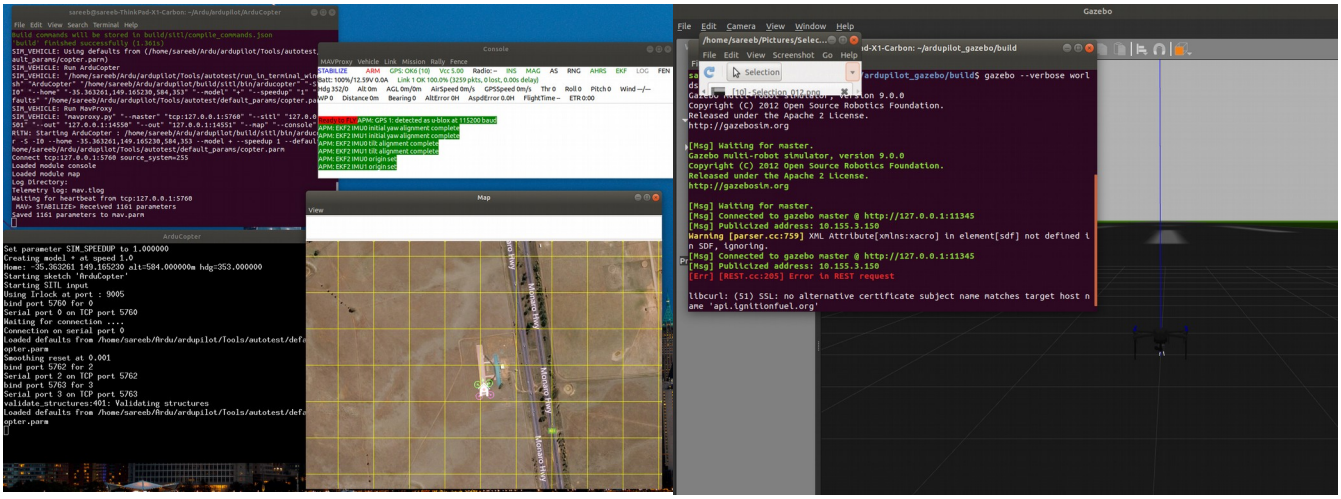
Software: MATLAB, Simulink, AutoCAD, SolidWorks, PTC Creo Pro, Ansys Workbench and Maxwell, FEMM, Mathematica
Programming: Python, MATLAB, C, C++, ROS, OpenCV, Bash Scripting, Linux Command Line, Latex, Docker, Git

Miscellaneous: State Estimation and Transformation, Robot Localization, Extended Kalman Filters, State and Object-Oriented Programming, C++ optimization, Assembly Language, Data Structures, Sensor Fusion, Perception, Route Planning and Trajectory Construction, Vehicle Motion Control , Control System Design, PID and LQRControl.

PROJECTS

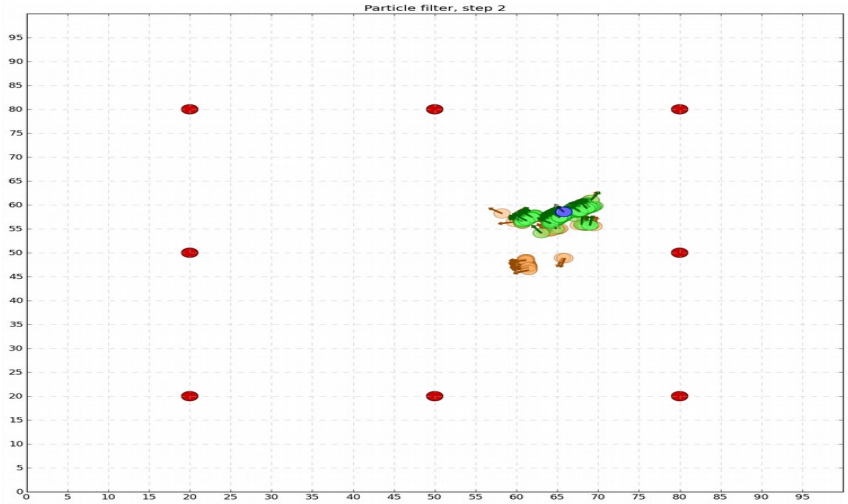
Master's Independent Research *June 2019-Ongoing*

- Implemented developer level APIs for Autonomous Operation of UAVs for various cases and applications through Drone-kit in Python and MavROS in C++.
- Currently working on developing full-stack software for autonomous flying and software testing of UAVs which will be used by the 5G Communications Lab to test their product in the air.
- The software testing platform will also be used as a reference test-bed platform by students of the graduate course – ECE 592 Autonomous Aerial Robotics.
- The software development work and algorithms for autonomous navigation that I have implemented in my Master's Research work will be used by NCSU for the 24 million dollar NSF project.



Robot Localization *Nov 2018*

- Designed a 2-D histogram filter for Robot Localization in Python and subsequently converted the filter to C++ for optimization, better memory efficiency and smooth working.



State Estimation of an Autonomous Vehicle *Dec 2018*

- Designed an Extended Kalman Filter in Python for the vehicle State Estimation based on LiDAR data.

Planning an Optimal Path *Jan 2019*

- Implemented a Google Maps style routing algorithm based on the A* search for the Udacity self-driving car.

Trajectory Visualizer *Feb 2019*

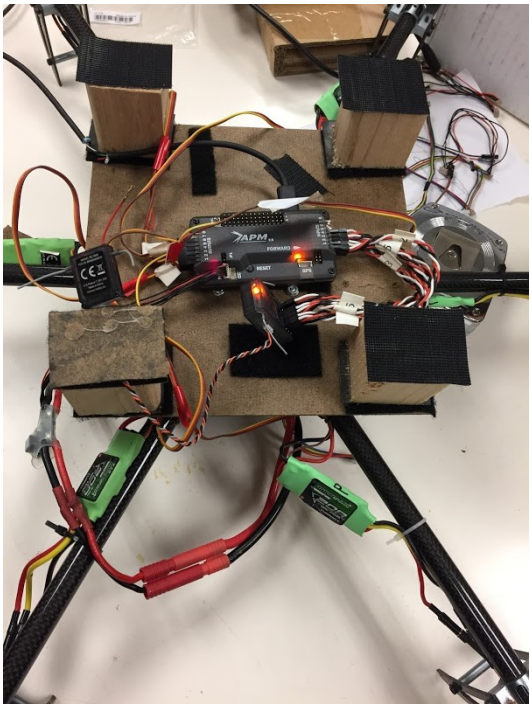
- Implemented an algorithm for the reconstruction of vehicle trajectories from accelerometer data.

Image Classifier from Scratch *Mar 2019*

- Built a traffic light classification pipeline in computer vision for a self-driving car based on feature extraction.

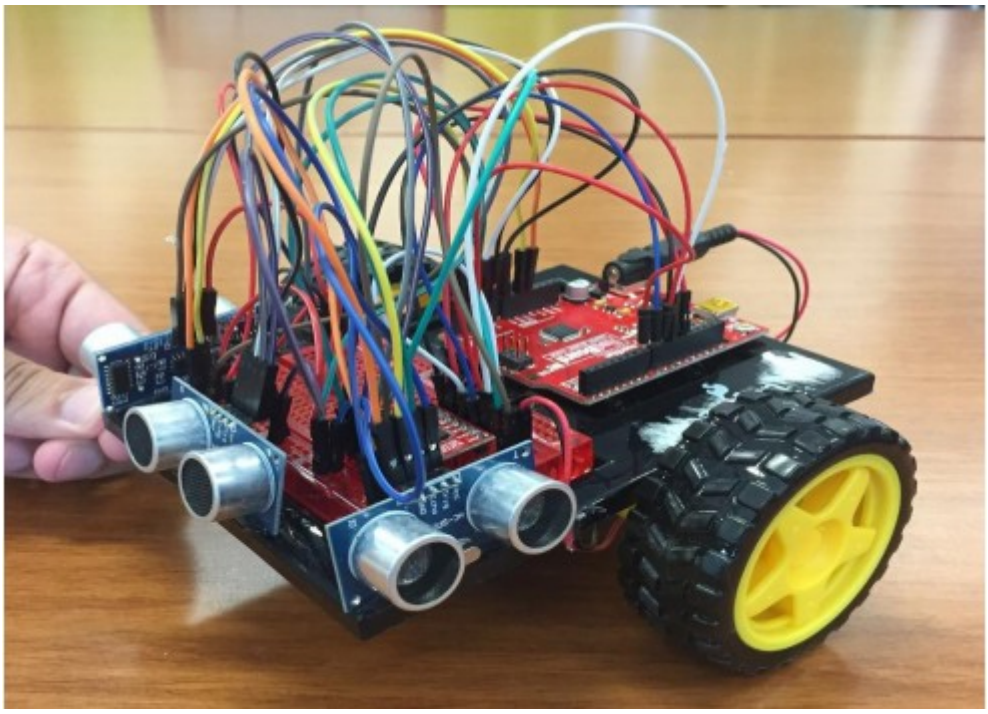
Autonomous Tethered Drone *Jan 2019 –May2019*

- Fabricated an autonomous drone with an autopilot based on MAVLINK tethered to an autonomous ground control system powering it robustly for one hour while the drone loiters at 50m altitude.



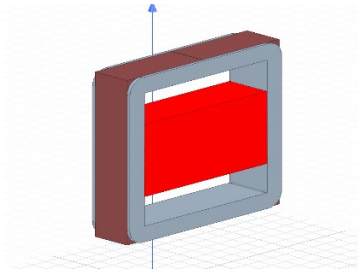
Obstacle Avoiding Wheelchair *Feb 2019 –May2019*

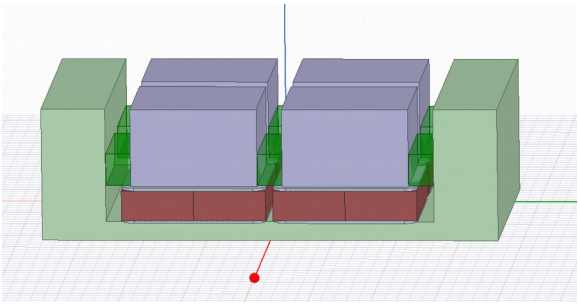
- Implemented the algorithms responsible for Obstacle Avoidance in ROS and C++ to an autonomous driving wheelchair through an array of sonar sensors instead of the traditionally used LiDAR in an effort to reduce costs.



Electro-Permanent Magnetic Clamp *Jan 2019 –May2019*

- Designed an Electro-Permanent Magnetic clamp (EPMC) for a local manufacturer, using Magnetic Circuit Analysis (MCA) to provide a high reluctance force on the workpiece during machining process, reducing set-up times.





WORK EXPERIENCE

FIL Industries, Srinagar, India | Junior Mechanical Engineer *July 2017– July 2018*

- Operations, Maintenance in-charge of the Juice manufacturing plant an d Warehouse facility of the Fruit and Beverages Department with special focus on production and quality control, breakdown maintenance, spare part inventory management, maintenance of plant machinery and various operational control measures.

Maruti Suzuki India Limited, Gurgaon, India | Project Intern *Dec 2015 – Jan 2016*

- Implemented a Programmable Logic Controller (PLC) system for automation through Poka-Yoke mechanism enabling mistake-proofing leading to high standards of quality.