

Education

Washington University | Saint Louis, MO

M.Eng in Robotics

BS in Mechanical Engineering, Minor in Nanoscale Engineering

Drake University | Des Moines, IA

BS in Physics

Expected Graduation Date: May 2021

3.80 GPA

3.10 GPA

August 2016 to May 2018

3.85 GPA

– Dean's List '16, '17, '18

– Worked 20 hours/week

Technical Experience

Robotics & Adaptive Control Designer | Washington University | Saint Louis, MO

January 2020 – May 2021

- Designed different type of robust controllers for X-45A based on optimal control and observer-based loop recovery theory for analyzing stability margins in frequency and time domain to understand performance and robustness.
- Developed a swing up algorithm based on a PID controller that balances the arm between $\pm 20^\circ$ against gravity
- Designed a 3D Framework for a 2 Degree of rotation (DOF) and 6 DOF Robotic arm to design feedback gains which were later implemented in a real time pendulum system through Simulink
- Developed a feedback system algorithm by linearizing 2DOF and 3DOF framework in Simulink to create a user-friendly control environment enabling full control of the arms within the real-world parameters
- Programmed an AI system in Python to beat the Pac Man game and possibly other AI Pac Man systems

IOT Developer | Washington University | Saint Louis, MO

August 2020 – January 2021

- Developed an asynchronous automated intelligent planter system (on an Arduino and Raspberry Pi) using Amazon AWS to optimize indoor growth of plants
- Designed an algorithm for calibrating light and water sensors to communicate with respective lighting and watering system based on the plant specie's specific growth requirements

Rover Prototype Designer | Washington University | Saint Louis, MO

August 2019 – March 2020

- Prototyped an automated compact rover with a parachute hatch in SolidWorks to sustain a 1200ft drop
- Designed an advance algorithm using C++ to automate the rover's motor controls based of a GPS modular system to navigate it to a designated target within a threshold
- Designed an algorithm using C++ for the rover's parachute mechanics to optimize parameters and sustain the 1200ft drop with minimal damage

Prototype Analyst | Integrated Dynamics | Karachi, Pakistan

June 2017 – August 2017

- Custom built a RaspberryPi based sturdy quadcopter and derived stable automation and manual parameters such as roll, pitch and yaw through trial and error
- Implemented additional hardware on a Parrot drone to automate agricultural surveillance and crop analysis to help farmers improve their agricultural efficiency
- Designed an automated agricultural drone with a large battery life and multiple sensors for crop analysis

Additional Experience

Support Technician | WashU IT | Saint Louis, MO

October 2018 – May 2021

- Troubleshooted network, domain, software and operating system problems and developed solutions for users during the pandemic to transition to work from home
- Prepared different departments for the migration procedure by planning intensive discovery of department's expectations, requirements and current flow of work for smoother transitions for new OS

Research Assistant | Faculty: Dr. Athanasios Petridis | Drake University

May 2018 – August 2018

- Led the process of designing and simulating a theoretical framework for a supercapacitor based on the electrostatic principle employed in Van De Graff generator with the objective of creating an electrostatically charged supercapacitor as an alternative to chemical supercapacitors
- Planned the detailed documentation and execution of implementing the theoretical framework to construct the supercapacitor using Van De Graff generators

Skills and Languages

Proficient: MS Office, Adobe Photoshop, Illustrator, InDesign, Python, Java, C++, MATLAB, LaTeX, SolidWorks, AutoCAD, Simulink, Arduino, 3D Printing, Laser-Cutting Machines, Milling
Languages: English, Urdu, Sindhi, Hindi

Intermediate: Pearl, SML, Choco, Fortran, gnu-plot, HTML, Ubuntu, SQL, Micro-Fabrication techniques, Photolithography, Etching, Micro Molding

Learning: Android, IOS development, ROS