Zain Merchant

Summary Statement

Seeking to obtain a pathways internship at NASA to utilize and develop my technical skills in the fields of computer science, engineering, and electronics starting Fall 2017.

Education

Bachelor of Science in Computer Science, The University of Texas at Dallas
Junior, Expected Graduation in May 2018

Employment / Experience

For Summer 2017, I will be an Undergraduate Researcher at the Massachusetts Institute of Technology — Haystack Observatory.

NASA Johnson Space Center; Houston, TX
International Space Station On-Orbit Engineering (OB2) Intern (January 2017 — May 2017)
Developed a multiplatform (Android and iOS) mobile application in C# (using Xamarin) to have a read/write interface with the International Space Station Mission Evaluation Room (MER) Web System and other NASA / ISS resources. Created a user login and verification system, a SQLite database, and developed my own search functionality for the console log entries.

William B. Hanson Center for Space Sciences; Richardson, TX
Undergraduate Researcher (May 2016 — December 2016)
Conducted research at the Upper Atmosphere and Remote Sensing Laboratory. Developed a beacon satellite receiver to calculate total electron content (TEC) in the ionosphere. Investigated different methods of signal acquisition and built a nested Quadrifilar Helicoidal (QFH) antenna system. Also programmed a signal recording and satellite tracking software to automate the process.

Robotics and Automation Society at UT Dallas; Richardson, TX
Fundraising Chair (August 2014 — May 2016)
Instructed members in computer programming and Arduino during weekly tutoring sessions. Collaborated with others on projects such as an Intel Edison IoT alarm clock to measure and display metrics obtained through various sensors. Elected to Fundraising Chair in May 2015 to help coordinate fundraising events, sponsorships, and other club activities.

Projects

Autonomous Satellite Tracking and Recording Software in Python — *Summer 2016 (Research Project)*
Forecasted satellite paths using Two Line Element (TLE) sets to automate the data retrieval process for our antenna. Programmed the satellite tracking code to work alongside the Software Defined Radio platform, GNURadio, to record specific satellite transmissions using an Ettus Research Universal Software Radio Peripheral (USRP).

iOS Road Conditions Detection and Reporting Application in Swift — *September 2016 (Independent Project)*
Created a mobile application to autonomously detect, verify, and report roads with rough pavement or potholes. The application utilizes the iPhone's GPS, gyroscope, and accelerometer to distinguish normal road conditions from those requiring repair. The city of Richardson received a $25,000 grant from State Farm for continued development.

Enigma Machine in Verilog — *November 2016 (Academic Project)*
Developed a digitally encoded processing unit in Verilog to simulate a WWII Enigma Machine with 4 states - On, Reset, Encrypt/Decrypt, and Calibrate. The project used a testbench interface to encode and decode entire messages at a time.

Facial and Object Tracking Using OpenCV in Python — *December 2016 (Independent Project)*
Using the OpenCV Python library, I developed a program to track objects through a webcam, including faces, using Haar Cascades and a multitude of training images. Applied this project towards creating a rudimentary real-time visual heart rate monitor based on the MIT CSAIL Eulerian Video Magnification project. Also, created a tutorial presentation to assist others interested in OpenCV.

Programming Languages / Platforms

Java, C++, Python, SQLite, C#, Matlab, Arduino, HTML / CSS, Swift, Verilog, OpenCV, GNU Radio, and the UNIX Command Line

Relevant Coursework

Algorithm Analysis & Data Structures, Discrete Mathematics I & II, Linear Algebra, Computer Architecture, Digital Logic & Computer Design, Digital Systems Laboratory, Software Engineering, and Organization of Programming Languages

Awards

- 1st Place at Richardson Community Hack Week 2016
- 1st Place for Best Microsoft Hack at TAMUHack 2015
- 1st Place for Best Drone Hack (State Farm) at TAMUHack 2015