Roumen Guha

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Current graduate student and former automotive engineer transitioning to robotics, with extensive experience in embedded systems and system integration. Looking for Summer 2020 internship or co-op opportunities in robotic perception and motion-planning.

Experience

Dec 2016 - May 2018 **Controls & Electrical Team Lead**, *Wisconsin Hybrid SAE Vehicle Team*, Madison, WI.
Managed team to completion of converting a stock SUV into an **electric vehicle** with 35-mile range, in **under 4 months**.
- Developed motor control code for **driving and regenerative braking**, improving range on a single charge.
- Managed student team to **integrate a small ethanol engine** into our electric vehicle to achieve a range-extended hybrid.
- Planned, designed, built, wired and wrote code for a dynamometer over summer. Used by several vehicle teams for testing.
- Performed high-voltage wiring, built and debugged vehicle wiring-harness, and integrated power electronics.
- Worked with **Simulink**, **MotoHawk**, **MotoTune**, **CANoe**, **CANdb++** and other Woodward and Vector development tools and software.

Sept 2014 - May 2018 **Team Member**, *Wisconsin Hybrid SAE Vehicle Team*, UW-Madison.
- Assisted in the implementation of a load dump and high-voltage battery, allowing dynamometer to continue for longer periods without stopping.
- Integrated temperature control sensors onto the vehicle network, allowing easy driver-monitoring of battery state.
- Successfully debugged and resolved issue with battery voltage sags shutting down the electric motor.

Sept 2017 - Dec 2017 **Undergraduate Teaching Assistant**, *Department of Electrical & Computer Engineering*, UW-Madison.
- Assisted **Professor Barry Van Veen** in teaching an introductory undergraduate signal processing course.
- Supervised lab assignments. Validated assignment questions.

May 2015 - July 2016 **Help Desk Agent**, *Division of Information Technology (DoIT)*, Madison, WI.
- Successfully resolved technical issues with **80 university members every week**, while **working 15 hours/week**.
- Recognized by grateful callers for going above and beyond my responsibilities.

Education

2019–2021 **M.S., Electrical Engineering**, *University of California San Diego*, Focus: Robotics, *Advanced courses: Sensing & Estimation, Planning/Learning, Neural Networks, Autonomous Driving*.

2014–2018 **B.S., Electrical Engineering & Math**, *University of Wisconsin-Madison*, Dean's Honors, AMCHAM Scholarship, *Advanced courses: Robotics, Machine Learning, Image Processing, Optimization, Artificial Intelligence*.
GPA: 3.4

Favorite Projects

Most of these can be found on my GitHub page.

Nov 2017 - Dec 2017 **Dancing Robot**.
- Built a dancing robot arm with a robotic arm, utilizing **inverse kinematics** and a **DSP-based beat-tracker**.
- Programmed using **ROS** in **Python** on a **Raspberry Pi**.

Nov 2017 - Dec 2017 **MLSP 2014 Schizophrenia Classification Kaggle Challenge**.
- Built a schizophrenia **classifier** in **MATLAB**.
- **PCA**, **LDA** and **clustering** techniques were employed under a serious time-constraint.

Nov 2017 - Dec 2017 **Brush Stroke Classification**.
- Wrote a **Mathematica** image processing routine to **classify** Van Gogh's brush strokes in his lesser known sketches.

Sept 2017 - Oct 2017 **Stop Sign Detection**.
- Coded a **Mathematica** image processing routine that **detected stop signs** in a class-provided dataset with 98% accuracy.
- Utilized classical techniques such as **segmentation, filtering, dilation and erosion, opening and closing**.
- **Won Silver in class competition.**

Apr 2017 - May 2017 **Tesla's Positioning Problem**.
- Modeled the problem of Tesla's charging infrastructure, and found an **optimal solution** that would **minimize costs** while spreading out the stations according to usage statistics, travel time, and while **minimizing waiting times** at the stations.
- Taught myself the Julia programming language.

Skills

Advanced MATLAB, Simulink, C, Java, Mathematica

Intermediate ROS, C++, Python, Julia, Git, Bash, Altium, Quartus, SPICE, ARM Assembly, Raspberry Pi, Cortex-M4