

Roumen Guha

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SKILLS

MATLAB/Simulink, C/C++, Java, Python, Git, Bash, Julia, Jupyter, Mathematica, Woodward MotoHawk, Woodward MotoTune, Vector CANoe, Vector CANdb++, L^AT_EX, ARM Assembly, Robot Operating System (ROS), SPICE, Altium Designer, Altera Quartus II, Mercurial, Windows, Linux, Microsoft Office

EDUCATION

University of California-San Diego, San Diego, California, USA

- M.Sc. Electrical Engineering 2019 – Present
 - Track: Intelligent Systems, Robotics & Control

University of Wisconsin-Madison, Madison, Wisconsin, USA

- B.Sc. Electrical Engineering and Mathematics 2014 – 2018
 - Cumulative GPA: 3.38 / 4.00
- Awards and Honors
 - **Dean's Honor List**, UW-Madison 2014 – 2017
 - **AMCHAM-MACEE 2014 Scholarship**, American Chamber of Commerce 2014 – 2018

WORK EXPERIENCE

Department of Electrical & Computer Engineering, UW-Madison

- Undergraduate Teaching Assistant Sep 2017 – Dec 2017
 - Assisted **Professor Barry Van Veen** in teaching ECE 203 — **Signals, Information, and Computation**.

Division of Information Technology (DoIT), UW-Madison

- Help Desk Agent May 2015 – Jul 2016
 - Assisted the students and faculty of the UW-Madison to resolve their technical problems.

CAMPUS ACTIVITIES

Projects:

- **Dancing Robot:** Built a dancing robot arm with a robotic arm, programmed in Robot Operating System (ROS) and Python. Built to minimize response times and maximize amusement. Video demo available [here](#).
- **MLSP 2014 Schizophrenia Classification Kaggle Challenge:** In this project, the objective of the challenge was to classify (as correctly as possible) individuals in the testing set who suffer from schizophrenia. PCA, LDA and clustering techniques were employed under a serious time-constraint. Code and write-up available [here](#).
- **Brush Stroke Classification:** Built an image processing routine in Mathematica to classify Van Gogh's brush strokes in his sketches across the years, in an effort to classify paintings that art experts don't recognize as definitively his. Results cannot be shared due to the protected nature of the content.
- **Stop Sign Detection:** Built an image processing routine in Mathematica that would detect stop signs in a class-provided dataset with 98% accuracy. Tested it on a self-collected dataset, and was able to achieve 85% accuracy. Placed Silver for the class competition. Code and write-up available [here](#).
- **PCB Business Card:** Designed, built, tested and debugged a PCB business card in Altium Designer, programmed an MCU in C++ to control LEDs and a buzzer, and read touch input to make the system interactive. Utilized JTAG debuggers.
- **Tesla's Positioning Problem:** Modeled the problem of planning for Tesla's electric vehicle charging stations, and found an optimal solution that would minimize costs for Tesla, while spreading out the stations according to usage statistics, travel time, and to minimize waiting times at the stations. Developed in Julia; hosted [here](#).
- **MicroMarioBros:** Programmed Cortex-M4 (TI DSPs) microprocessors in C and ARM assembly to play Mario, Hangman, Snake and Etch-A-Sketch. Implemented drivers for SPI, I2C, UART and PWM. Project involved use of PWM, timers, interrupts, EEPROM (via I2C), and an LCD controller. Code and write-up available [here](#).
- **DIY Guitar Pedal Board:** Programmed a TI OMAP-L138 C6000 DSP+ARM board in C to implement real-time audio signal processing algorithms. Programmed board with tremolo, flanging and chorus sound effects. Also implemented FIR and IIR digital filters in C, as well as frame-based DSP. Implemented the FFT through TI's DSPLIB.

Wisconsin Hybrid SAE Vehicle Team, UW-Madison

- Controls and Electrical Team Lead Dec 2016 – May 2018
 - Trained and managed team members to ensure timely completion of projects and their integration into our overall goal of converting a stock vehicle into a plug-in hybrid electric vehicle.
 - Recently converted a stock 2009 Ford Escape into an electric vehicle capable of city driving, capable of 35 miles of range, in under 4 months. Developed motor control code for driving and regenerative braking; performed high-voltage wiring, built and troubleshot vehicle wiring-harness, and integrated power electronics. Worked with Simulink, MotoHawk, MotoTune, CANoe, CANdb++ and other Woodward and Vector development tools and software.
 - Planning and designing, building, wiring and writing code for a dynamometer, which all SAE vehicle teams will utilize. Implemented a load dump and high-voltage battery, as well as performed technical coordination with sponsors, other teams, and training of new members. Integrated a small ethanol engine to integrate into our electric vehicle to achieve a range-extended hybrid.
- Team Member Sep 2014 – May 2018
 - Utilized the SAE J1939 vehicle bus standard for all embedded vehicle systems work.
 - Programmed Woodward ECUs with code developed Simulink, integrating sensors and other control modules over CAN 2.0B, after reverse engineering the CAN messages from donated parts.

HackIllinois 2016, University of Illinois Urbana-Champaign

Feb 2016

- Competed in HackIllinois 2016, to develop Better Addiction, an app to help you kick a bad habit by developing a better one. Developed in Java using Android Studio.

**ADVANCED
COURSEWORK**

UCSD: Linear Algebra, Statistical Learning I, Random Processes, Image Processing, Sensing & Estimation in Robotics, Statistical Learning II, Neural Networks for Pattern Recognition, Stochastic Processes in Dynamic Systems I, Planning/Learning in Robotics, Autonomous Driving and Driver Assistance Systems

UW-Madison: Robotics, Artificial Intelligence, Pattern Recognition, Image Processing, Optimization, Feedback Control Systems, Digital Signal Processing (DSP), Real-Time DSP, Microprocessor Systems, Electronic Circuits II, Numerical Methods, Real Analysis, Probability Theory, Applied Stochastic Processes, Cryptography, Financial Engineering, Engineering Economics

Coursera: Machine Learning, Neural Networks for Machine Learning

INTERESTS

Digital photography, swing dancing, cooking, rock climbing, reading, ukulele

LANGUAGES

English (native), Spanish (A2), Malay (A2), Bengali (A1)

REFERENCES

Available upon request.