ARNAV JOSHI

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EDUCATION

University of Michigan — Ann Arbor, MI
B.S.E. Mechanical Engineering — *September 2016 – May 2020*
Minor in Computer Science, Minor in Mathematics — *3.40/4.00*
Relevant Courses: Automatic Control, Electric Circuits, Design and Manufacturing, Fluid Mechanics, Heat Transfer, Data Structures and Algorithms, Web Systems, Probability and Statistics, Numerical Methods, Real Analysis

WORK EXPERIENCE

Robotics and Optimization for the Analysis of Human Motion Lab — Ann Arbor, MI
Research Assistant — *July 2018 - Present*
- Assisting with writing academic papers in the field of statistical cybersecurity for self-driving vehicles
- Implementing algorithmic models in C++, Python, and MATLAB to validate new methods of cyber-physical control
- Collecting and analyzing experimental data from autonomous robots to illustrate viability of attack detection algorithms

Ford Motor Company — Dearborn, MI
Autonomous Vehicle Software Development Intern — *June 2019 – August 2019*
- Designed, developed, and tested a new infrastructure and simulator for the rapid prototyping of motion planner algorithms
- Implemented a provably safe vehicle trajectory planner in ROS to achieve a 0% collision rate
- Documented code and libraries to increase the extensibility and usability of code

PROJECT EXPERIENCE

Networked Rover Platooning — Ann Arbor, MI
Research Assistant — *September 2019 – Present*
- Developing software packages in C++ and Python to connect 3+ autonomous rovers
- Validating vehicle platooning algorithms on networked vehicles for benchmarking and publication
- Assembling and wiring of 5 rovers to increase torque, eliminate motor jitter, and increase computing power

Two-Directional Ball Catcher (Senior Capstone) — Ann Arbor, MI
Software and Mechatronics Engineer — *September 2019 – December 2019*
- Designing, building, and implementing a 2 directional cart-and-rail mechatronic system with C++ and SolidWorks
- SIL and HIL validation of PID and LQR controllers to develop an interactive catching game for U-M visitors
- Managing purchasing and a budget of over $500 for manufacturing, materials, and electronic components

Michigan Robotic Exploration of Space Team — Ann Arbor, MI
Mechanical Engineer — *September 2017 – May 2019*
- Design and manufacturing of a mineral collection system to qualify a Mars rover for NASA competition
- Analyzing of various rover systems using CAD and FEA to improve rover reliability and function
- Design and manufacturing of housings to allow for electronics operation in a simulated Mars environment

PUBLICATIONS

1. M. Porter, A. Joshi, P. Hespanhol, A. Aswani, M. Johnson-Roberson, R. Vasudevan, "*Simulation and Real-World Evaluation of Attack Detection Schemes*," in American Control Conference, 2019, accepted [arXiv:1810.07773]
2. M. Porter, S. Dey, A. Joshi, P. Hespanhol, A. Aswani, M. Johnson-Roberson and R. Vasudevan, "*Detecting Deception Attacks on Autonomous Vehicles via Linear Time-Varying Dynamic Watermarking*," in International Conference on Cyber-Physical Systems, 2020, submitted

NOTABLE SKILLS

Computer Languages: C/C++, Python, MATLAB, ROS, Java, JavaScript, SQL, Mathematica, Unix, HTML, CSS
Engineering: SLAM, 2D/3D CAD, Finite Element Analysis, Machine tools, Electric circuits
Software: SolidWorks, AutoCAD, MSC ADAMS, Microsoft Office, Linux, Adobe Creative Cloud
Spoken Languages: English, German