Maxwell Patwardhan

maxwellpatwardhan@gmail.com - LinkedIn

EDUCATION

Master of Science in Mechanical Engineering (MSME), GPA: 3.97
Concentration in Electrical Hardware Engineering, Robotics, Controls
Northwestern University, June 2024
Bachelor of Science in Mechanical Engineering (BSME), GPA: 3.73
University of Colorado Boulder, May 2023
Minor: Applied Mathematics
Awards: Cum Laude, Engineering Honors, Dean's List (Fall 2020 – Spring 2023), Passed FE Exam (April 2023)

EXPERIENCE

Sargent & Lundy — Chicago, IL
Instrumentation and Controls Engineer II, Nuclear Power Group — Aug. 2024 – Present
- Designing digital control systems for nuclear plant modifications, focusing on electrical schematics for critical components and systems
- Conducting hands-on hardware testing using oscilloscopes, power supplies, and other standard electrical test equipment to support root cause analysis of control system fault
- Collaborating with cross-functional teams, suppliers, and customers to facilitate design decisions and select process equipment

Interactive and Emergent Autonomy Lab — Evanston, IL
Graduate Researcher — Nov. 2023 – Jun. 2024
Master's Thesis: *Design and Deployment of Multistable Robotic Metamaterial*
- Researched, prototyped, and tested a robotic metamaterial platform capable of performing locomotion, grasping, and sensing tasks
- Led schematic capture and PCB layout for power regulation and battery management, optimizing power consumption
- Performed prototype bring-up, debugging, and functional verification to optimize PCBs for robust operation in real-time robot system
- Created comprehensive documentation detailing the assembly and control of the robotic system as an addendum to thesis

Bolder Interactive Inc. — Boulder, CO
Electrical Engineering Intern — May 2023 – Sep. 2023
- Owned the full design and production of a four-layer, high-density PCB that powered and controlled five motors and seamlessly integrated depth sensors, inertial measurement units, and thermocouples for an interactive animatronic display
- Wrote and executed comprehensive board-level test plans, validating electronic system performance, reliability, and operator safety
- Designed PCBs for power supply stability and mitigation of ground bounce, current transients, and back-EMF from motors
- Documented design methodologies and specifications following client protocols, producing detailed constraint and functionality reports
- Conducted weekly design reviews using Agile methodologies to enable rapid iteration and record design changes within project timeline
- Collaborated with software and creative teams to define, integrate, and test, ensuring smooth transition from prototypes to production

Autonomous Robotics and Perception Group — Boulder, CO
Undergraduate Researcher — Apr. 2021 – Jan. 2022
- Combined and optimized electronic sub-systems, integrating LiDAR, motion sensors, DC/DC converters, point-of-load circuits, and batteries on autonomous robot quadrupeds, achieving 1.5 hours of runtime
- Independently designed, tested, and deployed a fully autonomous robotic platform equipped with depth-sensing cameras and inertial measurement units, ensuring reliable hardware integration for navigation over rough terrain

PROJECTS

Wireless Web Camera – PCB Layout Engineer — Jan. 2024 – Mar. 2024
- Designed high-speed circuitry and led schematic capture and PCB layout for a wireless camera streaming 480p video at 20fps
- Selected and programmed a microcontroller in C to process, compress, and transmit data, using SPI, I^2C, and UART protocols
- Leveraged mixed-signal hardware design techniques to ensure power stability and optimize data transfer rates
- Minimized static power consumption to $45\mu A$ by optimizing buck regulator topology and reducing noise with hardware filtering

Robotic Telemanipulation System - Lead Electrical Engineer — Jan. 2024 – Jun. 2024
Argonne National Laboratory – Northwestern University Selective Capstone Program
- Designed and integrated two PCBs for power regulation and CAN-based data transmission between microcontrollers
- Created schematic captures, PCB layouts, and BOMs; selected MCUs and motor controllers for performance and power
- Optimized buck regulator circuits to achieve 94% efficiency, reducing input voltage to three distinct domains on the same board
- Collaborated with mechanical and software teams to develop a human-robot system enabling telemanipulation of a robotic hand

Aircraft-Automatically Deployable Flight Recorder – Lead Electrical Engineer — Aug. 2022 – May 2023
Boeing Inc. – University of Colorado Boulder Capstone Program
- Led an electrical team of two students, using DFM and DFA techniques to develop a PCB with embedded software for flight data acquisition, secure data storage, GPS correspondence in remote environments—design patent pending
- Designed and integrated LDO-based power regulation and EMI filtering circuitry
- Conducted Electrical Load Analysis (ELA), performed circuit modeling, simulation, and analysis for system optimization
- Integrated PCB with flight recorder housing; partnered with mechanical team to reduce board size to 12 in^2 and unit cost to $35

Technical Skills

Altium Designer, Eagle PCB, C++, C, Python, MATLAB, Simulink, LabVIEW, Version Control (Git), SolidWorks