

UNMESH PHATERPEKAR

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Education

University of Colorado, Boulder

August 2023 - July 2025

MS in Electrical and Computer Engineering, Focus in Embedded Systems

(GPA: 3.63/4.0)

Courses: Embedded Systems Design, Practical PCB Design, IoT Embedded Firmware, Low Power Embedded Design

Techniques, Introduction to Power Electronics, High-Speed Digital Design

Dwarkadas J. Sanghvi College of Engineering

August 2018 - May 2022

Bachelors in Electronics and Telecommunications Engineering

(GPA: 3.83/4.0)

Courses: Electronic Devices and Circuits, Digital System Design, Microcontrollers and Applications

Skills

Microcontrollers	8051, MKL25Z128VLK4, ATmega328P, STM32F4, NVIDIA Tegra X1, EFR32BG, BCM2711
Languages	C/C++, Python, HTML, CSS
Debuggers	Oscilloscopes, Logic Analyzer, Multimeters, VNA, JTAG
Peripherals	GPIO, SPI, I2C, UART, ADC, DAC, Timers
Hardware	PCB Schematic Capture and Design, Circuit Design
Development and Design Tools	Git, Simplicity Studio, STM32CubeIDE, MCUXpresso, Altium, KiCad, LTSpice, Gazebo, AutoCAD, SolidWorks, ADS, Hyperlynx, MATLAB and Simulink, Ansys HFSS, Microsoft Office

Experience

University of Colorado, Boulder

January 2025 - May 2025

Graduate Teaching Assistant | Internet of Things - Embedded Firmware

- Guided students in debugging IoT systems on EFR32BG13 (Blue Gecko Series), resolving hardware communication bugs, implementing API updates, and contributing to system stability through targeted framework redesigns.
- Reviewed and optimized embedded firmware to improve peripheral communication and error handling routines, while collaborating with the instructor to update course content with hardware-focused improvements.

Hydrobar Technologies

May 2022 - July 2023

Import/Export Assistant | Mumbai, India

- Managed billing, invoicing, and documentation for the supply of hydraulic motors, pumps, and equipment to domestic clients, ensuring accuracy and compliance with company and client requirements.
- Coordinated with logistics providers and internal teams to track deliveries and streamline dispatch operations, improving supply timelines and supporting efficient order fulfillment for clients like Mahindra & Mahindra and L&T.

D.J. Sanghvi College of Engineering

March 2020 - June 2021

Electronics and Simulation Engineer | ABU Robocon 2021

- Collaborated on the design and optimization of control circuitry using ATmega series MCUs, enhancing system reliability by 30% through refined hardware development, contributing to an All-India Rank 9 at National ABU Robocon 2021.
- Managed system kinematics and dynamics and developed real-time simulations in ROS and Gazebo, boosting simulation accuracy and testing efficiency, achieving 5th place at ABU Robocon MATLAB competition 2021.

EcoSys Efficiencies Private Limited

March 2020 - July 2020

IOT System Development Intern | Google Firebase, KiCad

- Designed and implemented an automated anti-theft system by integrating motion sensors with microcontroller platforms, enabling discrepancy detection and enhancing warehouse security, resulting in a 30% reduction in inventory loss risks.
- Created a hardware-based data acquisition system with motion and environmental sensors, enabling real-time warehouse monitoring and improving inventory tracking accuracy by 40% via Firebase integration.

Projects

Pocket Ranger | Silicon Labs, Altium, LTSpice, BLE

- Designed and developed a low-power gaming system by interfacing two Blue Gecko MCUs over BLE, enabling real-time communication between a sensor-equipped controller and display unit, achieving a 35% improvement in power efficiency.
- Integrated a custom PCB integrating a joystick, MPU-6500, ambient light sensor, and OLED display, optimizing firmware with a BQ25570 PMIC for solar and battery charging, resulting in a 40% increase in overall system energy efficiency.

Instrument Droid | Altium Designer, Atmega, Baremetal

- Designed 4-layer PCB integrating microcontroller, DAC, and op-amp for VRM Thevenin resistance measurement (0.1Ω-10Ω) with UART validation, achieving 25% accuracy improvement through enhanced signal integrity.
- Programmed bare-metal firmware for dynamic load control and on-the-fly resistance calculation via I²C sensor integration, implementing Smart LED and buzzer feedback to enhance system diagnostics and operational reliability.

High-Speed Interconnect Analysis | ADS, Hyperlynx, Sierra Circuits, Saturn PCB

- Analyzed S-parameters of a differential microstrip line in mixed-mode and single-ended configurations, assessing impedance, reflections, and crosstalk behavior up to 12 GHz, achieving 90% simulation-to-measurement correlation.
- Modeled interconnect behavior using discrete LC elements and tightly coupled differential lines, replicating launch discontinuities and coupling with < 5% deviation, validating 50-56 Ω single-ended and 100 Ω differential impedance.