UNMESH PHATERPEKAR

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EDUCATION

University of Colorado, Boulder, USA   **August 2023 – June 2025**
Professional MS in Electrical and Computer Engineering, Embedded Systems   **(GPA 3.61/4)**
Subjects: Embedded Systems Design, Principles of Embedded Software, Practical Circuit Board Design, Internet of Things Embedded Firmware, Real-Time Embedded Systems, Low Power Embedded Design Techniques, Introduction to Power Electronics, High Speed Digital Design, Developing Industrial Internet of Things

TECHNICAL SKILLS

Programming Languages	C, C++, Python
Operating Systems	Linux and Microsoft Windows
Microcontrollers	8051, NXP FRDM-KL25Z, Arduino, Jetson Nano, Blue Gecko, Raspberry Pi
Software	Simplicity Studio, STM32CubeIDE, MCUXpresso, Altium, KiCad, Keil μ Vision, LTSpice, AutoCAD, SolidWorks, ADS, Hyperlynx, MATLAB and Simulink, Gazebo, Cheddar, Ansys HFFSS

EXPERIENCES

University of Colorado Boulder, Boulder, CO   **January 2025 - Present**
Graduate Teaching Assistant | Internet of Things – Embedded Firmware

- Guided students in troubleshooting and debugging IoT projects utilizing the Bluetooth Low Energy (BLE) stack on EFR32BG13 Blue Gecko Series from Silicon Labs
- Contributed to ECEN 5823 Internet of Things Embedded Firmware course by helping students resolve issues and improve their projects

EcoSys Efficiencies Private Limited, Mumbai, India   **May 2020 - July 2020**
IOT System Development Intern | Google Firebase, Altium, Sublime Text

- Gathered live data from the warehouse and saved the data to Firebase through the Console for inventory logging
- Constructed a web page with HTML, CSS, and JavaScript to exhibit the provided information and converted the project data specifications into appropriate data structures
- Initiated hardware solutions to identify discrepancies in the warehouse utilizing motion sensors and established an automated anti-theft system

ACADEMIC PROJECTS

Pocket Ranger | Simplicity Studio, Altium, LTSpice

- Designed and developed a low-power gaming system using two Blue Gecko MCUs, enabling Bluetooth Low Energy (BLE) communication between a sensor-equipped controller (Stick Gecko) and a display unit (Screen Gecko)
- Integrated a joystick, MPU-6500 gyroscope, ambient light sensor, and SH1107 OLED display into a custom PCB, optimizing firmware for efficient power management using the BQ25570 PMIC, with charging support via battery and solar cell

Pi Parking System | Raspberry Pi OS, OpenCV, Visio, Cheddar

- Programmed a real-time parking system prototype with GPIO for gear simulation, integrating OpenCV to display a 15FPS reverse camera feed, an ultrasonic sensor with motor control to apply brakes within 300ms of obstacle detection
- Implemented POSIX APIs to develop camera, sensor, motor, and scheduling services, ensuring efficient real-time operation and process synchronization through semaphores for optimized resource management and system performance

Eco Sensor System | Simplicity Studio, Visio, Arduino

- Devised 90% of the proposed product which detects flammable gas (300-10000ppm) and measure ambient light intensity using MQ-2 and TEMT6000 sensors with ADC conversion, displaying real-time data via a WS2B18 RGB Breakout board utilizing the WS2812/SK6812 one-wire protocol
- Created GATT services for sensor data and integrated encrypted wireless communication and alarm systems to signal hazardous conditions in a client-server configuration

Smart Security System | MCUXpresso IDE, State Diagram, LogicPort

- Designed and implemented a security mechanism using a PIR sensor, achieving 95% accuracy in detecting unauthorized access and reducing false alarms by 30% through an innovative hand gesture authorization system
- Employed a security system using a GPIO-based interface for the PIR Obstacle Sensor and I2C protocol for the ZX Gesture and Motion Sensor, triggering an alarm upon detecting unauthorized entry to alert the user

Agriculture Automated Irrigation System | STM32 Cube MX, PuTTy, KiCad

- Developed an advanced UART-based Modbus irrigation system, optimizing dispensing accuracy, nutrient efficiency, and crop yields while reducing fertilizer and water usage by up to 30% for sustainable farming

EXTRA CURRICULAR ACTIVITIES

- Collaborated with the Mechanical department to develop real-time robot simulations using ROS and Gazebo, integrating control mechanisms and optimizing performance; secured 5th place in DJSCE Robocon MATLAB (2021) and All-India Rank #9 in DD National Robocon (2021) as Main Controller, with Arduino DUE for precise robotic control