Mohnish Nanthakumar

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EDUCATION:

University of Wisconsin-Madison GPA: 3.6

Madison, WI

Expected Graduation: May 2027

B.S. Computer Engineering, B.S. Computer Science

TEAM PROJECTS:

Avionics Engineer - *Wisconsin Space Program (WiSP)*

Sep. 2024 - Present

- **Programmed** and **Documented** the **Flight Computer** (FC) and **Ground Station** (GS) ESP32 sending telemetry data, (e.g. altitude, acceleration) using a GPS module and LoRa RF Module, to a ground station to display
 - o Programmed data acquisition, transport, and backup for a real-time system using firmware libraries
 - o Developed **test scripts** for every major function (e.g LoRa initialization, Altimeter status)
 - o **Documented** design choices, connections, and data flow of modules on FC and GS
- · Headed an improved New Member Project simulate a flight computer communicating to a ground station
 - o Mentored new members through electronics, microcontrollers (Arduino Nano), and elementary PCB design
- Designed the **Engine Control Unit** (ECU) of a bipropellant liquid rocket (IPA + O2) Arduino sending engine data (e.g. temperature, pressure) to a ground station to display
 - o Designed the Schematics and Printed Circuit Board (PCB) for the ECU in Altium using Multi-Channel design
 - o Documented the PCB, including choices of electronic components, sensor requirements, etc.

Software Engineer - FRC Team 3130 (High School Robotics Team)

Sep. 2022 - May 2024

- · Managed a team of 10+ software developers
 - o Used GitHub and GitKraken to handle programming workflow of the organization
 - o Gave lessons on version control, PID motor control, GUI-based debugging, and the Java programming language
- · Wrote Software on 120+lb, 12V, aluminum robots for yearly competitions against other robots
 - Interfaced different subsystems (Xbox controller, chassis, accelerometer, robot arm, etc.) using the WPILib framework and CAN

PERSONAL PROJECTS:

Custom Alarm

- Fully Developed and Debugged an alarm on an STM32F4 microcontroller
- Bare-metal Programmed using the microcontroller's Datasheet, Reference Manual, and Application Notes
- Took project through various stages of development (Arduino prototype 1, STM32 NUCLEO prototype 2, and STM32 PCB final)
- Peripherals used: UART (MP3 Module), ADC (Volume and Hour Dials), DMA, GPIO, TIM, External Interrupts (Buttons)

AWARDS:

2nd Place - UW Madison Design Lab Makeathon - 7 teams

- Worked with a group for 24 hours to develop a Computer Vision device to automate detection of defects on PCBs
- Wrote Python and Bash scripts for a Linux Platform (Raspberry Pi) to control a Camera
- Trained object detection YOLO model with pictures of competition-provided defected PCBs
- · Used image segmentation and standard image preprocessing techniques to optimize model training
- Presented project to engineers from Plexus and Accuray and secured a \$150 cash prize

TECHNICAL SKILLS:

Software: C, C++, Unix, Linux, Bash, Python, Java, JUnit, HTML/CSS/JS, React, React Native, Git Workflows, LC-3 Assembly, Arch Linux Electrical: PCBA Design, Altium Designer, Altium 365, Multimeter, Oscilloscope

Embedded: FreeRTOS, Bare-Metal Programming, STM32, Raspberry Pi, Arduino, UART, I2C, SPI, ADC,, TIM, PWM, Clock Configuration Miscellaneous: MATLAB, Onshape, Fusion 360, 3D-Printing, MS Office, Slack, Atlassian Trello