Mohnish Nanthakumar

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EDUCATION:

University of Wisconsin-Madison　　**GPA**: 3.6　　　　　　　　　　　Madison, WI
B.S. Computer Engineering, B.S. Computer Science　　*Expected Graduation*: May **2027**

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
  - Programmed data acquisition, transport, and backup for a **real-time system** using firmware libraries
  - Developed **test scripts** for every major function (e.g LoRa initialization, Altimeter status)
  - **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
  - 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
  - Designed the Schematics and **Printed Circuit Board** (PCB) for the ECU in Altium using Multi-Channel design
  - 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**
  - Used **GitHub** and GitKraken to handle programming workflow of the organization
  - 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