Brijesh Mehta

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EXPERIENCE

SMART Centre (Conestoga College), Cambridge CA

Research Student Electronics (Part-Time) Start Date - Present

- Contributed to the Autonomous Tractor project as a part-time research student, focusing on enhancing its safety and functionality.
- Designed a custom PCB incorporating 5V and 3.3V power supply, CAN Bus termination and peripheral pinouts.
- Port existing C & C++ code to be used with Symmetric Multiprocessing (SMP) FreeRTOS on the RP2040 Microcontroller.

Research Student Electronics (Co-Op) May 2024 - August 2024

- Contributed to the Autonomous Tractor project as a research student, focusing on firmware and driver development using the RP2040 microcontroller.
- Integrated Bluetooth functionality, enabling the tractor to connect to a bluetooth controller over bluetooth classic as an HID device, allowing remote control.
- Developed CAN bus drivers to facilitate communication between the microcontroller and the motor controllers.
- Developed drivers for 2D Lidar and Ultrasonic sensors to enhance object detection capabilities of the tractor.
- These efforts collectively advanced the functionality and safety of the autonomous tractor.

Tesseract 3D Printing, Mumbai IN February 2022- July 2023

Firmware & Hardware Developer, 3D Printing Technician

- Contributed to the custom 3D printer project for in-house manufacturing, focusing on mechanical design, firmware development and PCB design.
- Provided maintenance, troubleshooting and repair service to keep the existing 3D print farm operational.
- Designed and prototyped 3D models for various clients, tailoring each design to meet their specific requirements.
- These efforts collectively enhanced the in-house manufacturing capabilities and ensured optimal functionality of the 3D print farm.

TECHNICAL SKILLS

- **Languages :** C, C++, Python.
- **Peripherals, Communication Protocols :** UART, SPI, I2C, TIMERS, RTC, PWM, ADC, CAN, WiFi, Bluetooth.
- **Operating Systems :** FreeRTOS, Zephyr RTOS.
- **Microcontrollers :** ARM Cortex M3/M4, M0 architecture family of microcontrollers(NRF52840, STM32F407, STM32F411RE, RP2040)
- **Data Structures and Algorithms :** Linked Lists, Stack, Queue, Heap, Searching and Sorting.
- **PCB Designing :** Altium Designer.
- **Libraries :** NRF SDK, STM32 HAL, ESP-IDF, CMSIS, LVGL.

- **Version Control :** Git and GitHub.
- **Lab Equipment :** Logic analyzers, Oscilloscopes, Signal generators, power supply, Multimeters, Soldering iron and other lab equipment.
- **3D Modelling & 3D Printing :** Fusion 360, FDM 3D Printing.

PROJECTS

SMART Home Automation

- Utilised STM32F407 running STM32 HAL with FreeRTOS and ESP32 running AT Firmware for Wi-Fi functionality.
- Developed GUI using LVGL.
- Integrated Google Geolocation API and OpenWeatherMap for location-based weather data.
- Synced time and date using NTP Server.
- Monitored room temperature with MCP900 sensor to control heating/cooling.
- GitHub Link - https://github.com/Brijesh397/SMARTHome

Smart Monitoring System for Vertical Farming Capstone Project

- Develop an advanced monitoring system to automate and optimise vertical farming.
- Each sensor node has a NRF5280 running Zephyr RTOS with 18650 battery and BMS which communicates over BLE with the main MCU(ESP32) which is running FreeRTOS.
- Integrated camera module along with AI to detect crop anomalies and optimise irrigation schedules.
- Design a user-friendly GUI with LVGL for real-time local monitoring and control.
- Implemented AWS MQTT Broker for secure communication between the microcontroller and Android/web app.
- GitHub Link - https://github.com/Brijesh397/Smart-Monitoring-System-for-Vertical-Farming

HAL Library for the STM32F4xx series of Microcontrollers.

- Created low-level drivers for GPIO, SPI, and UART peripherals.
- Developed APIs to:
    - Configure the system clock.
    - Debounce buttons using both polling and interrupts.
    - Interface with a keypad using polling and interrupts.
    - Configure the SysTick timer for implementing timeout features and delay functions.
- GitHub Link - https://github.com/Brijesh397/STM32F4xxHardwareAbstractionLayer

EDUCATION

Postgraduate Diploma in Embedded Systems Development 2023 - 2024

3.98 GPA
Conestoga College, Cambridge CA.

Bachelor of Science in Computer Science 2019 - 2022

9.7/10 CGPA
University Of Mumbai, Mumbai IN.