**Mukesh Tamatapu**

**Junior Firmware Engineer - R&D**  
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**Professional Summary:**

A dedicated and detail-oriented Junior Firmware Engineer with over 2 years of hands-on experience in embedded systems development, firmware design, debugging, power electronics, and Machine Learning in Embedded Systems and IoT. Adept at programming in C and utilizing development tools for firmware optimization and testing. Experienced in working with microcontrollers, hardware interfaces, and power electronics circuits. Strong problem-solving skills with a keen ability to troubleshoot, debug, and enhance system performance. Proven ability to collaborate effectively in cross-functional teams and contribute to the design, development, and maintenance of embedded firmware solutions. Passionate about expanding technical expertise and driving innovation in firmware, power electronics, and IoT-based ML applications.

**Key Areas of Focus and Hands-on Experience:**

* EEG signal processing in Earbuds
* IMU in Earbuds
* Comcast Project
* Controller development for various embedded systems
* Power electronics testing
* Machine Learning in Embedded Systems and IoT

**Technical Skills:**

* **Programming Languages:** C, Embedded C, Python (for ML applications in Embedded Systems)
* **Embedded Systems Development:** Firmware development for microcontrollers, bootloaders, and low-level system initialization
* **Hardware and Interfaces:** Working knowledge of microcontrollers; communication protocols like I2C, SPI, UART; and power management in embedded systems
* **Power Electronics:** Development and testing of power converters, motor drivers, and switching circuits
* **Machine Learning in Embedded Systems:** data preprocessing, and deployment on edge devices
* **IoT Development: Sensor interfacing,** low-power communication, and cloud integration
* Debugging and Testing: Debugging tools like JTAG, oscilloscopes, logic analyzers; unit testing, integration testing; experience with debugging firmware, hardware-related issues, and power electronics circuits; memory analysis and optimization
* **Development Tools & IDEs:** IDEs like CCS, Eclipse, and Arduino IDE
* **Documentation & Standards:** Writing and maintaining technical documentation; familiarity with industry standards (ISO, IEC, etc.) for embedded systems
* **Product Development:** Embedded software development, digital electronics, power electronics, and sensors

**Work Experience**  
Junior Firmware Engineer

Smart Rotamach Pvt. Limited  
 January 2023 – January 2025

**Projects Handled**

**Gesture-Controlled Earbud**

* **Description:** Development of AFE sensor (MAX86176 and MAX86178) used in Earbuds for EEG signals.
* **Application:** Utilized in wearable devices and health trackers to capture high-precision optical signals for heart rate, SpO₂ (blood oxygen), and PPG (photoplethysmogram) measurements**.**
* **Functionality:** The sensor detects EEG signals with the help of electrodes placed in the Earbud. It was further used for gesture detection**.**

**IMU in Earbud**

* **Description:** Development of IMU sensor (BHI160B) used in Earbuds for motion tracking.
* **Application:** Utilized in wearables, smartphones, and IoT devices for detecting motion, orientation, and environmental interactions**.**
* **Functionality:** The sensor detects Earbud movements and tap status.

**BLE Architecture**

* Designed and developed BLE packets and transmission mechanisms from Earbud to the application. This implementation aimed to minimize packet loss during data transmission.

**IMU False Condition**

* Developed a code to avoid head movements using an IMU sensor to get EEG data. This data was used for gesture detection and training the ML model**.**

**Comcast**

* **Description:** Development of Comcast device used to control Smart TVs through IR communication**.**
* **Application:** Enabled Smart TV control using an Earbud through IR communication.
* **Functionality:** The Comcast device sent IR signals to control the Smart TV.

**Power Electronics Projects**

* **Testing of Motor Driver Circuits:** Tested motor driver circuits for embedded applications.
* **Power Management Systems:** Implemented efficient power management techniques for battery-operated embedded devices.
* **Switching Circuits:** Developed and optimized switching circuits for various power applications.

**Machine Learning & IoT Projects**

* **Embedded ML for Gesture Recognition:** Trained and deployed ML models for real-time gesture detection on embedded devices.
* **IoT Sensor Data Processing:** Developed firmware for low-power IoT sensors, integrating ML algorithms for predictive analytics.

**Responsibilities during the Period**

* Understanding product requirement specifications provided by customers and creating documents like SyRS, SDD, Test Plan, and Test Report.
* Organizing and participating in design document reviews, including flowcharts, SDD, RCA, and test result reviews.
* Supporting software testing and capturing ADC data for debugging.
* Conducting unit testing, integration testing, system testing, and customer acceptance testing.
* Proficient in the development and testing of IMU sensors, EEG sensors, BLE transmission, power electronics circuits, and filters such as low-pass, high-pass, notch, and Madgwick filter.
* Involved in testing circuits like ZCD, PFC, PWM switching, ADC, and DAC.
* Responsible for EEG data collection for ML model training.
* Worked with controllers like ESP32, MAX78000, QCC5141, TMS320F280039C and IDEs like Eclipse, Arduino IDE, and CCS IDE

**Achievements**

* Got the Letter of Appreciation for Efforts & commitment for reaching the Targets.

**Education:**

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| --- | --- | --- | --- | --- | --- |
| **S.no** | **Qualification** | **Name of institution** | **University/Board** | **Year of passing** | **%/CGPA** |
| 1 | B.Tech(ECE) | S.R.K.R Engineering college | JNTU-Kakinada | 2022 | 7.8 |
| 2 | Intermediate | Sasi junior college | Board of Intermediate Education, Andhra pradesh | 2018 | 97 |
| 3 | Class x | Stanns English medium High School | State Board of secondary Education | 2016 | 9.7 |

**Personal Details:**

**Date of Birth:** 12/08/2000 **Nationality:** Indian **Gender:**   
Male

**Marital Status:** Unmarried

**Languages Known:** English, Telugu

**Nationality:** Indian

**Hobbies:** Listening Music, Playing cricket

**Declaration:**

I hereby declare that the details above are correct and true to the best of my knowledge.

**Place:***Mukesh.T*

**Date:   
Signature**