Muhammad Faheem

Embedded System Engineer | Software Developer Engineer
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CAREER OBJECTIVE:

To be able to work in a highly organized environment and contribute my expertise and knowledge in Electronics processes and applications such as Software & Firmware development, Hardware Designing, Programming, Testing, Troubleshooting and Modifying Electrical, Electronics equipment's and Embedded systems.

CAREER PROFILE/SKILLS:

- Applying knowledge and principles of Electronics theory, testing methodology procedure and Embedded systems
- Software Development and Quality assurance, Electronics and Embedded System Engineering, techniques and principles
- Experience in robotics, multiple communication protocols, technical software, and programming languages including C, C++, OOP
- Proficiency with microprocessors and microcontrollers including ESP32 WROOM, PIC, ARM, Arduino, STM, GPM, nRF chips
- Skilled in hardware design, from circuit development to rigorous testing, ensuring electronic system performance and reliability
- Utilizing high-level & real-time operating systems (RTOS) in products, such as MS Windows, Linux and command-line systems
- Strong verbal, non-verbal, leadership, project management, and team management skills, with an ability to meet timelines
- Demonstrates a high sense of quality and responsibility with a solution-oriented, independent, and structured approach to work

ACADEMIC EDUCATION:

DEGREE/CERTIFICATION	CGPA/PECENTAGE	YEAR
BSc (Electrical (Electronics) Engineering)	3.01	2016
PG Diploma (Computer Engineering)	3.05	2023

PROFESSIONAL WORK EXPERIENCE:

Organization: Minebea Intec GmbH (Ferchau GmbH, Aachen Germany)
Tenure: December 2023 – June 2023
Designation: Software Tester / Software Developer
Responsibilities:

- Developing detailed test scenarios and specifications to ensure comprehensive software evaluation
- Creating customized software variants tailored to meet specific customer requirements
- Reproducing and conducting in-depth analysis of problem cases reported from the field to identify root causes
- Addressing and resolving customer complaints related to software issues to enhance user satisfaction
- Performing rigorous tests on both simulated environments and actual systems to validate software functionality
- Designing, executing, and maintaining both manual and automated software tests to guarantee quality and performance
- Overseeing version control and meticulous documentation management using Polarion to maintain project integrity

Organization: AXO Track GmbH, Next Big Thing AG (Berlin, Germany)
Tenure: June 2023 – November 2023
Designation: Senior Embedded Systems Engineer
Responsibilities:

- Firmware development using nRF 9160 and modem chip on custom hardware, utilizing NRF Zephyr SDK with RTOS, C, C++, and OOP
- Establishing communication with remote servers, AWS IoT Core, and S3 bucket to ensure data exchange and system functionality
- Pioneering an innovative firmware architecture, encompassing event-driven, state machine, and modular design for system efficiency
- Developed RTOS-based embedded software, including thread management, task scheduling, priority, and semaphore implementation
- Managing version control and documentation on GitHub and Confluence, while utilizing command-line tools for debugging, running, and testing firmware, and conducting & writing developer and unit tests

Organization: Cobra Firing Systems (USA) / MikroStarTech (SMC. Pvt) Ltd.
Tenure: March 2021 – May 2023
Designation: Embedded Systems Engineer
Responsibilities:

- Proficient in designing advanced digital filters, encompassing Finite & Infinite Impulse Response (FIR) (IIR) and adaptive filters
- Proficiency in developing robust RF signal modulation and demodulation algorithms, including Quadrature Phase Shift Keying (QPSK), Binary Phase Shift Keying (BPSK), Frequency Shift Keying (FSK) and Gaussian Frequency Shift Keying (GFSK)
- Utilized MATLAB/MATLAB Simulink to generate a wide array of audio signals, showcasing proficiency in signal synthesis and analysis
- Designed and implemented a precise time code methodology using MATLAB, ensuring accurate decoding of generated audio signals
- Leveraged this methodology to enable precise cue activation in firing systems, enhancing synchronization and operational efficiency
- Created graphic libraries for Kinetis and ColdFire microcontrollers using Freescale CodeWarrior IDE and integrated with freeRTOS
- Proficient in diverse electronics circuit designing, encompassing hardware debugging, project, product and component testing

- Demonstrated proficiency in utilizing STM32 and ESP WROOM-32D to interface with TFT LCD displays and GPS modules
- Utilized various IDEs, including CodeWarrior, Segger Embedded Studio, Keil µVision, Visual Studio Code with Platform IO, and IAR
- Additionally, leveraged the nRF SDK with nRF52840, nRF52832, and Arduino IDE with diverse AVR chips in project development
- Implemented a diverse range of serial communication protocols, SPI, I2C, I2S, UART, USART, CAN, LIN, RS-232, RS-485, and MIDI
- Led design unit and functional, Unit, integration testing efforts, ensuring the reliability and performance of electronic systems
- Developed meticulous technical documentation, including Device Verification Testing (DVT) reports, kit installation manuals, and comprehensive project documentation

Organization: The University of Lahore / Integrated Engineering Center of Excellence
Tenure: October 2018 – March 2021
Designation: Embedded System Engineer
Responsibilities:

- Spearheaded the complete design of hybrid electric vehicles, including BLDC motor controllers and self-charging systems
- Designed intricate electrical systems for motors, generators, actuators and its integration with main Electric control unit
- Integrated automotive sensors and developed motor drivers, utilized accelerometers and gyro meters to enhance vehicle performance
- Led circuit design for electric vehicle hybrid systems, encompassing ultra-capacitor units, vehicle control units, and engine control units
- Managed comprehensive software design for Electrical Control Units, Regenerative Braking Systems, and Battery Management Units
- Initiated projects involving real-time operating systems, control systems, systematic designs, and conceptual mock-up modeling

Organization: JOLTA Battery Private Limited
Tenure: June 2016 – September 2018
Designation: Electronics Embedded System Engineer (Research and Development Team)
Responsibilities:

- Developed software programs in C, C++, conduct research, planning, design, and testing of embedded systems
- Demonstrated expertise in WiFi, including ESP8266 and ESP-12E, as well as USB, Bluetooth, and PCI technologies
- Worked with a range of microcontrollers, including ARM, STM32, GPM Microcontrollers, 8051, Arduino, FPGA kits
- Demonstrated expertise in leveraging Artix FPGA family to develop efficient and budget-friendly solutions, emphasizing (IoT) applications
- Provided leadership within teams, defining individual and team goals, managing resources, and overseeing project management

Organization: Pakistan Aerountical Complex (PAC) Kamra
Tenure: July 2015 – August 2015 **Designation:** Electronics Engineer
Organization: Oil & Gas Development Company Limited
Tenure: May 2015 – July 2015 **Designation:** Electronic Engineer

PROJECTS:

Railway Switch Health monitoring device

- Engineered a sensor system with accelerometers, vibration, temperature, and humidity sensors to assess railway track switch health, complemented by long-life optimized battery solutions for sustained operational efficiency
- Implemented an Over-The-Air (OTA) update infrastructure, enabling remote firmware updates for continuous improvement and maintenance of deployed devices
- Utilized FRAM (Ferroelectric Random Access Memory) for advanced memory management within the project, enhancing data storage capabilities with its non-volatile, high-speed, and energy-efficient characteristics, ensuring optimal performance and reliability

Advanced Fire Cue System with LCD Display Integration

- Development of an advanced RTOS-based fire cue system and associated devices, ensuring precise control and synchronization
- Applied a centered around free RTOS advanced concepts of task scheduling and multitasking for enhanced performance
- Kinetis and ColdFire microcontrollers in a virtual machine running Windows XP, using the CodeWarrior IDE with free RTOS integration
- Skillfully interfaced controllers with TFT LCD displays (320 x 240 and 240 x 320) featuring controller ICs SSD2119, ILI9341, ILI9325, ST7735, and ST7789, delivering rich visuals and seamless cue management
- I also worked with parallel interfaces like ISA, ATA, SCSI, PCI, and IEEE-488 & 8080, 6080 for LCD display applications
- Employed bit-banging techniques to optimize system performance and developed RGB LED drivers for enhanced cue effects

IoT Project Development with NRF and BLE Integration

- Spearheaded IoT projects and product development, using diverse programming languages (C, C++, Python, OOP) and toolkits
- Proficiently utilized communication protocols such as SPI, I2C, I2S, UART, USART, CAN, AWS IoT Core, and S3 for seamless data exchange among master and slave devices while interfacing with various sensors and modules
- Crafted handheld industrial devices incorporating IoT technologies for low-energy communication modules
- Successfully interfaced nRF52842 and nRF52840 with Bluetooth Low Energy modules (BLE) and I2S microphones
- Operating small DC motor to be used in remote devices in Power saving or low energy modes

Hybrid & Electric Vehicle Development (2-3-wheeler)

- Developed a scalable plugin hybrid electric powertrain for light-duty vehicles, featuring a range extender
- System is designed for existing 3-wheeler product line will be used in other vehicles under development having 4 wheels

- Implemented a concept for the main electric control unit and its sub-units, seamlessly orchestrated via master-slave controller devices
- Utilized industry-standard and automotive-grade PIC and STM chips, incorporating CAN, LIN, and SPI protocols for optimal performance
- Developed Electric Bike models, including E-70, E-100, and E-125, capable of providing up to 3-4 hours of continuous driving time
- PCB layout, Battery management system, Electric system, and BLDC motor driver, including ultracapacitor units, were the main stages

Dynamometer (Engine Testing Bed)

- Designed and developed an engine testing bed (dynamometer) for a wide range of vehicles
- Created an autonomous system capable of utilizing drive cycles generated from data logging devices
- Implemented load and voltage control methods using AVR chip, along with AC induction motors, capacitor banks in the hardware setup

Advanced Vehicle Data Logging Device

- Developed a versatile data logging device for 2-4-wheeled vehicles, capturing comprehensive data parameters, including precise drive cycle information like distance, location, angular and linear acceleration, and velocity
- Equipped with a sophisticated array of sensors, including Gyroscope, Accelerometer, GPS, GSM Module, and SD Card Data logger
- Utilized ATmega2560 & 328p chips as controllers, implementing multiple serial communication protocols for seamless data integration

Smart Home Automation Projects: BUBFI Bulb, JOLTA I/O Board, Water Automation System

- Leveraged advanced technologies, including WiFi Modules (ESP8266, ESP-12E), USB, Bluetooth, and serial communication protocols as the foundational components for these projects
- Seamlessly integrated WiFi chips into BUBFI Bulb, water automation systems, and ESP I/O Board, enabling convenient Android-based control and automation

IoT Security Camera with Artix FPGA Kit

- Developed an IoT security camera system utilizing the Artix FPGA Family for real-time image processing and transmission of encrypted video feed over a secure network.
- Designed and implemented the FPGA-based image processing pipeline, optimizing for real-time object detection and facial recognition using hardware acceleration.
- Integrated network communication protocols to enable secure data transmission over the internet, ensuring privacy, data integrity
- Power-efficient design utilizing Artix FPGA's low-power features, extending the camera's battery life for extended operation
- Validated and tested the system to meet stringent security and performance requirements, achieving a reliable and efficient IoT security solution

Android-Based GPS-Guided Projectile Launcher (Final Year Project)

- Integrated Android and Microcontroller platforms for precise target acquisition and launching
- Utilized Bluetooth for seamless wireless communication between the Android application and control system
- GPS coordinates from a module mounted on the Projectile launcher to calculate the required angle and distance for accurate targeting

TECHNICAL SOFTWARE & PROGRAMMING LANGUAGES:

- C, C++, OOP, Embedded C, MATLAB, Simulink, Assembly, Python, Verilog, VHDL,
- Windows Xp, Code warrior, Free RTOS, Microsoft visual, Microsoft visual studio, Platform IO
- DEV C++, Arduino IDE, ModelSim, Logisim, Eclipse, MPLAB X IDE with XC8 Complier
- IAR Embedded workbench, MicroWind, XILINX ISE, VeriWell, Spartan 3E FPGA
- Polarion, GIT Hub, Confluence, JIRA, Microsoft Word, Power Point Presentation, Excel, Outlook

CERTIFICATION/ ADDITIONAL SKILLS:

- Monitoring & Reporting of SDG # 12 in Pakistan (The University of Lahore, 24 December, 2020)
- IELTS Academic (British Council Islamabad, 28 December, 2016)
- 3RD Entrepreneurship Conference LCL'14 (Jinnah Convention Center, Islamabad, 15TH November, 2014)

[Online Courses]

- Algorithms for Battery Management Systems (University of Colorado System, Coursera)
- Embedding Sensors and Motors (University of Colorado Boulder, Coursera)
- Interfacing with the Raspberry Pi (University of California, Coursera)
- Embedded Systems (University of California, Coursera)

TRAININGS & WORKSHOPS:

Training on Management essential packages Year - 2017

- Team work, Performance Management, Motivation, Planning and Organizing

Training on Four pillars of leadership Year - 2017

- Team leadership, Team Management, Human resource Management