Bishal Patel (Jr. Firmware Engineer)

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PROFESSIONAL EXPERIENCE

Jr. Firmware Engineer, *Resideo Technologies(Honeywell Homes)* 04/2025 – Present | MN, United States

- Designed, developed, and tested embedded firmware for smart home products (e.g., IoT thermostats) using **C/C++** and real-time operating systems on Wi-Fi platforms while implementing **LowPowerMode** using **RTC, STOP, LPTIM** timers utlizing *Atlasian platform, Confluence, Jira, BitBucket, SourceTree & Visual Studio* creating **PCSIM** and creating a GUI test tool for harware testings.
- Collaborated closely with cross-functional teams (systems, hardware, test, and quality) to produce architecturally sound designs, optimize hardware selection, and develop comprehensive test plans while implementing **HAL**(Hardware Abstraction Layer).
- Researched and implemented innovative algorithmic solutions to address technical challenges, integrating new tools(**Tracealyzer**) and techniques to enhance firmware design, development, and management(Board Support Package-**BSP**, Battery management System). Implemented **FreeRTOS** for the STM boards to achieve Boiler protocols (OpenTherm), Control algorithm, Automation test interface (**AAT**), Memory/**NVM**(Non-Volatile Memory) handling. Partition the system into clean, concurrent system.
- Spearheaded full lifecycle firmware development of smart home thermostat—from concept and design review to debugging and documentation—to code review before merge to master. Supported the connected layer of IoT devices by working in a hybrid team environment, contributing to continuous product improvements and customer-focused innovation implemeting the CI/CD.

Staff Firmware Engineer, *ITRON INC* 09/2021 – 01/2024 | Waseca, United States

- Led independent roles in planning, developing, and implementing firmware engineering focusing on version control using GitHub to collaborate across multifunctional teams, IAR ARM, and Visual Studios. Proficiently coded, debugged, troubleshoot, conducted unit testing, and performed code refactoring in **C/C++** Programming language while documenting specifications and changes.
- Utilized **Azure DevOps** for streamlined data delivery, overseeing the transition of Real-Time Operating Systems **(RTOS)**, and implementing communication protocols such as **I2C, UART, SPI**, and **TIMER32** while addressing bugs and warnings.
- Played a crucial role in the development of the Solar Battery Access Point (SBAP), involving SBAP board testing to ensure robust performance and reliability and applied firmware on Radio, Cmodem, NCL, SSL, and Chip Support Libraries (CSL).
- Actively contributed to code reviews before development, optimizing code for efficiency and functionality and utilizing adn generating schematic diagrams to implement embedding of components(NXPA5000) in the chip.
- Specialized in firmware roles for battery management systems used in battery-powered devices, and added features to microprocessors and updated CMSISv2 new APIs.

Graduate Teaching Assistant, *ECET, Minnesota State Unievrsity* 08/2024 – 05/2025 | Mankato, United States

- Provided support to student groups for MicroProcessor-II(STM475XX) programming in C language using Atmel Studio microchip and Keil Uvision 5 and Digital System Design and Testability Labs(FPGA-5CEBA4FC23) in Verilog, SystemVerilog using Quartus Prime and also assisted with debugging and testing Systems, monitored their progress, and enforced lab safety rules.
- Assisted with grading and supervised lab sessions, ensuring safety, efficiency, and proper equipment setup and use of electrical instruments like oscilloscopes, function generators, etc.

EDUCATION

MS Electrical & Computer Engineering, *Minnesota State University|GPA*4.0 08/2024 – Present | United States

OS for Heterogeneous Sys, **Application od AI &ML** (PCA, ANN,MLP), **Computer Architecture Design**(Cache management, Single Processor(SystemVerilog), RiscV in AMD Vivado & Vitis), **Parallel Processor**(NVIDIA **CUDA** coding for CPU & GPU utilizing Jupyter Lab), **Real-Time Embedded System**(Creating, managing threads, tasks, queues, semaphores and metaphores to implement and modify FreeRTOS using STM32CUBE) **Design Methods**(Reliability, Failure Management and Effect Analysis-FMEA), **Application of Zephyr RTOS**(Zbus and BLE Application).

B.S.E.C. Computer Engineering, *Minnesota State University|GPA*3.4 08/2017 – 05/2022 | Mankato,, United States

Microcontroller-I&II, Smart Sensor, Junior and Senior Design, Hardware and Organization, Algorithm, Data Structure, Control system, Communication protocols, Electronics, Circuits I&II, Physics I,II&III, Technical Communications.

PROJECTS

Embedded Speech-to-Speech & Text Translation System on Raspberry Pi 5 2025

- Built a Python-based embedded speech translation system on Raspberry Pi 5 using **gTTS**, speech recognition, and machine translation, featuring a touch-enabled GUI and real-time audio and text translation with features like reply and record.

Sports Training System 2021

- Utilized IoT chip in closed-loop control system for precise and dynamic ball throw in different directions and speeds using four motors, switches, and Arduino in a lab setting collaborating with a multidisciplinary team, demonstrating strong team-work.

Home Automation System 2020

- Utilized an Arduino Microcontroller interfacing with a mobile app through Bluetooth for seamless remote control.
- Led the development of a sophisticated Home Automation System, enabling users to control the energy consumption of devices.

LEADERSHIP/ORGANIZATIONS

MNSU Student Assoc.(CSET Senator), **NeStCom(Rec. Stud. Org.)Liasion** United States

SKILLS

C/C++, Python, Atlassian, Visual Studio, Office 365, Jira, Github, BitBucket, Confluence, Azure DevOps Communications, Quick Learner, Detailed observer, Coordination, Supervision, Mentoring