Sanap Ashok

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Profile Summary

- A results-oriented professional with **11+ years** of expertise in designing and developing specializing in Safety Sensors, Actuators & Interlocks for Industrial Automation, Home Appliances, and Gamma Radiation measurement.
- Currently holding the position of **Technical Lead** at the **Schmersal Global Competence Center**, bringing expertise as a certified professional **in IEC61508** Functional Safety.
- Worked with **Agiliad Technologies Pvt. Ltd**. As **Embedded Tech Lead**.
- Worked with **Whirlpool of India Ltd** as **Sr. Embedded Software Engineer**.
- Worked with **Electronet Equipments Pvt Ltd** & **Signal Corporation** as **Embedded Software Engineer.**
- Acquired valuable internal exposure through multiple engagements in **Germany**.
- Demonstrates a strong commitment to meeting stringent **IEC 61508:2012** standards, emphasizing reliability and fault tolerance.
- Implemented **fault detection** and **diagnostic features** to attain and sustain Safety Integrity Levels (SIL).
- Contributed to projects through various **phases** of the Software Development Life Cycle (**SDLC**), from Requirement and Project Kickoff to Bench testing and Product sustain in the field.
- Proficient in **Agile-Scrum methodology** for effective software development.
- Spearheaded the development of a robust bootloader for **STM32G071RB**(Cortex-M0+) and **R7FA2E1A9**(Cortex-M23) microcontrollers, showcasing expertise in low-level programming and system initialization.
- In-depth knowledge of industry standards, including **MISRA C**, and the ability to ensure compliance with coding guidelines during the **Unit Testing Phase**.
- Proficient in **Board Bring up**, with the capability to navigate and **Interpret complex schematics** effectively.
- Skilled in diagnosing hardware issues and identifying bugs, ensuring a streamlined and efficient troubleshooting process.
- Additionally, well-versed in utilizing **GitHub** as a versioning tool to facilitate collaborative development and maintain **code integrity**.

Technical Expertise:

- **Microcontroller Expertise:** Experienced in driver development for various microcontrollers, including **STM32G071RB** (Cortex M0+), Renesas **R7FA2E1A9** (Cortex-M23), **Rx210 Family**, and Freescale **MKE04Z128** (Cortex M0+).
- **Bootloader Development:** Proficient in the development and integration of bootloaders for 32-bit microcontrollers.
- **Prototyping project** with Raspberry Pi Zero, ESP32 Development Board as Smart Bed to weight measurement of patient completed.

Professional Recognition:

- Schmersal Global Competence Center (SGCC), Pune:
  - Best Performer Award at SGCC for completion of Bootloader Project within Planned Timeline.
- Whirlpool of India Ltd, Pune:
  - Constellation Award for quick project execution within planned Project Timelines.
  - Star Employee Award for developing quality software from scratch.

Technical skills

Programming Languages:	Embedded C, C, Python (Beginner)
Development Tools, Editors:	IAR, Eclipse, Keil, GCC, GDB, MPLAB, Vim, VS Code
Hardware Platforms/ Microcontrollers:	Micro-controllers like Renesas Rx210, NXP MKE04Z128, Stm32F446RE, R7FA2E1A9, STM32G071RB, Raspberry Pi ZeroW, HC-05 BT Module, ESP8266, ESP32.
OS Platforms:	Windows, Linux/Unix,
Hardware Debuggers:	Segger - JLink, Renesas – E1/E20 Emulator
Development Methodologies:	Agile SCRUM
Version Control Tools	SVN, IBM-RTC, **GitHub**, PTC-MKS
Static code analysis tools	PC-Lint, Parasoft, Axivion
Unit Testing Tool	Tessy(Beginner)
Formatting Tools	AStyler
Requirement/Defect tracking tool	IBM-RTC, Polarion, JIRA
Protocol used	SPI, I2C, UART, RS232
Coding Standards	MISRA-C 2012
Measurement tools	DSO(Tektronix, Rigol), Beagle I2C/SPI analyzer(TP320121), Logic Analyzer, Pico-scope (5442D PC USB)
Certifications	Electrical safety, Practical Hazardous area, Functional Safety **IEC 61508:2010.**
Other Skills	Linker Scripts

Soft Skills:

- Effective and strong communicator with stakeholders.
- System Requirement, Software Requirement creation, Strong Problem Solving.
- Technical Leader, Collaborative team player, Out of the Box thinker.
- A commitment to staying updated with the latest technologies and methodologies in the embedded systems field.
- Task identification and delegation to Team members, Prioritizing Task and Issues.
- Effective multiple Task Handling capabilities.
- Individual Contributor.

Work Experience

Company: **Schmersal Global Competence Center.** **Dec 2020 – Current**
Role: **Technical Lead** **Agarkarnagar, Pune**

Project 01: Development of Platform for Safety Sensors, Actuators & Interlocks:
The project involves the creation of a comprehensive platform for Safety Sensors, Actuators & Interlocks within the realm of Industrial Automation. The initiative aims to integrate advanced technologies, ensuring a cohesive system that enhances safety measures in industrial environments. The platform facilitates seamless communication and coordination between safety sensors and actuators, contributing to optimal performance and operational reliability.

Programming Language:	Embedded C
Hardware used:	Renesas Cortex-M23 Core (R7FA2E1A9), Cortex-M0+ core (STM32G071RB).
Platform:	Windows 10
Tools:	IAR, VSCode, GitHub, JIRA, JLink-Debugger, ST-Link, Polarion, Enterprise-Architect
Project Duration:	April 2023 till Present

Responsibilities Handled:

- System Architecture Design: Core Team member to the design phase by conceptualizing and architecting the overall system, ensuring scalability, reliability, and adherence to safety standards.
- Software Development:
  - ✓ Overseeing the software development process, including programming and coding for optimal functionality. Implementing safety algorithms and protocols to enhance system responsiveness.
  - ✓ Crafted modular and portable(reusable) source code, promoting enhanced reusability and flexibility.
- Cross-Functional Collaboration: Working closely with multidisciplinary teams, including hardware engineers, software developers, and quality assurance specialists, to ensure seamless integration and optimal performance.
- Safety Standards Compliance: Ensuring that the platform complies with industry safety standards and regulations. Conducting regular audits and assessments to maintain and improve safety protocols.
  - ✓ Integration of certified Self-Test libraries for ROM, RAM integrity check
  - ✓ Developed Diagnostics-Test Routines to detect fault in Safety Inputs & Outputs.
  - ✓ Developed Fail-Safe Routine for safety outputs, ensuring system reliability and compliance with industry standards.
- Developing Software Modules, deletion of tasks to Team Members & practicing Agile Methodologies to adapt to evolving project requirements.

Achievements/Outcomes:

- Successfully contributed to the creation of a cohesive platform that enhances safety measures in industrial environments.
- Ensured optimal performance and reliability through seamless communication and coordination between safety sensors and actuators.

Collaboration:

- Collaborated effectively with cross-functional teams to achieve seamless integration and optimal system performance.

Learnings:

- Gained valuable insights into designing scalable and reliable systems in compliance with safety standards. Enhanced skills in overseeing software development for optimal functionality and responsiveness.

Impact on Business/End Users:

- The developed platform significantly improved safety measures in industrial environments, contributing to enhanced operational reliability and performance.

Project02: Bootloader Development for Safety Sensors, Actuators & Interlocks:
Bootloader system capable of managing firmware updates for two distinct microcontrollers within a single embedded system. This involved in-depth understanding and integration of low-level hardware interfaces, memory management, and communication protocols.

Programming Language:	Embedded C
Hardware used:	Renesas Cortex-M23 Core (R7FA2E1A9), Cortex-M0+ core (STM32G071RB).
Platform:	Windows 10
Tools:	IAR, VSCode, GitHub, Tortoise SVN, JIRA, JLink-Debugger, ST-Link, Polarion, Enterprise-Architect

Project Duration: June 2021 till Oct 2022.

Responsibilities Handled:

- Engineered a dual-bootloader system for simultaneous firmware updates on two Microcontrollers, prioritizing system integrity.
- Collaborated on secure protocols for seamless firmware updates and communication interfaces, optimizing compatibility.
- Developed low-level drivers and implemented a fail-safe routine for safety IO, enhancing system reliability.
- Led unit testing, debugging, and code optimization efforts for resource efficiency.
- Proactively addressed technical challenges, fostering a collaborative environment for swift issue resolution.
- Maintained meticulous documentation of the development process, serving as valuable.

Achievements/Outcomes:

- Successful creation of a dual-bootloader system ensuring simultaneous firmware updates, prioritizing system integrity.
- Implementation of secure protocols and communication interfaces optimized for compatibility.
- Development of low-level drivers and a fail-safe routine, contributing to enhanced system reliability.

Collaboration:

- Effective collaboration with cross-functional teams, ensuring seamless integration and optimal system performance.

Learnings:

- Gained insights into developing robust systems with a focus on safety and reliability.
- Strengthened skills in low-level driver development and fail-safe mechanisms.

Impact on Business/End Users:

- The developed dual-bootloader system significantly improved firmware update management, enhancing system reliability and performance in industrial environments.
- references for future initiatives and team onboarding.

Company: **Agiliad Technologies.** **Nov 2019 – Dec 2020**
Role: **Tech Lead** **Bund Garden, Pune**

Project 03: Smart Bed to Monitor patient's weight: The Smart Bed is designed to accurately measure a patient's weight through a combination of sensors, including load cells and pressure sensors. Information from these sensors is gathered at precise intervals of 500 milliseconds. Utilizing a sophisticated weight calculation algorithm, the system ensures a high level of accuracy, providing weight measurements with a precision of 100 grams.

Programming Language: Embedded C, C++
Hardware used: STM32F44ERE, RPI-ZeroW.
Platform: Windows 7, Linux
Tools: STMCubeIDE, GitHub, ST-Link,
Project Duration: Nov 2019 till Oct 2020.

Responsibilities Handled:

- Gathered client requirements, managed high-level design, and configuration.
- Designed and implemented weighing algorithm software in C++ for Linux, employing multi-threading and state-level diagrams.
- Developed application software from scratch using Vim, GCC, and created modular C++ classes for various components.

- Designed GUI using QT creator, debugged software using GDB for issue identification.
- Interacted directly with stakeholders for effective communication and facilitated regular team-client meetings for timely software releases.

Achievements/Outcomes:

- Successfully designed and implemented a weighing algorithm application with multi-threading, ensuring system reliability.
- Developed a user-friendly GUI and modular code structure, enhancing software usability and maintenance.

Collaboration:

- Effectively collaborated with cross-functional teams, ensuring integration and optimal software performance.

Learnings:

- Acquired insights into developing robust, user-friendly software and honed skills in GUI development and debugging.

Impact on Business/End Users:

- The developed weighing algorithm software and user-friendly GUI improved system reliability and usability, benefiting industrial environments.

Company: **Whirlpool of India Ltd.** **Jan 2016 – Nov2019**
Role: **Sr. Embedded Software Engineer** **Viman Nagar, Pune**

Project 04: Convection Oven and Microwave Oven:

The project aims to create an array of culinary delights customized for the distinct preferences of the US and UK markets. It integrates cutting-edge real-time sensor sampling and load control features, meticulously designed to comply with Class B safety standards—a prerequisite for obtaining UL certification.

Programming Language:	Embedded C
Hardware used:	Renesas Rx210, MKE04Z128.
Platform:	Windows 7
Tools:	IAR, VSCode, GitHub IBM-RTC, PTC-MKS, JLink-Debugger, ST-Link
Project Duration:	August 2016 till Sept 2019.

Responsibilities Handled:

- Developed, debugged, and maintained robust embedded solutions with a Real-Time Operating System (embOS), Hardware debug and issue identified and fixed.
- Implemented cooking algorithms for both Microwave and Convection Ovens.
- Optimized cooking algorithms to enhance overall system performance.
- Executed State Machine development using Plant-UML.
- Conducted system requirement analysis, prepared Software Requirement Specifications (SRS), design documents, and test cases for White Box testing.
- Followed the Agile SCRUM methodology for efficient project execution.

Achievements/Outcomes:

- Successful integration of cutting-edge features in Convection and Microwave Ovens tailored to US and UK market preferences.
- Implementation of cooking algorithms optimized for superior performance.
- Compliance with Class B safety standards, a critical step towards obtaining UL certification.

Learnings:

- Strengthened skills in real-time embedded solutions, cooking algorithm development, and system requirement analysis.
- Gained experience in State Machine development using Plant-UML.

Impact on Business/End Users:

- The Convection and Microwave Oven Culinary Solutions project delivered appliances that not only cater to market preferences but also meet stringent safety standards, ensuring reliability and performance for end users.

Company: **Electronet Equipments Pvt. Ltd.** **April 2014 – Jan 2016**
Role: **Software Engineer** **Kondhwa(bk), Pune**

Project 05: Gamma Radiation Monitors:
Development of a Gamma Radiation Monitor for Power Plants, designed to measure Gamma Rays activity, ensuring the safety of living beings. The Gigger-Muller Sensor is employed to measure radiation, and radiation levels are transmitted over MODBUS-RTU protocol to control room alarm systems, preventing potential accidents.

Programming Language:	Embedded C
Hardware used:	PIC24FJ64GA002
Platform:	Windows 7
Tools:	MPLab IDE, PICKIT02,
Project Duration:	June 2014 till Nov 2015.

Responsibilities Handled:

- Developed maintainable and extensible code for Gamma Radiation Measurement Instruments.
- Consulted with engineering staff to evaluate the interface between hardware and software.
- Rapidly prototyped new capabilities to confirm the feasibility of features.
- Modified existing software to correct errors and improve performance.
- Prepared detailed reports concerning project specifications and activities.
- Contribution in Hardware design i.e., schematic preparation and PCB Layout validation.

Achievements/Outcomes:

- Successful development of a Gamma Radiation Monitor crucial for safety in Power Plants.
- Implementation of the MODBUS-RTU protocol for efficient transmission of radiation levels to control room alarm systems.

Learnings:

- Enhanced coding skills for Gamma Radiation Measurement Instruments.
- Gained experience in the interface between hardware and software in safety-critical applications.

Impact on Business/End Users:

- The Gamma Radiation Monitor project significantly improved safety measures in Power Plants by accurately measuring and transmitting radiation levels, providing timely alerts to prevent potential hazards.

Company: **Signal Corporation.** **Oct 2012 – April 2014**
Role: **Software Engineer** **Bhosari, Pune**

Project 06 Customer Feedback Machine: Implementation of a Customer Feedback Machine deployed in malls and vehicle service centers, designed to log customer feedback for storage in a PC database. The system aims to enhance customer satisfaction and facilitate future analysis.

Programming Language:	Embedded C
Hardware used:	Pic184520
Platform:	Windows XP
Tools:	MP Lab IDE, PICKIT02,
Project Duration:	Dec 2012 till March 2014.

Responsibilities Handled:

- Developed embedded firmware according to product specifications.
- Participated in product design, firmware development, and unit testing.
- Provided timely communications on significant issues or developments.
- Prepared the design document and test cases to ensure robust functionality of the firmware.
- Contributed to Hardware design activities like schematic preparation, PCB Layout validation and Hardware debug.
- Installed and commissioned the product in the field, offering support for field defect fixing.

Achievements/Outcomes:

- Successful implementation of the Customer Feedback Machine in malls and service centers, contributing to improved customer satisfaction.
- Effective storage and retrieval of customer feedback data for future analysis.

Learnings:

- Strengthened skills in embedded firmware development.
- Gained experience in product design and installation in real-world scenarios.

Impact on Business/End Users:

- The Customer Feedback Machine project played a pivotal role in enhancing customer satisfaction by providing a systematic approach to collecting and analyzing feedback in malls and vehicle service centers.

Education

Education	College/University/Board	Year of Passing	Percentage (%)
B.E. (ECE)	Dr Babasaheb Ambedkar Marathwada University Sambhajinagar(Aurangabad), Maharashtra.	2012	65.20
H.S.C.(Science)	Maharashtra State Board	2007	80.0
S.S.C	Maharashtra State Board	2005	69.33

Personal Details

Name	Ashok Shivaji Sanap
Father's Name	Shivaji Thakaji Sanap
Date of Birth	31-March-1989
Gender	Male
Marital Status	Married
Nationality	Indian
Passport Available	Yes
Languages Known	English, Marathi, Hindi
Hobbies	Reading Books, Watching Movies, Travelling