

Profile Summary

- A results-oriented professional with **12 years 3 Months** 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** 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 measure weight 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
Design Tools, Editors:	IAR, Eclipse, Keil, GCC, GDB, MPLAB, Vim, VS Code
Hardware Platforms:	Micro-controllers like Renesas Rx210, NXP MKE04Z128, Stm32F446RE, R7FA2E1A9, STM32G071RB, Raspberry Pi ZeroW, HC-05 BT Module, ESP8266, ESP32.
Platforms:	Windows, Linux/Unix,
Hardware Debuggers:	Segger - JLink, Renesas – E1/E20 Emulator
Development Methodologies:	Agile SCRUM
Version Control Tools	SVN, IBM-RTC, <b>GitHub</b> , PTC-MKS
Static code analysis tools	PC-Lint, Parasoft, Axivion
Unit Testing Tool	Tessy
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, Logic Analyzer, Pico-scope
Certifications	Electrical safety, Practical Hazardous area, Functional Safety <b>IEC61508:2010</b> .

Soft skills

- Effective communicator with stakeholders.
- Collaborative team player.
- A commitment to staying updated with the latest technologies and methodologies in the embedded systems field.

Work Experience

<b>Company:</b> Schmersal Global Competence Center.	<b>Dec 2020 – Current</b>
<b>Role:</b> Tech Lead	<b>Agarkarnagar, Pune</b>
<b>Project 01: Development of Platform for Safety Sensors, Actuators &amp; Interlocks:</b> 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.	
<b>Programming Language:</b>	Embedded C
<b>Hardware used:</b>	Renesas Cortex-M23 Core R7FA2E1A9, Cortex-M0+ core STM32G071RB.
<b>Platform:</b>	Windows 10
<b>Tools:</b>	IAR, VSCode, GitHub, Jira, JLink-Debugger, ST-Link, Polarion, Enterprise Architect
<b>Project Duration:</b>	April 2023 till Present
<b>Responsibilities Handled:</b> <ul style="list-style-type: none"><li>• 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.</li><li>• Software Development:<ul style="list-style-type: none"><li>✓ Overseeing the software development process, including programming and coding for optimal functionality. Implementing safety algorithms and protocols to enhance system responsiveness.</li><li>✓ Crafted modular and portable source code, promoting enhanced reusability and flexibility.</li></ul></li></ul>	

- **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,** delegation of task to Team Members & Utilizing 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.

<b>Programming Language:</b>	Embedded C
<b>Hardware used:</b>	Renesas Cortex-M23 Core R7FA2E1A9, Cortex-M0+ core STM32G071RB.
<b>Platform:</b>	Windows 10
<b>Tools:</b>	IAR, VSCode, GitHub, Tortoise SVN, Jira, JLink-Debugger, ST-Link, Polarion, Enterprise Architect
<b>Project Duration:</b>	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.

**Role: Tech Lead**

**Nov 2019 – Dec 2020**

**Company: Agiliad Technologies.**

**Bundgarden, 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:** STM32F447RE, 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.  
**Role:** Sr. Embedded Software Engineer

**Jan 2016 – Nov2019**  
**Vimannagar, 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, Tortoise SVN, Jira, JLink-Debugger, ST-Link, Polarion, Enterprise Architect  
**Project Duration:** August 2016 till Sept 2019.

**Responsibilities Handled:**

- Developed, debugged, and maintained robust embedded solutions with a Real-Time Operating System (embOS).
- 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.  
**Role:** Software Engineer

**April 2014 – Jan 2016**  
**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.

**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:**

MPLab 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.
- 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 centres, 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 analysing feedback in malls and vehicle service centres.

Education

- **B.E** in Electronics and Communication Engineering from Dr. Babasaheb Ambedkar Marathwada University, Aurangabad in **2012** with **65.20%** percentage.
- **H.S.C** from Maharashtra State Board in **2007** with **80.00%** percentage.
- **S.S.C** from Maharashtra State Board in **2005** with **69.33%** percentage.

Personal Details

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