Hrishikesh Karande

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PROFILE

Innovative and detail-oriented **Embedded Systems Engineer** with a strong foundation in **embedded software and hardware design**. Experienced in developing **high-performance solutions** for industrial applications, specializing in **microcontrollers, RISC-V, and PCB design**. Proficient in **C++, Python**, with hands-on expertise in **circuit design, sensor integration, and real-time embedded systems**. Passionate about optimizing embedded solutions through **hardware-software co-design**, ensuring efficiency and reliability. Eager to contribute to **cutting-edge technology development** in the embedded systems industry.

PROFESSIONAL EXPERIENCE

Embedded Software Engineer Intern   12/2024 – 03/2025
Infineon Technologies AG 🔗   Münich, Germany
- **Domain: Embedded Software Development using Modelling Framework.**
- Developed **Python-based CLI scripts** for the **metasw project**, automating custom tasks in **embedded software development** using **XML configuration files and CMake** for **code generators**.
- Applied **Model-Driven Architecture (MDA)** and **software modelling** using **BOUML, Mako templates**, and Infineon's **MetaGen framework** to generate **VHDL - RTL, C**, and **Rust** target code.
- Collaborated with **PhD researchers** and **senior engineers** on **RISC-V firmware** and **system-level software**, optimizing **automation processes** in **embedded systems**.
- Explored **control flow metamodel** and **parser implementations**, contributing to **code generation** for **embedded processors**.
- Enhanced **Meta-Software project** by testing **Scope Manager** with **pytest** and leveraging **API libraries** for **model-based embedded development**.

Operations Supervisor - Wissenschlaftliche Hilfskräfte (WHB)   07/2023 – 03/2024
eLab - Uni Siegen 🔗   Siegen, Germany
- **Domain: Digital and Analog Electronics, 3D Printing**
- Gained expertise in **Microcontrollers, 3D Printing, Soldering (SMD and THT), and PCB Design (Eagle, KiCad and Altium)**.
- Experienced in programming **(C++, Java, Python and MATLAB)** and debugging **microcontrollers** (Raspberry Pi, ESP 32, Arduino).
- Gained **hands-on experience** in designing and testing electrical components for **hardware projects** related to **sensor integration** and **real-time embedded systems**.
- Conducted **electrical and safety testing** of various hardware prototypes, using **oscilloscopes**, **multimeters**, and other test equipment.
- Worked on **hardware design** and integration with **microcontrollers** (Raspberry Pi, ESP32, Arduino), particularly in areas of **sensor data processing** and hardware-software interfacing.
- Conducted workshops for students on **programming, microcontrollers, 3D printing, soldering, PCB design, and real-time embedded systems**.

Software Engineer   12/2020 – 07/2022
Birlasoft 🔗   Pune, India
- **Domain: Software Development and Testing**
- Professional industry experience of working with Selenium Java for **Software Automation**.
- Worked in a professional team handling code reviews, using **Git** for version control, and leveraging **CI/CD** tools such as **Jenkins**.

SKILLS

Programming Languages:
Python, Embedded C, C++, Rust, VHDL

Version Control:
Git for managing code contributions and maintaining large-scale projects

Embedded Systems:
RISC-V, ARM Cortex, ESP32, Arduino, Raspberry Pi, FPGA

Collaboration:
Experience working cross-functionally with business analysts, process engineers, and data scientists

Circuit Design & PCB Tools:
KiCad, Altium, Eagle, PCB Layout, Schematic Design

Electrical Testing & Debugging:
Oscilloscopes, Digital Multimeters, Embedded Linux Debugging

Automotive & Industrial Systems:
CAN, I2C, SPI, MQTT, Edge Computing, Sensor Integration

Software & Tools:
MATLAB, Git, CI/CD

PUBLICATIONS

Raising the Bar(Ometer): Identifying a User's Stair and Lift Usage Through Wearable Sensor Data Analysis 🔗   02/2025
Springer
- Developed a machine learning-based system using wearable sensor data to classify stair and elevator usage with **87.61% accuracy**.
- Collected and analyzed data from 20 participants, leveraging **inertial and pressure sensors** to enhance real-time activity detection.
- Investigated sensor impact on model performance, demonstrating the potential for **health and lifestyle insights** using wearable technology.

PROJECTS

SMARTWATCH BASED HUMAN ACTIVITY RECOGNITION 🔗
Academic - Uni Siegen - Masters level
- Designed a study and recorded a multimodal dataset to perform Human Activity Recognition.
- Designed and implemented a **data pipeline** to process and classify large amounts of sensor data, utilizing **Python**, **Pandas**, **NumPy, Imblearn, Scikit-learn** for preprocessing and feature extraction.
- **Collaborated with data scientists** to refine machine learning models based on real-time data, ensuring smooth integration between hardware sensors and data analytics pipelines.
- Conducted **data quality checks** and maintained reliable data storage systems for ongoing data collection, ensuring scalability in handling increased sensor data.
- Utilized **version control systems (Git)** to manage code versions and collaborative contributions from other developers in the project.

XY PLOTTER
Academic - Pune University - Bachelors level
- Designed and implemented a **precision XY Plotter using stepper motors and Arduino** for high-accuracy plotting applications. Integrated **CNC-based firmware** to ensure stable motor control.
- Integrated Arduino with a CNC platform for carrying out plotter operations.
- Tested the project under multiple conditions.
- Build a stable system from previous rigorous prototypes.

AUTOWRITER - A WRITING MACHINE FOR THE DISABLED
Academic - Pune University - Bachelors level
- Designed, built and pitched- 'AUTOWRITER' a product which helps the differently abled to write on a paper with a pen/pencil using voice commands.
- Built an end-to-end system using the microcontroller from **Texas Instruments' BeagleBone Black** to control a self designed **XY Plotter** with speech input.
- Led my team to the Semi Finals of **Texas Instruments - India Innovation Challenge and Design Contest 2016** held in New Delhi.
- Ranked among **top 36 from a total of 2500+ teams.**

LUMINOSENSE - NON INTRUSIVE LOAD MONITORING
Academic - Pune University - Bachelors level
- Built an **Energy Monitoring Solution** for commercial buildings. Carried out aggregated current and voltage wave-forms measurement at a single point.

- Built a **full scale system by designing and manufacturing** the **PCB** incorporated with sensors like current and voltage transformers.
- Used a **deep learning algorithm (SparseNILM)** for pattern recognition. Thus, the energy consumption of individual appliances was predicted and recommendations were given by the system.

INVACARE AIQ SAP AUTOMATION
Professional - Birlasoft - Entry level Engineer
- Worked on **Automating the SAP Fiori Platform** of the USA based Healthcare company, Invacare.
- The primary goal of the project was to Automate **750+ Manual Test Cases** in a short time span.
- Daily activities included **preparation of Automation Scripts, Test Data, and Scenario understanding** of the actual execution of the process flow.
- Also undertook the responsibility of **monitoring and tracking the defects in the Automation tool** used for the project.
- Added responsibilities included occasional **reviewing of the Team's work** and reporting on the Scenario Health of the **Automation Flow**.

STRYKER SELENIUM SALESFORCE AUTOMATION
Professional - Birlasoft - Entry level Engineer
- Worked extensively on **automating the salesforce platform** of Stryker, an American multinational medical technologies corporation.
- Carried out localization for the different countries and multiple **language-specific UI Automation Testing**.
- Used **Selenium framework** and with the help of tools like **TestNG and Maven on Java OpenJDK 1.8** version.
- Handled the **localization for Italian, German, and Russian Language** for the External Approver user of the Salesforce UI.
- Responsibilities included executing **end-to-end Automation Suites and refactoring unique language-specific Xpath Locators and maintaining Datasheets.**

EDUCATION

Masters of Science
University of Siegen 🔗
- Field of study: **Computer Science with Embedded Systems**

- Worked on multiple Embedded Systems projects using technologies like **MEMS, IMUs, CAN, I2C, MQTT, Edge Computing.**
- Actively improving German language proficiency, currently at German **B1** level, targeting **B2 by 2025** to enhance professional communication.

2022 – present
Siegen, Germany

Bachelor of Engineering
Savitribai Phule Pune University 🔗
- Field of study: **Electronics and Telecommunication**

- Received great appreciation for excellence in several National Level Innovation Challenges, Hackathons, and Design Contests.
- Strong foundation in **electronics hardware**, **circuit design**, and **safety-critical systems** development.

2015 – 2020
Pune, India

ACHIEVEMENTS

FINALIST
Bangalore, India
ACCENTURE INNOVATION CHALLENGE
- Ranked among the **top 14 from a total of 13000+ teams**. Led my team to the finals of Accenture Innovation Challenge 2018 held in Bangalore.

SEMIFINALIST
Delhi, India
TEXAS INSTRUMENTS IICDC
- Led my team to the Semi-Finals of Texas Instruments - India Innovation Challenge and Design Contest 2016 held in New Delhi. **Ranked among the top 36 from a total of 2500+ teams.**

LANGUAGES

Englisch	● ● ● ● ●	**Deutsch**	● ● ● ● ○
7.5 IELTS		B1	