

# Ramakrishna Makani

Software Research and Development Engineer

🏠 Kempten, Germany

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## Profile

Software Research and Development Engineer with a Master of Science degree in Automation and Robotics from TU Dortmund, Germany, with 3+ years of experience in Research and Development in the landscape of Industrial Automation with projects ranging from Embedded Systems, Communications, Sensors and Actuators, Control Systems. Self-driven and motivated to manage and handle projects independently and experience of planning and working with a team.

## Areas of Expertise

Embedded Systems - Linux - Industry 4.0 - Open Platform Communications Unified Architecture (OPCUA) - Robotics - Microprocessors and Microcontrollers - Sensors - Software Design - Social Media and Technology Marketing

## Education

**M.Sc. Automation and Robotics,** [Technische Universität Dortmund](#) **Dortmund, Germany** Nov 2020 - Mar 2024  
German Grade: 2,2 / 4

Relevant Courses: Embedded Systems, Robotics, Industrial Communication, Process Automation, Software Engineering

**B.E. Electronics and Instrumentation,** [RV College of Engineering](#) **Bengaluru, India** Aug 2016 - Oct 2020  
German converted Grade: 2,2 / 4

Relevant Courses: Embedded Systems, Control Systems, Microcontrollers and Microprocessors, Communication Networks, Programming in C/C++

## Professional Experience

**Embedded Software Developer,** [\(BE.services GmbH\)](#) **Kempten (Allgäu), Germany** 05/2024 - present

- Designed and Developed Pub/Sub over UDP transport layer in C++ for Matrikon's eFlex OPC UA SDK using with a low memory footprint for embedded devices.
- Developed the SDK for embedded devices with ultra low memory footprint (below 2KB RAM).
- Developed and released the first version of [eTSN](#) product, which is an engineered solution with OPC UA Pub/Sub and Time Sensitive Networking (TSN) for reliable, low latency real-time communication.
- Development planning, estimation and management of Git of the projects under the product.
- Drafted proposals alongwith universities and potential customers as part of pre-sales activities.
- Represented the company at trade fairs such as HannoverMesse, SPS and many Workshops.

**Working Student,** [\(SALZ Automation GmbH\)](#) **Bad Salzuflen, Germany** 09/2022 - 03/2024

- Designed and Developed a Prototype for Controller-to-Controller communication to show Proof of Concept (PoC) towards OPC UA FX (Field eXchange).
- Implemented and maintained Git workflow for Projects.

**Intern,** [\(CENSE, Indian Institute of Science\)](#) **Bengaluru, India** 09/2022 - 03/2024

- Development of LoRa (Long Range) based sensor network and LoRaWAN network infrastructure for tank level monitoring.
- Design and development of a custom Ultrasonic sensor for specific high humidity scenarios.

## Skills

- **Programming:** C/C++ (Advanced), Python (Intermediate), PLC Programming (IEC 61131)
- **Embedded Platforms:** Linux, FreeRTOS, ZephyrOS
- **Software Platforms:** Docker, LabVIEW, Robotic Operating System (ROS), MATLAB/Simulink
- **Management:** Git, Jira, Confluence

# Projects

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## Master's Thesis

TU Dortmund, Germany, 2024

- **Title:** Design and Development of a Novel Trust Framework for Humanoid Trust Behaviour in Multi-Robot Systems.
- **Supervisor:** Prof. Dr. Selma Saidi, Chair of Embedded Systems, TU Dortmund.
- Developed a mathematical model to quantify the trustworthiness of each robot in a Multi-Robot System (MRS) based on its inherent features, such as capabilities.
- Designed and developed a trust model that updates the robot's capabilities based on the outcomes of allocated tasks to the robots and evaluated the proposed novel trust framework against metrics such as trust convergence.
- Achieved 100% task allocation using the trust framework in a Python (using numpy, libraries) based simulation for a given mathematical distribution of incoming tasks to the MRS.
- Awarded Best Thesis with the highest possible grade of 1.0 (German grading system).

## Race Against The Machine (RATM)

TU Dortmund, Germany, 2023

- Developed a racing scenario between a teleoperated vehicle and an autonomous vehicle.
- Established robust Teleoperated Driving over a 5G network.
- Implemented SLAM using Google Cartographer with Pure Pursuit control for autonomous navigation.
- Designed and Developed V2V and V2I communication using Cooperative Awareness Messages (CAM).
- Built a Digital Twin UI to show live vehicle positions on a map.

## Bachelor's Thesis

RV College of Engineering, India, 2020

- **Title:** Design and Development of a PID based Control System for a Two Wheeled Self Balancing Robot.
- Developed a feedback control system for balancing a two wheeled robot vertically using NI LabVIEW and NI myRIO board.
- Designed a complementary filter for fusion of gyroscope and accelerometer data in order to achieve high accuracy tilt-angle measurement to be used as negative feedback.
- PID control algorithm tuned using Ziegler–Nichols method was used for controlling the duty cycle of PWM signal being given to the wheel motors to produce a balancing action.
- Implemented a sensor fusion model using a complementary filter combining gyroscope and accelerometer data.
- Awarded the highest achievable grade of 10.0 (Indian grading system).

## Student Project

RV College of Engineering, India, 2019

- Signal processing of EEG signals to classify Alpha, Beta, Theta, and Delta (ABTD) waves.
- Correlation ABTD wave mapping with humanoid mood to control various music playlists.
- Developed APIs to control real-time devices using embedded systems.

# Languages

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- **English** [Native]
- **German** [Intermediate]
- **Telugu, Kannada, Hindi** [Native]