Ragesh **Ramachandran**

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Summary

I am a roboticist passionate about autonomous machines, Data-science and Mechatronics. Being involved in numerous projects in the domain right from the conceptual stage to their deployment, I have acquired extensive problem-solving capabilities in this domain. My areas of interests include:

- **Mechatronics**
- **Software engineering**
- **Embedded systems**
- **Machine Learning**

Experience

Fraunhofer IPA, Robotics and Assistance Systems
Stuttgart, Germany

RESEARCH ASSOCIATE — *Nov. 2019 - Present*

- My main role is in software engineering and system integration of robots with ROS applications
- Providing Consultation services on ROS middle-ware to SMEs working in agricultural robotics
- Implementing AI based predictive maintenance system for industrial robots and Fault detection

Fraunhofer IPA, Robotics and Assistance Systems
Stuttgart, Germany

RESEARCH ASSISTANT — *March. 2019 - Sept. 2019*

- Development of ROS packages for fault detection and isolation in the Pilz prbt scan and polish robots.
- Automated Planning was used for Fault diagnosis.

Ingeniarius,Lda
Coimbra, Portugal

ROBOTICS ENGINEER INTERN — *July. 2018 - Sept 2018*

- Developed Autonomous docking service for the recharging of STOP - "Seguranças robóTicos coOPerativos" Robot in ROS and Gazebo using the ROS navigation stack.
- Worked on the development of a differential drive robot, including electro-mechanical design, embedded system design and embedded firmware development for sensors and drives using Arduino and ROS

Mechatronics and Intelligent Systems Research Lab
Kerala, India

RESEARCH ASSISTANT — *Jan. 2017 - August. 2017*

- My research work includes Prosthetic arm controlled using EMG signals, embedded system design of Unmanned Ground Vehicles and Teaching pendant for industrial robotic arm.
- During my tenure at the lab, I mentored students in their Bachelor thesis, conducted workshop on embedded systems and robotics and represented the lab at a national robotic festival "Robotsavam 2017".

United Kingdom University Rover Challenge 2016
Manchester, UK & Kerala, India

TEAM LEAD — *Jan. 2015 - July. 2015*

- Cleared the Critical Design Round of the United Kingdom University Rover Challenge 2016 and got shortlisted among the final 14 teams
- Managed a team of 23 people and designed electronic circuits for control system of robotic arm, power management, wireless communication, sensors, drive system, system integration and development of ROS drivers for the rover.

University Rover Challenge 2015
Utah, USA & Kerala, India

EMBEDDED SYSTEM DESIGNER — *Dec. 2014 - May. 2015*

- Designed the embedded system of the rover and robotic arm, designed high current motor drivers, power distribution system, and perception unit consisting of IMU, Ultrasonic sensors and cameras
- Developed H-bridge motor driver using MOSFET for the rover and also designed a wireless kill switch for the rover using NRF24 module.

Education

Ecole Centrale de Nantes
Nantes, France

MASTERS IN ROBOTICS AND EMBEDDED REAL-TIME SYSTEMS — *Sept. 2017 - Sept.2019*

Amrita Vishwa Vidyapeetham (Amrita University)
Kerala, India

BACHELORS IN ELECTRONICS AND COMMUNICATION — *June. 2013 - May. 2017*

Publications

Design and Development of an Intelligent Rover for Mars Exploration
Washington DC, USA

THE 18TH ANNUAL INTERNATIONAL MARS SOCIETY CONVENTION — *2016*

An Advanced Spider like Rocker-Bogie Suspension System for Mars Exploration Rovers
Bucheon, Korea

4TH INTERNATIONAL CONFERENCE ON ROBOT INTELLIGENCE TECHNOLOGY AND APPLICATIONS (RITA) — *2015*

Skills

LANGUAGES

- English: Proficient (TOEFL 87)
- French, German: Basic

ROBOTICS

- Linux, ROS, ROS 2.0, docker, Yocto, CI, unit testing.

PROGRAMMING

- C++ and Python.
- Git, CMake, catkin, colcon and CI

EMBEDDED SYSTEMS

- VHDL, Embedded C, Arduino.
- Working knowledge of Eagle CAD, Proteus and KiCad

SOFTWARES

- Experienced in Gazebo, OpenCV, Photoshop and LaTeX

TOOLS

- Rapid prototyping in 3D printers and CNC machines.
- Experience in PCB design and development.

Academic Projects

Development of an autonomous docking routine for the STOP - Robot

GRADUATE STUDENT

Coimbra, Portugal

July. 2018 - Sept. 2018

- The electronics for the charging system for docking the robot was designed and prototype developed.
- Autonomous docking service for the recharging of STOP-robot was implemented using the navigation stack of ROS.

Calibration and development of a multi-robot localization system

GRADUATE STUDENT

Nantes, France

April. 2018 - PRESENT

- Developed and calibrated the system of four IR image sensors for the absolute localization of the Turtlebots in ROS.

Hybrid localization of mobile robot using dead reckoning and magnets

GRADUATE STUDENT

Nantes, France

Jan. 2018 - Feb. 2018

- Sensor fusion of wheel odometery and magnet beacons for Localization of a mobile robot was performed and the estimation was done using Extended Kalman filter.

ASTRA -Multi-robot system integrating UAV and UGV for surveillance

EMBEDDED SYSTEM DESIGNER AND SOFTWARE ARCHITECT

Kerala, india

Jun. 2016 - PRESENT

- The embedded system for the robot was designed consisting of GPS, wheel odometer, IMU, Laser range finders and Ultrasonic sensors on ATmega 2560 MCU and firmware developed using ROS
- A Raspberry Pi was used for runninng ROS and detect the presence of intruders using Computer Vision

DHRUV-Disaster and Hazard Rescue Unmanned Vehicle

MENTOR AND MECHATRONIC ENGINEER

Kerala, india

Dec. 2015 - June. 2016

- A systems was developed consisting of thermal camera, sensors for measuring carbon monoxide, carbon dioxide, methane, butane, ammonia, chlorine and air quality on ATmega 2560 platform and firmware developed in ROS
- The system was integrated into a custom-made robotic platform for hazard rescue missions

SAKSHA-Development of teaching pendant for 6 DOF robotic arm

MENTOR AND DESIGNER

Kerala, india

Aug. 2015 - Nov. 2016

- A system was developed with potentiometers, Accelerometer and ATmega 2560 MCU as a teaching pendant for a 5DOF robotic arm.

References

Harsh Deshpande

Research Associate, Robotics and Assistance Systems.
Fraunhofer IPA, Stuttgart, Germany.
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Sebastien Faucou

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University of Nantes, France.
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