RAHUL R. RAMACHANDRAN

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Experienced lead robotics engineer (4+ years) specializing in dexterity and locomotion algorithms for dynamic applications.

Work Experience

Robotics Engineer

The National Robotarium, Heriot-Watt University

- Directed robotics manipulation team created a digital twin of the manipulation lab; system design, motion planning, control system development & software-hardware integration.
- Led mission planning, maintenance, and piloting for L3Harris IVER3 AUV & C-Enduro USV; reverse engineered the BMS, integrated Starlink and Marine DC generator with C-Enduro USV.
- Collaborated with biz dev and project managers to conduct site assessments, facilitate client workshops, deliver presentations, and prepare 10 project proposals for government and industry funding. Currently the lead engineer for 2 projects and successfully completed 6 projects (£1.5 million pounds).

Research and Development Engineer - Robotics and Autonomous Systems May 2021 - Aug. 2022 VEDA Aeronautics Pvt. Ltd. New Delhi, India

- Completed the first working prototype of a multirotor interceptor drone for defense application and tested the algorithms in a custom designed simulation environment.
- Developed real-time visual servoing, object detection and tracking system.
- Designed system architecture for real-time embedded platforms and developed GPS/vision-based motion planning for aerial robots.

Education

Master of Science in Robotics

University of the West of England Bristol Advisor: Prof. Manuel Giuliani, Bristol Robotics Laboratory

Dissertation Title: Human's Social Signals during Error Situations in Human-Robot Interaction

Developed a multimodal dataset from 600 manually annotated HRI AV recordings; trained and evaluated ML classifiers using 10-fold cross-validation and percentage-split methods. Results validated prior research and revealed new correlations in HRI error situations.

Mechatronics Engineer/Intern

MTJB Engineering Ltd.

- Delivered modular redesign of rapidly reconfigurable multi-rotor vehicle (Thunderbird) CAD models and created a system architecture design.
- Built rapid prototypes of 3 subsystems inclusive of sourcing electrical/electronic components.
- Completed the software-hardware integration for the POC; carried out formal verification and validation testing.

Bachelor of Technology in Mechatronics Engineering

SRM Institute of Science and Technology

Major in Robotics; robotics engineering, automotive electronics, advanced control, mechatronics design, sensors & actuators, PLC applications, CAD/CAM, and object-oriented programming.

Visiting Research Student in Robotics

Tokai University, Shonan Campus Advisor: Prof. Yoshio Yamamoto

Dissertation Title: Modeling and validation of a new continuum robot manipulator design

Designed a multi-segment parallel continuum robot inspired from elephant trunk, derived mathematical model, built a concept prototype, and implemented PID control for testing.

Jan. 2019 - Sep. 2020 Bristol, United Kingdom

July 2014 - June 2018

Chennai, India

Oct. 2017 - Feb. 2018

Hiratsuka, Japan

July 2019 - March 2020

Bristol, United Kingdom

Sep. 2022 - Present

Edinburgh, Scotland, UK

Certifications

ROS2 Industrial hands-on training

The Construct, Apr. 2023

• Basics, Nav2, and manipulation using MoveIt2.

NVIDIA – Getting Started with AI on Jetson Nano

NVIDIA Deep Learning Institute, Oct. 2021

• Configured a NVIDIA Jetson Nano and camera, collected and annotated image data, trained custom neural networks, and deployed custom model for on-device inference.

Technical Skills

Languages: Python, C++, Embedded C, Lua, Shell, and G.

Software and Tools: ROS1/ROS2, Nvidia Isaac Sim & gym, OpenCV, MoveIt, Ardupilot & PX4 autopilot, Rviz, Gazebo, Git, Docker.

IDEs: MATLAB, LabVIEW, SolidWorks, Autodesk Fusion, Eagle, LATEX.

Embedded Systems & Robotics Hardware: Nvidia Jetson Nano & Orin; Raspberry Pi; Arduino, Pixhawk Autopilot, Beagle Bone Black micro-controllers; NI data acquisition (DAQ) & RIO reconfigurable input/out devices, Robotic manipulators - Fanuc, ABB YuMi Dual arm, UR; mobile robots - Boston Dynamics spot, Unitree G1, B1 & Go1, Robotnik.

Prototyping & Fabrication Tools: Bambu labs 3D printers, Laser cutting machine, Oscilloscopes, Lathes, Power Saw, Soldering, Voltera PCB printer, & CNC Machining.

OS: Linux(Ubuntu), Windows, macOS

Leadership / Other Activities

Robotics Instructor

Brainobots Kuwait, C/O Brillianz Consulting and Training Co.

• Taught 22 students (ages 8–16) fundamentals of electronics, Arduino programming, and circuit design through hands-on projects, including building a wheeled robot.

UWE Bristol Tamil Society

President

• Founding President; organized 4 events, secured the first £250 Global Cultural Exchange funding, grew membership to 45+ in 3 months, and earned 3 awards including Best New Society 2019 among 113+ societies.

Robotics and Artificial Intelligence Foundation

Technical Council Member

• Presented and led 3 robotics and AI events across India, developed a robotics curriculum, and reviewed 15+ educational resources for workshops.

Awards and Recognition

Judges' Award for "Tenacity" (SRM ASV), International RoboBoat Competition

Office of Naval Research and Association for Uncrewed Vehicle Systems International, Florida, USA, June 2018

• Led a five-member team for vision-based navigation pipeline development and designed a power distribution board with protection circuits for integrated sensor-actuator systems.

2nd Prize, National Level RoboWars Competition

Vellore Institute of technology, Vellore, India, Sep. 2016

• Led a four-member team to design and develop a defensive robot, conducted wedge-angle calculations to optimize speed and maneuverability, fabricated components using CNC machining, and remotely operated the robot.

5th Rank National Level (850 teams in total), NIYANTRA 2015 – Student Design contest National Instruments, Bengaluru, India, Nov. 2015

• Designed a semi-autonomous quadcopter with pesticide spraying and plant health monitoring systems, integrating various IoT devices.

Feb. 2021 - April 2021

Remote work, Kuwait

Sep. 2019 – May 2020

Bristol, United Kingdom

Feb. 2015 – July 2018

Chennai, India

Publications

A Modular, Tendon Driven Variable Stiffness Manipulator with Internal Routing for Improved Stability and Increased Payload Capacity

Kyle L. Walker, Alix J. Partridge, Hsing-Yu Chen, **Rahul R Ramachandran**, Adam A. Stokes, Kenjiro Tadakuma, Lucas Cruz Da Silva and Francesco Giorgio-Serchi *IEEE International Conference on Robotics and Automation (ICRA) 2024*

Static and Temporal Differences in Social Signals Between Error-Free and Erroneous Situations in Human-Robot Collaboration

D.E. Cahya, **Rahul R Ramakrishnan**, Manuel Giuliani 11th International Conference on Social Robotics (ICSR) 2019

A Look at Motion Planning for AVs at an Intersection

Shravan Krishnan, Govind Aadithya R, **Rahul R Ramakrishnan**, Vijay Arvindh and Sivanathan K 21st International Conference on Intelligent Transportation Systems (ITSC) 2018