MUKIL SARAVANAN

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EDUCATION

Master of Science in Robotics — Sep 2024 - Present
Delft University of Technology (TU Delft) — *Delft, Netherlands*
GPA: 8.67/10.0 (until Quarter 1)

Bachelor of Electronics and Communication Engineering — Aug 2018 - Jun 2022
Government College of Technology (Anna University) — *Coimbatore, India*
CGPA: 8.85/10.0 **(First Class with Distinction)**

SKILLS

Technical Skills	Machine Learning, Control System Design, Computer Vision
Soft Skills	Self-discipline, Work ethic, Leadership
Tools	*Frameworks & Libraries*: PyTorch, Tensorflow, Scikit-learn, Keras, OpenCV, SKRL *Physics Engines*: Gazebo, PyBullet *Tools*: Robot Operating System (ROS1, ROS2) *Embedded Devices*: STM32, Raspberry Pi, Arduino *Programming Languages*: Python, C++, MATLAB

RESEARCH EXPERIENCE

Research Engineer — May 2023 - Mar 2024
Hindustan Aeronautics Limited (HAL) — *Bangalore, India*

- Researched and developed a state-space model of a high-fidelity system and a control algorithm in association with HAL & IISc under the guidance of Mr. Hitesh Mohan Trivedi and Prof. Abhra Roy Chowdhury

Graduate Researcher — Mar 2022 - May 2024
Indian Institute of Science (IISc) — *Bangalore, India*

- Researched on on developing a novel Brain-Robot Interface to localize audio sources of assistive robots in industry 4.0 scenarios under the guidance of Prof. Abhra Roy Chowdhury
- Received **2 awards in prestigious IEEE ICRA, IROS 2022** competition. Published a first authored conference paper in AIR 2023. Filed an **Indian Patent**.

Summer Research Fellow — Jul 2021 - Oct 2021
Indian Institute of Science (IISc) — *Bangalore, India*

- Awarded **the prestigious Indian Academy of Sciences (IAS) Summer Research Fellowship** to research under the principal research scientist Dr. Rathna G N at Digital Signal Processing lab.
- Focused on feature extraction methods of ECG signals to detect emotions for a trans-radial prosthetic arm. Adopted 4-level wavelet decomposition to extract a total of 18 temporal, spectral and non-linear Heart Rate Variability (HRV) features.

PATENT

Brain-computer interface-based Sound Source Localization for Attending tasks in an Industrial environment via Human-Robot Interaction - (Indian Patent Filed. Application Number: 202341087196): Embodiments of the disclosure relate to a Brain-Robot Interface framework using Auditory Steady State Response (ASSR) for audio-aware navigation of mobile robot in industrial environments.

PUBLICATIONS

Transforming Pixels into a Masterpiece: AI-Powered Art Restoration using a Novel Distributed Denoising CNN (DDCNN) - (Presented at - IEEE ICETCI 2023): The work presents a creation of diverse dataset of deteriorated art images with various degradation levels and a CNN-based approach to restore intricate details in the art.

Advancing Assistive Robotics: Enhancing Robot Navigation through Activity Recognition - (Poster Accepted at - IEEE IROS 2023): The research focuses on enhancing assistive robot technology through activity-based communication and robot navigation in Human Robot Interaction scenarios.

Unlocking the Secrets of Gesture-based Communication: A Feature Extraction Technique for Accurate Recognition of Human Activities in Socially Assistive Scenarios - (Presented at - ACM AIR 2023): The work aims at the development of a reliable human gesture recognition system driven through spatio-temporal feature extraction of human pose using human pose estimator model.

ACCOLADES

- Awarded 2nd prize in NVIDIA Art Restoration Hackathon in IEEE ICETCI 2023
- Awarded 2nd prize in HEART-MET Activity Recognition Challenge in **IROS 2022**
- Secured 9th position in BARN Challenge 2022 in **ICRA 2022**
- Secured an overall 11th position among 152 international teams in the team 'strawberry stacker' of E-Yantra Robotics Competition 2021 - 2022
- Selected for Summer Research Fellowship Program (SRFP) 2021 by Indian Academy of Sciences (IAS) among over 40,000 applicants
- Top 4 finalist in men's category from colleges of India and Sri Lanka in Synopsys Inno Champ 2020 for the innovative idea to prevent COVID-19.

PROJECTS

Cooperative Multi-Agent Reinforcement Learning (MARL) for aerial manipulator(Ongoing): Jointly researching with Dr. Sihao Sun on MARL techniques to address the coordination of aerial manipulators, performing load-carrying tasks in a decentralized setting.

Waypoint tracking controller of quadrotor: Developed and evaluated waypoint tracking controller for quadrotor using potential field constraints in Model Predictive Control (MPC), as a part of Planning & Decision-Making course project.

Benchmark Autonomous Robot Navigation Challenge: Developed a navigation algorithm to manoeuvre a non-holonomic mobile robot in 300 increasing levels of highly cluttered obstacle configurations.

Strawberry Stacker: Minimized delivery time and flying cost of a multi-drone system to pick strawberry boxes from a field and stack them onto a transport trailer.

Indoor Obstacles detection model: Built a deep learning-based object detection model for detecting indoor obstacles from a cleaning robot's point of view. Boosted the baseline inference speed by 50%

Feature Extraction of ECG Signal for Emotion Detection: Extracted a total of 18 features in temporal, spectral and non-linear domain of ECG signals for unimodal emotion detection.

Industrial Mobile Manipulation Challenge: Solved a pick and place operation of a wheeled mobile robot in an industrial setup.

TEACHING EXPERIENCE

Teaching Assistant (Lab Instructor) - Intelligent Mobile Robotics (MN 207) Fall 2022, Fall 2023
Indian Institute of Science (IISc) *Bangalore, India*

- Taught students the fundamentals of embedded systems and aided in embedded C programming.
- Developed and delivered hands-on lab sessions that allowed students to realize the concepts through Firebird V robots.

PROFESSIONAL EXPERIENCE

Chairperson Sep 2021 - Nov 2022
GCT IEEE Student Branch *Coimbatore, India*

- Established and chaired the GCT IEEE Student Branch comprising 60+ members to foster a **strong research culture** in GCT. **Founded** the Robotics Club
- Conducted a 6-month intra-college AI hackathon with over 100 participants, hosted more than 20 seminar sessions, AI BootCamp, inter-college workshop on 'Wheeled Mobile Robotics' to 60+ undergraduate students in Tamilnadu and presented works on National Technology Day 2022, featured in IEEE Madras Section Newsletter.

OPEN-SOURCE TOOLS/DATASET

Art Image Distortion Dataset: An RGB Image Dataset encompassing a total of 85,1000 images with 17,020 clear images and 50 distorted versions for each of these clear images

ROS bag plotter MATLAB: A tool to visualize ROS bag signals in MATLAB.

Arduino library for Ultrasonic Sensor (HC-SR04): An Arduino library to compute proximity information for HC-SR04

OUTREACHES

- **Facilitator** in a two-day hands-on workshop on 'Robot Operating System (ROS1)' to over 40 students, organized by BMSCE IEEE PES and Sensors Council, Bangalore in 2024
- **Facilitator** in a workshop in 'IEEE International Conference for Women in Innovation, Technology & Entrepreneurship' to 40+ multi-disciplinary students and industrialists on Cobotics: Perception, Planning & Controls in 2022
- **Facilitator** in the workshop 'Introduction to Wheeled Mobile Robotics' to 60+ undergraduate students from all around Tamilnadu in GCT 2022

LEADERSHIP ACTIVITIES

- Mentored a team of 10 members at Robotics Society in GCT IEEE Student Branch
- Led a team of 4 members in E-Yantra Robotics Contest (eYRC) 2021-2022.
- Led a team of 4 members in E-Yantra Innovation Contest (eYIC) 2020

PROFESSIONAL AFFILIATIONS

- Student Branch Advisor at GCT IEEE Student Branch Nov 2022 - Present
- Student Member in IEEE, IEEE Robotics and Automation Society (RAS) Mar 2021 - Present
- Team Lead at GCT Robotics Society Dec 2021 - Oct 2022