

# MUKIL SARAVANAN

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## EDUCATION

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**Master of Science in Robotics** Sep 2024 - Present  
[Delft University of Technology \(TU Delft\)](#) *Delft, Netherlands*

**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)**

**Higher Secondary School Certificate (Class 12)** Jun 2017 - Apr 2018  
[Sri Lathangi Vidhya Mandir Higher Secondary School](#) *Pollachi, India*  
**Percentage: 97.4 %**

## SKILLS

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**Technical Skills** Control System Design, Computer Vision, Machine Learning, Digital Signal Processing  
**Soft Skills** Self-discipline, Work ethic, Leadership  
**Tools** Robot Operating System (ROS), MATLAB, Embedded Devices (Arduino, Raspberry Pi, STM32), C++, Python, Linux, OpenCV

## RESEARCH EXPERIENCE

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**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 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.

## TEACHING EXPERIENCE

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**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

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### Chairperson

GCT IEEE Student Branch

Sep 2021 - Nov 2022

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.

### Summer Intern

TCS iON

Jun 2020 - Jul 2020

Remote

- Designed a Robot Process Automation (RPA) bot solution to download email attachments and automate data entry into a web form.
- Compared and utilized web scrapping tools such as UiPath and Selenium to automate the workflow.

## PATENT

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**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

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**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

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- 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.
- Awarded 2nd place in district level inter school science exhibition (senior category) for making Piezo electric shoe.

## PROJECTS

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**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. [YouTube](#)

**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. [GitHub](#)

**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% [GitHub](#)

**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. [GitHub](#)

**Industrial Mobile Manipulation Challenge:** Solved a pick and place operation of a wheeled mobile robot in an industrial setup. [GitHub](#)

**Automatic UV-C Sanitizer for Grab Handles:** Proposed a model to prevent the spread of infection via the commonly touched surface by automating the sanitization process using Far UV-C radiation. [GitHub](#)

**Smart Switch: IoT-based home automation:** Developed a solution to automate household switches using a timer-based socket breaking system. [YouTube](#)

**Dual Powered Multi-purpose Emergency Kit with HAM Radio Receiver:** Developed a solar and hand-crank powered multiplexer-based 144 MHz HAM radio receiver. [YouTube](#)

## OPEN-SOURCE TOOLS/DATASET

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**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 [GitHub](#)

**ROS bag plotter MATLAB:** A tool to visualize ROS bag signals in MATLAB. [GitHub](#)

**Arduino library for Ultrasonic Sensor (HC-SR04):** An Arduino library to compute proximity information for HC-SR04 [GitHub](#)

## OUTREACHES

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- **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

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- 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

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- 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