Updated in Oct 2023

MUKIL SARAVANAN

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EDUCATION

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

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

Secondary School Leaving Certificate (Class 10)
Venkitaraj Matriculation School — Jun 2015 - Apr 2016
Percentage: 96.4 % — *Sultanpet, India*

SKILLS

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

RESEARCH EXPERIENCE

Research Engineer — May 2023 - Present
A prominent Indian Defence Company

- Researching on state-space modelling and controlling of a system with a prominent defence company of India under the guidance of Prof. Abhra Roy Chowdhury

Graduate Researcher — Mar 2022 - Present
Indian Institute of Science — *Bangalore, India*

- Researching under the guidance of Prof. Abhra Roy Chowdhury on developing a novel Brain-Robot Interface to localize audio sources of assistive robots in industry 4.0 scenarios.
- Received **2 awards in prestigious IEEE ICRA, IROS 2022** competitions.

Summer Research Fellow — Jul 2021 - Oct 2021
Indian Institute of Science — *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

Teaching Assistant - Intelligent Mobile Robotics (MN 207) — Fall 2022, Fall 2023
Indian Institute of Science — *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.
- 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 Jun 2020 - Jul 2020
TCS iON *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.

PUBLICATIONS

Brain-Robot Interface-Based Sound Source Localization of an Assistive Robot in Industry 4.0 - (Ongoing): The research proposes a Brain-Robot Interface framework using Auditory Steady State Response (ASSR) for audio-aware navigation of mobile robot in an industry 4.0 scenario.

Transforming Pixels into a Masterpiece: AI-Powered Art Restoration using a Novel Distributed Denoising CNN (DDCNN) - (Paper 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.

Spatio-Temporal Feature Extraction: An Approach to Recognize Natural Human Activities in Assistive Robotic Applications - (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 Hackthon 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

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.

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.

Smart Switch: IoT-based home automation: Developed a solution to automate household switches using a timer-based socket breaking system.

Dual Powered Multi-purpose Emergency Kit with HAM Radio Receiver: Developed a solar and hand-crank powered multiplexer-based 144 MHz HAM radio receiver.

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

CO-CURRICULAR & LEADERSHIP ACTIVITIES

- **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
- **Facilitator** in the workshop 'Introduction to Wheeled Mobile Robotics' to 60+ undergraduate students from all around Tamilnadu in GCT 2022
- 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
- Team Lead at GCT Robotics Society — Dec 2021 - Oct 2022
- Student Member in IEEE, IEEE Robotics and Automation Society (RAS) — Mar 2021 - Dec 2022