MUKIL SARAVANAN

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EDUCATION

Master of Science in Robotics (with Honors) — Sep 2024 - Present
Delft University of Technology (TU Delft) — *Delft, Netherlands*
CGPA: 8.1/10.0 (until Quarter 5)

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	Deep Learning, Deep Reinforcement Learning, Model Predictive Control Machine Perception
Soft Skills	Self-discipline, Work ethic, Leadership
Tools	*Frameworks & Libraries*: PyTorch, Tensorflow, Acados, CVXPY, OpenCV *Physics Engines*: Gazebo, PyBullet, MuJoCo *Robot Operating System*: ROS1, ROS2 *Programming Languages*: Python, C++, MATLAB, JAX *Embedded Devices*: STM32, Raspberry Pi, Arduino

RESEARCH EXPERIENCE

Research Assignment — Nov 2025 - Present
Cognitive Robotics(CoR), TU Delft — *Delft, Netherlands*

- Investigating into learning temporally-coherent action chunks using Contrastive Policy Learning from Interactive Corrections with Zhaoting Li under the supervision of Prof Jens Kober
- This work explores how reward signals can be leveraged to improve policy stability, sample efficiency, and exploration in interactive reinforcement learning settings.

Honours Research — Mar 2025 - Present
Autonomous Multi-Robots Lab (AMR), TU Delft — *Delft, Netherlands*

- Jointly researching on whole body control of aerial robot manipulation with Dr. Sihao Sun under the supervision of Prof Javier Alonso-Mora
- This work investigates developing a task space planning for a 2-DoF aerial manipulator using Non-linear Model Predictive Control (NMPC), integrating the system's coupled contact kinodynamics.

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 - (Granted Indian Patent. 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

PROJECTS

A Multi-Modal BEV Fusion and Affine Augmentation for 3D Object Detection: Developed BEVFusion-L, a late-fusion RGB–LiDAR architecture combining ResNet image semantics with voxelized LiDAR to mitigate sensor sparsity in autonomous driving. Achieved 77.74% mAP on the VoD dataset (+10.96% over CenterPoint), improving robustness for small and occluded objects, especially pedestrians and cyclists. *Project under Prof Holger Caesar, Advanced Machine Perception course*

Intelligent Robotic Control: Physics-Informed Learning, Iterative Learning Control, and Gaussian Processes: Implemented data-driven control strategies by uses physics-informed modeling, and probabilistic methods to control robotic manipulators. *Project under Prof Cosimo Della Santina*, Intelligent Control Systems course

Vision-Based Navigation on Resource-Constrained Micro Aerial Vehicle: Developed a lightweight CNN-based autonomous navigation framework for a Parrot Bebop 2 MAV using knowledge distillation and self-supervised monocular depth labeling. Achieved a 96% parameter reduction (1.5M $\rightarrow$ 48.8K), 1.4 MB model size, and real-time

onboard inference (11 FPS, 90 ms latency), with 86.63% accuracy and 0.9033 F1-score in dynamic obstacle avoidance. *Project under Prof Guido de Croon, Autonomous Flight of Micro Air Vehicles course*

Disturbance-Robust MPC for Output Tracking of Underactuated Systems with Ellipsoidal Terminal Set: Designed an output-based Model Predictive Controller with disturbance rejection for a drone carrying tethered cargo. Ensured constraint satisfaction and asymptotic stability using an ellipsoidal terminal set. *Project under Prof Sergio Grammatico, Model Predictive Control course*

Autonomous Apple Harvesting Robot: SLAM, Mobile Manipulation & Human-Robot Interaction: Designed and validated a low-cost autonomous apple-harvesting system using ROS 2, Visual-LiDAR-SLAM, and MPPI for robust navigation and dynamic obstacle avoidance in unstructured fields.

Waypoint tracking controller of quadrotor: Developed and evaluated waypoint tracking controller for quadrotor using potential field constraints in Model Predictive Control. *Project under Prof Javier Alonso-Mora, Planning & Decision-Making*

Other projects are found on this page

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: Created a dataset encompassing a total of 85,1000 RGB 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.

OUTREACHES

- **Student Volunteer** at multiple robotics conferences including IEEE RO-MAN 2025, IEEE ICRA@40 2024
- **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 students** at Cognitive Robotics Department (2025), Introduction Programme (2025) at TU Delft, Robotics Society in GCT IEEE Student Branch (2021 - 2022)
- **Technical lead** at numerous occasions – group projects (Idea to Start up - Deep Tech) & competitions {E-Yantra Robotics Contest (2021-2022), E-Yantra Innovation Contest (2020)}