# Malay Phadke

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## Education

**Sardar Patel Institute of Technology** 2021-2025
*Bachelor of Technology in Electronics and Telecommunications Engineering* *Mumbai, Maharashtra*
**CGPA: 9.5/10 (Rank 1/152)**

**Patkar College of Science and Arts** 2019-2021
*Senior Secondary School Examination (12th Standard)* *Mumbai, Maharashtra*
**Percentage: 97.83**

**Dr. Sarvepalli Radhakrishnan Vidyalaya** 2007 – 2019
*Secondary School Examination (10th Standard)* *Mumbai, Maharashtra*
**Percentage: 94.60**

## Research Experience

**University of Calgary** June 2024 – August 2024
*Research Intern* *Calgary, Alberta*

- Worked on reinforcement learning for cooperative path planning of UAV-UGV for Search & Rescue operations
- Created a modified TD3 algorithm for reaching predefined goal locations for Husky UGV using ROS and Gazebo.
- Worked on Jetson Orin Nano and Pixhawk Cube integration for getting sensor data onto the Jetson with Python

**Indian Institute of Technology, Bombay** Jan 2024 – May 2024
*Research Intern* *Mumbai, Maharashtra*

- Worked on contactless Biometrics authentication techniques using Deep Learning and Multiresolution analysis
- Created custom palmprint ROI extraction algorithm using MediaPipe
- Worked on Deep Siamese networks combined with Shearlet transform and Scattering Wavelet networks for contactless palmprint authentication and achieved state-of-the-art results.

**Drona Aviation (IITB Drone Startup)** June 2023 – September 2023
*Project Intern* *Mumbai, Maharashtra*

- Created the Pluto Python Wrapper, python scripts to control the Pluto nano drone with websockets. Also, created the Pluto Camera Python Wrapper, to get the camera stream connected to the drone. Further created various projects like face detection and recognition, gesture based selfie and drone control, colour based drone control, voice controlled drone, etc. using Python and ROS
- Built a Python to C Transpiler to convert python code to C code for drone programming
- Debugging previously built ROS packages for nano drones. Migrated codebase from ROS1 to ROS2 for nano drones

## Projects

**Drones for Smart Agriculture** | *(IEEE AESS Global Sponsored Project)*

- Worked on a novel project idea - UAV-UGV Collaboration for efficient agriculture; the proposal was accepted for funding of $25,000 annually for 3 years by IEEE AESS Global under the Distributed Sensing Technology and Education Initiative (DSTEI)
- Performed simulations and devised path planning algorithms using ROS-Gazebo, MATLAB, Python
- Worked on crop health classification pipeline using Transfer Learning. Fine-tuning YOLO to detect defects in Maize plant leaves. Implemented the complete pipeline on Jetson Orin Nano DevKit
- Integrated YDLidar X2 for the pesiticide spraying Unmanned Ground Vehicle.

**Comparison of Vision Language Architectures for Medical Image Understanding (Ongoing)**

- Conducting a comparative study of encoder-decoder architectures to identify the optimal approach for generating medical reports from radiological images.
- Analyzing model performance on the ROCOv2 dataset using metrics such as BLEU, ROUGE, and clinical relevance scores.
- Investigating combinations of Vision Transformers (ViT) and text decoders like BioBERT, T5, and BioGPT.

## Publications

- Sujata Kulkarni, **Malay Phadke**, Ashwini Sawant, Neel Patel, Om Patil, **"Advancements in Seismic Data Collection and Analysis Through Machine Learning"** , *Indonesian Journal of Electrical Engineering and Computer Science*
  DOI: 10.11591/ijeecs.v37.i3.pp2058-2068

## Patents

**NAZAR - ML based Solution for Surveillance Security**

- The invention introduces an advanced video surveillance system for CCTV that uses machine learning and image processing to enhance video quality, streamline monitoring, and improve threat detection. By integrating section extraction, image enhancement, and object detection, it automates surveillance tasks and supports proactive security measures.
- Indian Patent Office - Appl No: 202421053039

**UAV-UGV Collaboration for Port Monitoring**

- Reinforcement Learning based system coordinating UAVs with UGVs for cargo handling at ports. By observing UAVs gathering aerial congestion data, UGVs may adapt routes in a dynamic manner to be timely and avoid delay.
- Indian Patent Office - Appl No: 202421073880

## Certifications

**Coursera DeepLearning.AI** - TensorFlow Professional Developer Certificate

**Codecademy** - Python, C/C++, Go, Ruby

**NTPEL-IIT Guhwati** Computer Vision and Image Processing (Topper)

**NTPEL-IIT Madras** - Introduction of Embedded Systems (Topper)

## Positions Of Responsibility

**Chairperson** | IEEE AESS (Aerospace and Electronics Systems Society) SPIT Chapter

- Led a team of around 15 people working on the IEEE AESS Global sponsored project.
- Organized various events like drone workshops and hackathons to create interest among juniors and provide a platform for networking.

**Technical Head** | *Electronics Student's Association(ESA) SPIT*

- Worked on problem statements and handled technical logistics for TechnoHunt, PCB design and sensor based hackathon with 150+ teams , developed committee website

**Technical Team** | *IEEE SPIT*

- Organized different events like career guidance workshops, coding challenges, etc and worked on the committee website

## Achievements

**MITACS Globalink Scholarship**

- Selected as a research intern in University of Calgary, Canada as part of the MITACS Globalink Internship Program. Roughly 3000 students are selected among a pool of 40000 applicants all over the world.

**Electronics and Telecommunications Department Topper**

- Ranked 1st in my undergraduate department for consecutive 3 years

**Kavach Hackathon Winner**

- National level cybersecurity Hackathon organized by All India Council for Technical Education(AICTE) and Government of India with over 3900 teams participating
- Created a cryptocurrency analysis tool to find suspicious fund trails.

## Technical Skills

**Languages**: Python, C/C++, Golang, Java, Ruby, Javascript
**Technologies:** TensorFlow, PyTorch, React.js, Django, Flask, Node.js, Express.js, MATLAB, ROS, ROS2, Gazebo, PyBullet, AirSim
**Concepts:**Artificial Intelligence, Machine Learning, Deep Learning, Embedded Systems, Computer Vision, Signal Processing, API, Cloud Computing