# Bhakti Talele

Mumbai, India | +91 9372861871 | bhaktitalele25@gmail.com | LinkedIn: Bhakti Talele

**Aspiring PhD student** with research experience in signal processing, image processing, computer vision, and AI/ML. Conducted projects and internships involving machine learning, deep learning, multimodal and multitemporal data analysis, and development of practical tools for SAR/PolSAR data classification, EEG analysis, and biometric systems. Interested in further exploring advanced AI techniques and computational methods to address challenging problems in imaging and signal analysis.

## EDUCATION

**Vidyalankar Institute of Technology (VIT), University of Mumbai, India** **August 2021 - May 2025**

**Bachelor of Engineering**
Major: **Electronics and Telecommunications**
Minor: **Artificial Intelligence and Machine Learning**
CGPA**: 9.75/10**

**MS in ECE (Admitted, Spring 2026) – Carnegie Mellon University**

## WORK EXPERIENCE

**Project Lead, Chanakya Fellowship Program 2022-2023, Mumbai, India** **April 2023 - Jan 2024**

- Project Title: Voice Controlled Robot
- Grant: **6 Lakhs INR** by **Department of Science and Technology (DST), Government of India**
- Institution: **TIH-IoT**, **IIT Bombay**
- Led a team of 5 project fellows in collaboration with Mathworks Pvt. Ltd.
- Utilized technologies: Python, Computer Vision, Image Processing, Robotics, Voice Recognition.

## INTERNSHIPS

**Research Intern, IIT Kanpur, Department of Electrical Engineering** **Aug 2025 – Present**

- Working on hidden object detection and trail mapping in dense canopy forests using multimodal (Sentinel-1/2, LiDAR) and multitemporal datasets.
- Employing advanced deep learning architectures (CNNs, MLPs, U-Net variants) along with decomposition techniques and cross-attention mechanisms on NVIDIA GPUs for multimodal feature fusion and large-scale analysis.

**InfiCorridor Solutions Pvt. Ltd.** **Oct 2024 - May 2025**

- Designed GA, ACO-PSO, and transfer learning–based PolSAR classifiers, achieving up to 99% accuracy on ALOS-2 PALSAR & Sentinel-1 datasets.
- Applied speckle filtering, 7-component decomposition, and frequency-domain filters for feature extraction and image quality, and delivered a Python tool (SVM, RF, NN, DT) plus a MATLAB GUI (RF) with 90–99% cross-regional transferability.

**Research Intern, IIT Patna, Department of Electrical Engineering** **June 2024 - Aug 2024**

- Developed enhanced bank locker security system using multi-modal biometrics (face, fingerprint) and real-time path monitoring**.**
- Deployed on NVIDIA Jetson Board with GPU acceleration for embedded AI applications.

**RPA Developer Intern, The RPA Rookies** **Dec 2022 - Mar 2023**

- Built automation workflows using UiPath.
- Learned fundamentals of process automation and optimization.

**Microcontroller Programming Intern, Go-Green Technologies Pvt. Ltd.** **Dec 2022 - Jan 2023**

- Programmed ATmega328P microcontroller (Embedded C) for IoT-based systems.
- Gained hands-on experience with embedded system design.

## SKILLS

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|---|---|
| **Programming:** | Python, C, C++, Embedded C |
| **Domain:** | Signal & Image Processing, Computer Vision, AI & Machine Learning, Remote Sensing & GIS |
| **Tools:** | MATLAB, Arduino IDE, LaTeX, Microsoft Office Suite, MySQL, PostgreSQL, Python (NumPy, Pandas, SciPy, Scikit-learn, OpenCV, scikit-image), PyTorch, TensorFlow |
| **Soft Skills:** | Leadership, Analytical Thinking, Team Collaboration, Public Speaking, Project Management |
| **Relevant Coursework:** | Data Structures and Algorithms, Database Management Systems, Digital Signal Processing, Image Processing and Machine Vision, Artificial Neural Networks and Fuzzy Logic |

## PUBLICATONS

**2024 IEEE India Geoscience and Remote Sensing Symposium [IEEE InGARSS 2024]**
**PolSARHub: A Large-scale Repository for PolSAR Data**

- Developed a repository for labelled Polarimetric SAR data to enhance deep learning applications.
- Created an automated labelling system for multiple sensors (UAVSAR, Sentinel, NISAR).
- Implemented a time-series data processing pipeline for high-quality training datasets.

**International Journal of Computer Applications (Volume 187 – No.3, May 2025)**
**MATSAR: A Comprehensive Machine Learning Approach for PolSAR Data Processing**

- Developed a comprehensive GUI-based machine learning tool for PolSAR data processing, implementing multiple decomposition techniques to address limitations in existing software like PolSARPro and SNAP
- Deployed SVM, Random Forest, Neural Networks, and Decision Tree classifiers for land cover classification (settlements, forest, water bodies, mangroves) with comparative analysis framework

**2025 15th IEEE International Conference on Signal Processing, Communications and Computing (ICSPCC 2025), Hong Kong – (Presented)**
**Analysis of Machine Learning and Deep Learning Models for EEG-Based Emotion Classification**

- Designed a robust EEG emotion classification pipeline with FFT-based preprocessing and data augmentation.
- Reported model accuracies: DBMM (31.28%), Random Forest (82.72%), ANN (97%), and CNN (99%).

- CNN achieved highest accuracy and generalization, establishing it as the state-of-the-art for EEG-based emotion classification.

**Publications (Under Review)**
- Five manuscripts currently under review in **Advances in Space Research**, **Remote Sensing Applications: Society and Environment**, and **Applied Geomatics**.

## COPYRIGHT

**Computer Software for CAN Satellite** - Embedded C (Registration Number – SW-17692/2023, Government of India)

## UTILITY PATENT

**Smart Robot DOG** (Application Number – 202321046116, Government of India)
**System And Method for Voice Controlled Robot** (Application Number – 202421012725, Government of India) – Published, in process for grant
**Revolutionizing Agriculture Bot with IOT** (Application Number – 202421081383, Government of India)
**Enhancing Bank Locker Security with Biometric Authentication and Sensor Monitoring** (Deutsches Patent- und Markenamt)

## DESIGN PATENT

**Voice Controlled Robot** (Application Number – 408696-001, Government of India) – in process

## PROJECTS

- **Genetic Algorithm-Based Feature Selection for SAR Data Classification (Dec 2024 – Mar 2025):** Designed a GA-optimized Random Forest classifier for ALOS-2 PALSAR data, improving accuracy 64.3% → 84.7% in San Francisco. Applied speckle filtering and 7-component decomposition for feature extraction. Reduced training data needs by 92–99% while enhancing classification accuracy for large-scale land cover mapping.
- **Land-Cover Classification using ACO & PSO (Dec 2024 – Mar 2025):** Integrated Ant Colony Optimization for feature selection and Particle Swarm Optimization for Random Forest hyperparameter tuning, improving classification accuracy by 8–12%. Processed ALOS-2 PALSAR data of Mumbai, achieving 97%+ validation accuracy, accurately identifying complex land features (mangroves, bridges, wetlands) validated with Google Earth.
- **Frequency Domain Filters for PolSAR Image Quality Assessment (Dec 2024 – Mar 2025):** Applied nine frequency-domain filters to enhance T3 PolSAR components. Performed quantitative analysis using CV, SNR, ENL, SSIM, and PSNR, showing that frequency-domain filters can outperform the Lee Refined filter for specific features.
- **PolSAR Data Classification using Transfer Learning (Aug – Nov 2024):** Developed a MATLAB GUI for ALOS-2 PALSAR land cover classification using Random Forest. Achieved 99.02% accuracy in Mumbai and 94.56% overall across five cities. Demonstrated 90–92% cross-regional transferability and integrated real-time area computation.
- **Design and Development of PolSAR Classification Tool using Python (Jul – Aug 2024):** Built a Python tool for Sentinel-1 SAR data classification using SVM, Random Forest, Neural Networks, and Decision Trees.
- **Revolutionizing Agriculture Bot with IoT (Mar 2024):** Developed an autonomous crop monitoring and management system integrating deep learning algorithms and microcontrollers for real-time processing and precision watering. Techniques used: Object Detection, Plant Recognition, Soil Moisture Sensing, Environmental Monitoring.
- **Change Detection in Satellite Images (May 2024):** MATLAB-based system detecting constructional changes in Sentinel-2 satellite images. Techniques used: Subtraction Method, Edge Detection, Change Vector Analysis (CVA).
- **Face Recognition Attendance System (May 2023):** Real-time attendance system using Python, OpenCV, and face recognition algorithms for accurate face detection.

## TEACHING ASSISTANT EXPERIENCE

- **Assisted Dr. Rao in workshops on Embedded Programming for First-year students (2022-2023)**
- **Assisted Dr. Varsha Turkar in lab sessions on Remote Sensing for Master's students (2024)**

## AWARDS AND CERTIFICATIONS

- **Earned Elite + Silver certification from National Programme for Technology Enhanced Learning (NPTEL)**
  **-** Secured rank among top 5%
  - Introduction to Machine Learning (IIT Kharagpur)
- **Coursera**, Introduction to Microsoft Excel (December 2023) – certification course
- **Anaconda, Inc.,** Anaconda Python for Data Science Professional Certificate (May 2025) – certification course
- **Wolfram Research,** Statistics Foundations Professional Certificate (May 2025) – certification course
- **Deloitte**, Technology Job Simulation (July 2024) – certification course
- **Machine Learning Specialization** (DeepLearning.AI)_– certification course (ongoing)
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- **Academic Excellence Award,** Vidyalankar Institute of Technology (2022, 2023, 2024)
- **Best Volunteer Award, IEEE Bombay Section** (2024)
- **Winner of IEEE Region 10 Robotics International Competition (Stage 1) in 2024**
- **Winner of IEEE Shark Tank Competition, 2022**
- **Secured 2nd position in IEEE Bombay Section Can Satellite Competition 2022, funded by IEEE AESS**
- **Secured 1st prize in YES Reliance Competition (2018) along with cash prize of INR 30,000**

## LEADERSHIP, VOLUNTEERING and SOCIAL WORK

**Founding Member and General Secretary, IEEE AESS Student Chapter, VIT, Mumbai** **Aug 2023 - July 2024**
- Initiating a formation of a new student chapter with **30+** student members, conducting **15+** activities

**Praan Vaayu E-Waste Awareness Foundation** **2022 - Present**
- Supporting e-waste awareness and sustainability campaigns**.**

## ADDITIONAL INFORMATION

- **Member of IEEE Bombay Section, IEEE AESS and IEEE GRSS** – December 2021 – Present