Prajakta Bhimrao Mali

RS and GIS Analyst | Civil Engineer | Data Analyst
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PROFILE

Remote Sensing and GIS Analyst with a Master's in Remote Sensing and GIS specializing in Urban and Regional Studies. Skilled in leveraging geospatial tools, data analysis, and hydrological modeling to provide innovative solutions for sustainable development and resource management. Passionate about applying data-driven insights to address challenges in urban planning, climate change, and water resource management.

EDUCATION

Master of Technology in Remote Sensing and GIS **2022-2024**
Indian Institute of Remote Sensing (ISRO) (CGPA: 8.24)
Bachelor of Technology in Civil Engineering **2019-2022**
DACOE, Shivaji University (CGPA: 8.79)
Diploma in Civil Engineering **2016-2019**
Government Residential Women's Polytechnic, Tasgaon (Percentage: 80.79%)
Secondary School (10th Standard) **2015–2016**
Azad Vidyalaya, Kasegaon, Sangli, Maharashtra (Percentage: 95.20%)

DOMAIN EXPERTISE

- **Geospatial Analysis:** Flood Monitoring, Urban Growth Modelling, LULC Prediction, Site Suitability Analysis, Drought Assessment
- **Hydrological Modelling:** Urban Hydrology, Active and Passive Flood Plain Mapping, Landslide Susceptibility Analysis
- **Remote Sensing:** Machine Learning, Spectral Unmixing, Object-Based Image Analysis, Sub-Pixel Analysis
- **Climate and Environmental Studies:** Urban Heat Island Analysis, LST Analysis, Climate Change Impact Analysis, Bias Correction of Datasets

TECHNICAL SKILLS

- **Geospatial Tools & Software**: ArcGIS, ERDAS, QGIS, eCognition, TerrSet, Google Earth Engine (App Developer), Blender, Pix4D Mapper, AGISOFT, WEB-GIS
- **Programming & Analysis**: Python, R, MATLAB, Java
- **Hydrological Modeling**: HEC-HMS, Arc-SWAT, R-SWAT, CMhyd
- **Others**: AUTO-CAD, ENVI, SNAP, MS Office (Excel, Word, PowerPoint)

PROFESSIONAL EXPERIENCE

- **Young Professional – WebGIS** **Jul 2025 – Present**
  Maharashtra Institution for Transformation (MITRA), Government of Maharashtra
  NITI for Maharashtra | Office of Chief Economic Advisor to Hon'ble Chief Minister | World Bank–GoM-funded MRDP
- Supporting urban resilience and infrastructure planning through geospatial solutions under the Maharashtra Resilience Development Program (MRDP).

- Led statewide GIS-based mapping and quality validation of rural roads under MMGSY, PMGSY, and Proposed categories, ensuring spatial accuracy and attribute consistency across all tehsils of Maharashtra.
- Designed and conducted hands-on GIS training sessions for 300+ government officers from Zilla Parishads and PWD divisions, enhancing their capacity in road data mapping, standardization, and digital monitoring workflows.
- Prepared comprehensive district-wise abstracts and analytical summaries for rural road categories, supporting decision-making in connectivity planning and infrastructure prioritization at the state level.
- Developed an interactive WebGIS dashboard integrating datasets on Thermal Power Plants and Sewage Treatment Plants (STPs) to visualize STPs within 50 km buffer zones, identifying potential opportunities for treated wastewater reuse in thermal power generation.
- Contributed to climate-informed spatial planning and flood risk assessments under the Maharashtra Resilience Development Program, leveraging GEE, QGIS, and Leaflet for integrated, data-driven decision support.

❖ **Indian Institute of Science (IISc)**

Funding Agency: Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation (via NRCD)

Junior Research Fellow **July 2024 – June 2025**

- Collaborated with multidisciplinary teams from IISc and NIT Tiruchirappalli to support integrated river basin management and sustainable planning strategies.
- Processed and analyzed climate datasets (CMIP6, IMD) using Python for hydrological and environmental modeling, demonstrating readiness for Earth System Model integration.
- Supervised a team of four interns and coordinated with partner institutions to ensure timely execution of geomorphological and hydrological tasks.
- Mapping of river channels and valley margins using Sentinel-2 and Google Earth; generated centrelines, longitudinal profiles, and contours from DEMs to support detailed geomorphological analysis.
- Mapped physiographic zones, classified channel sinuosity, and conducted river style classification (40+ styles) based on valley confinement, lithology, and channel pattern, identified and categorized river islands and various bar types.
- Produced multi-year flood inundation maps (2015–2024) using Sentinel-1 SAR data; delineated active floodplains through frequency analysis and developed automated geospatial workflows using Python.
- Processed diverse environmental datasets, including soil moisture, lithology, texture, nutrients (15+ parameters), and satellite imagery (Planet Scope, Bhuvan, Bhukosh, CORONA) for hydrological, land use, and suitability analysis.
- Participated in field surveys for water quality, sediment sampling, geomorphology, and bio-assessment; contributed to agricultural mapping (cropping patterns, irrigation, yield), UAV planning, and represented the Cauvery Basin at the India Water Impact Summit 2024.
- Calculated soil erosion using the RUSLE model and estimated sediment yield for the Cauvery River Basin from 1990- 2024 to support watershed management and conservation planning.

❖ **Data Analyst Intern**, InnoBytes **1st June - 30th June 2024**

- Performed data pre-processing and analysis for geospatial and statistical datasets.
- Supported data-driven decision-making processes for environmental studies.

TEACHING AND OUTREACH EXPERIENCE

❖ **Teaching Assistant – Remote Sensing and GIS** **2023 – 2024**

Indian Institute of Remote Sensing (ISRO)

- Served as a Teaching Assistant for multiple national and international short-term courses during M.Tech. responsibilities included mentoring participants, resolving queries, and supporting hands-on training sessions related to GIS, remote sensing, and urban applications.

❖ **Guest Instructor – Application of GIS in Urban Planning** **May 2025**
National Institute of Technology (NIT), Patna

- Conducted a hands-on session on GIS-based spatial analysis and urban land suitability using Multi-Criteria Decision Analysis (MCDA), with real-world datasets and QGIS/ArcGIS tools. Participants included urban planners, researchers, and postgraduate students.

PROJECTS

1. **Project: Establishment of Centers for Cauvery River Basin Management Studies** **July 2024 – June 2025**
   Supervisors: Prof. Nagesh Kumar, Dr. Debsunder Dutta, Prof. Praveen Ramamurthy
- Supervised a team of four interns and collaborated with NIT Trichy on geospatial and hydrological analyses, including floodplain delineation and vulnerability assessment.
- Led the execution of hydrological models, integrating multi-source datasets such as climate variables, remote sensing imagery, and hydrological parameters for water resource assessment.

2. **Exploring Urban Water Balance Dynamics: Insights from VIS Fraction Mapping and Hydrological Modeling.** ***(M. Tech Project)*** **Aug 2023 – June 2024**
   Supervisors: Dr. Pramod Kumar, Dr. Vaibhav Garg, Dr. Asfa Siddiqui
- Analyzed urban water balance dynamics through high-resolution VIS (Vegetation-Impervious Surface-Soil) fraction mapping and hydrological modeling, evaluating spatio-temporal variations in surface runoff, infiltration, and evapotranspiration.

3. **Multi-Polarized SAR Data for Urban Flood Extent Delineation: A Case Study of Parts of Mumbai City**. **June 2023 – July 2023**
   Supervisors: Dr. Pramod Kumar, Mr. C.M.Bhatt
- Analyzed flood extent using advanced SAR data techniques, providing valuable insights for flood risk management in urban environments.

4. **Water Quality Analysis of Lower Koyana Basin Using Geospatial Data.** ***(B. Tech Project)***
   Supervisors: Dr. Abhijeet Zende **Aug 2021 – June 2022**
- Assessed spatiotemporal variations in water quality parameters of the Lower Koyana Basin using geospatial techniques for effective water resource management.

5. **Soft Storey Analysis for Building and Earthquake Simulation Using STADPRO.** ***(Diploma Project)***
   Supervisors: Dr. Mohankumar P. Hampali **Oct 2018 – April 2018**
- Conducted soft storey analysis for buildings and performed earthquake simulations using STADPRO to evaluate structural vulnerability during seismic events.

MINI PROJECTS

1. **Providing Web-Based Solutions for Users to Avoid Water Logging Areas Using APIs.** **June 2023**
- Developed a web-based tool utilizing APIs to identify and guide users away from water logging-prone areas, improving urban flood resilience.

2. **Earthquake Simulation and 3D Modeling in Blender with OSM and Blender-GIS as Tools.** **May 2023**
- Simulated earthquake scenarios and created 3D models in Blender using OpenStreetMap (OSM) and Blender-GIS, aiding in earthquake preparedness planning.

3. **GIS-Based Site Suitability Analysis for Sewage Treatment Plants in Satara District, Maharashtra, India.** **Nov 2022**
   Conducted GIS-based site suitability analysis to identify optimal locations for sewage treatment plants, contributing to better waste management in Satara District.

ACHIEVEMENTS

- **GATE (GE)**: AIR 129 **(2023)** | AIR 189 **(2024)** | AIR 132 **(2025)**
- **GATE (CE)**
- Secured **1st place** in Shivaji University's B. Tech Project Competition for water quality analysis in the Lower Koyana Basin.
- National Means-Cum-Merit Scholarship (126th District Rank).
- Winner of Wall Painting Competition at IIRS, ISRO.

CERTIFICATIONS

- **Getting Started with Imagery and Remote Sensing** (Esri Training)
- **Basics of MATLAB and Deep Learning Onramp** (MathWorks)
- **Statistical Analysis Onramp** (MathWorks)
- **Non-destructive Testing of Concrete Structures** (Concrete Fest 2018)
- ***GIS for Climate Action*** **(MOOC)** (Esri Training 6 weeks)
- **Master WebGIS with ArcGIS Online: From Basics to Pro** (Udemy)
- **Monitoring Global Terrestrial Surface Water Height using Remote Sensing** (NASA ARSET)
- **Leadership in Project Management** **(**Karmayogi Bharat – Department of Personnel & Training (DoPT), Government of India)
- **Fundamentals of Generative Artificial Intelligence** **(**Karmayogi Bharat – Indian Institute of Technology (IIT) Madras)
- **Innovate with Artificial Intelligence: A Design Thinking Approach** **(**Karmayogi Bharat - Microsoft)
- **Design Thinking for Data Professionals** **(**Karmayogi Bharat -FRACTAL)

PUBLICATIONS

- **Mali, P.** (Under Review). Exploring Urban Water Balance Dynamics through Vegetation-Impervious-Soil Fraction Analysis and Hydrological Modelling. Submitted to **Urban Science** (MDPI).
- **Mali, P.** (Under Review). Assessment of Land Use Land Cover Change of Visakhapatnam using CA-ANN. Book chapter in **Geospatial Technologies: Environmental and Climate Science Applications**, Taylor & Francis.
- **Mali, P.** (In Preparation). Urban Flood Inundation Mapping in Mumbai City, India using Multi-Polarised Sentinel-1 SAR Data. Manuscript under preparation.
- Developed **Google Earth Engine App** for **CMIP6 Data Explorer**. GitHub Repository

LEADERSHIP & VOLUNTEERING

- **Mess Secretary**: Managed dining services for 180+ students and 50+ international guests at IIRS.
- **Recreation Secretary**: Organized sports, festivals, and educational events at IIRS.
- **Class Representative**: Represented 60+ students during diploma studies.
- **Volunteer Researcher** – IAUC BibCom Literature Screening Project *(Aug 2025 – Present)* International Association for Urban Climate (IAUC) in collaboration with University College London (UCL)
  - Supporting the literature screening stage for the IAUC BibCom project contributing to the upcoming IPCC special report. Reviewing and summarizing ~20–25 research papers on urban climate within a month. Collaborating with an international team of 40+ researchers to validate LLM-assisted metadata accuracy for over 8,000 publications. Will be acknowledged as a co-author on the forthcoming research publication.

TRAINING & WORKSHOPS

- **Training on basics of layout and plan execution on actual site**
  Aryan Construction May 2017 – June 2017

- **Training Program of Recent Advances in Satellite-based Technologies for monitoring Hydro-climatological Extremes (RASTER 2023)**
  IIT Roorkee 11 Sept 2023 – 16 Sept 2023
- **One day workshop on Assessment of Impact of Climate Change on Vegetation Ecosystems using Geospatial Technologies** November 27, 2024
  International Institute of Information Technology Hyderabad (IIITH)
- **9th India Water Impact Summit (IWIS) and 2nd Climate Investments and Technology Impact Summit (CITIS)**
  Delhi December 4-6, 2024
  Represented Indian Institute of Science (IISc) as a Project Associate. Attended sessions focusing on "River Rejuvenation and Conservation: Learning from the Past and Strategizing for the Future" and "Climate Innovation: FOAK as an Asset Class, NOAK as the Scaling Model".
- **Bhuvan Overview – Webinar-based Training Program**
  National Remote Sensing Centre (NRSC), ISRO January 21-23, 2025
  Completed a webinar-based training on "Bhuvan Overview," gaining insights into the functionalities and applications of Bhuvan, ISRO's geospatial platform for remote sensing and GIS applications.
- **Numerical Modelling Studies for Coastal Engineering**
  Center for Sustainable Environment and Education (CSEE) April 5-27 2025
  Topics included coastal process simulation, wave dynamics, sediment transport, and application of numerical models in environmental and infrastructure planning.
- **Fundamentals of Biomonitoring in River Health Assessment**
  Jointly conducted by ICWaR, IISc Bengaluru & Kathmandu University April 27-May20 2025
  Participated in an 8-hour training session covering river health assessment techniques using biomonitoring and ecological indicators.

HACKATHON AND COMPETITIONS

IEEE GRSS Science Day Hackathon 2025
Participant – PS1: Change Detection in Satellite Imagery
Used remote sensing and ML techniques (Random Forest, SVM, Image Differencing) for satellite-based change detection as part of Team GeoHackers**.**

REFERENCES

- **Dr. Pramod Kumar** | Dean (A), GD-HUSG | Indian Institute of Remote Sensing, ISRO Email: pramod@iirs.gov.in
- **Dr. Vaibhav Garg** | Scientist/ Engineer-SF | Indian Institute of Remote Sensing, ISRO Email: vaibhav@iirs.gov.in
- **Dr. Asfa Siddiqui** | Scientist/Engineer-SF | Indian Institute Remote Sensing, ISRO Email: asfa@iirs.gov.in
- **Prof Nagesh D Kumar** | Professor, Water Resources and Environmental Engineering Department of Civil Engineering, Email: nagesh@iisc.ac.in