Devaraj Raja

Chennai, Tamil Nadu, India | +91 8667414221 | devarajraja.rs.gis@gmail.com
LinkedIn | Portfolio

Profile Summary

Remote Sensing and GIS Engineer with 6+ years of experience in geospatial analysis, satellite imagery processing, SAR/InSAR analysis and spatial data analytics. Proven expertise in developing Python-based automated SAR processing pipelines for oil spill, flood, and soil moisture detection, reducing processing time from hours to minutes. Experienced in dam subsidence monitoring, flood risk assessment, biodiversity mapping, and geospatial data automation. Proficient in ArcGIS, QGIS, ESA SNAP, Python and GIS workflow optimization.

Technical Skills

- **GIS/Remote Sensing Software:** QGIS, ESA SNAP, ERDAS Imagine, eCognition, Pix4D, Agisoft Metashape, ENVI-SARscape, PCI Geomatica, Global Mapper, PhotoMod, AutoCAD, ESRI ArcGIS Suite (ArcMap, ArcGIS Pro, ArcGIS Online, ArcGIS Enterprise, ArcGIS Instant Apps, StoryMaps, Dashboards, Survey123, Experience Builder)
- **Programming Languages/Cloud:** Python (Proficient), Google Earth Engine (Proficient), R (Beginner), SQL(Beginner), HTML /JavaScript / CSS (Beginner), AWS (EC2, S3)
- **Collaboration/Development Tools:** GitHub, Jira, Confluence, Slack, Jenkins, Postman, Looker Studio, Fibery, Microsoft Office
- **Geospatial/Modeling Software:** PAST, FRAGSTATS (LST), MSPA-FAD, HEC-RAS, MIKE
- **Survey/Field Equipment:** GPS, DGPS, RTK, CORS, GAGAN, Drones/UAV, Total Station, Terrestrial LiDAR
- **Core Competencies:** SAR/InSAR/DInSAR/SBAS Processing, Geospatial Analysis, Remote Sensing Image Processing, GIS Analysis, Spatial Data Processing, Change Detection, Flood Modeling/Risk Assessment, LULC Classification, DEM Generation, Species Distribution Modeling, Vegetation Management, QA/QC

Professional Experience

SAR Engineer

Eartheye Space | *Bangalore, India* **Apr 2025 – Nov 2025**

- **Oil Spill Detection:** Developed an automated processing pipeline for detecting and monitoring oil spills using Very High Resolution SAR data (Capella, Umbra and ICEYE etc.). Reduced processing and delivery time from 1 hour to 1 min. (Threshold technique).
- **Flood Detection:** Designed an automated processing pipeline for flood detection (Capella, Umbra etc.). Reduced processing and delivery time from 25 min to 1 min. (Threshold technique).
- **Soil Moisture:** Developed an automated processing pipeline to detect soil moisture using SAR data for X-band (Capella), C-band (Sentinel-1), and L-band (ALOS PALSAR-2). (RSMI).
- **Blank Spot Detection:** Automated processing pipeline to detect blank spots in plantation areas (Variance value).
- **Path Detection:** Automated processing pipeline to detect paths in plantation areas.
- **DinSAR:** Processed newly available Fucheng-1 data for surface deformation analysis. (Variance value).
- **Co-registration of Optical and SAR Data:** Fused data by applying cloud removal on optical data and spatially co-registered it with SAR imagery.
- **Change Detection:** Using radar backscatter values, performed change detection analysis to detect deforestation, river ice formation, and wildfires.
- **Vessel Detection:** Threshold-based approach used to detect vessels in the sea.
- **Methane Extraction:** Extracted methane values from Sentinel-5 data.

Junior Research Fellow – National Hydrology Project

National Remote Sensing Centre, ISRO | *Hyderabad, India* **Aug 2023 – Mar 2025**

- **Subsidence Monitoring using SBAS:** Identified subsidence in dams using SAR Single Look Complex (SLC) data, applying the Small Baseline Subset (SBAS) InSAR technique within a Python Jupyter Notebook environment. This approach significantly reduced computational time from weeks to days and enabled subsidence estimation using single-pass images.
- **DinSAR based Subsidence Monitoring:** Estimated subsidence for an additional dam using Differential InSAR (DinSAR) methodology.
- **Flood Mapping and Analysis:** Flood mapping using various synthetic aperture radar (SAR) and optical commercial data sets from International Charter including RCM 3, TerraSAR, COSMO-SkyMed, Gaofen-3, ALOS-PALSAR-2, Worldview, GeoEye, and KOMPSAT. Developed models to minimize manual corrections and produced false colour composite (FCC) images along with 3D video animations to effectively present the findings.
- **InSAR DEM for Landslide Analysis:** Applied microwave InSAR techniques for generation of Digital Elevation Model (DEMs), subsequently utilizing the generated DEMs to estimate the volume of landslide.
- **Photogrammetry DEM for Landslide Analysis:** Created DEMs using the CartoSAT-3 photogrammetry technique and the estimated volume of landslides.
- **Flood Modeling:** Flood Modeling using Mike and HEC-RAS.
- **Flood Risk assessment:** Prepared Flood hazard and zonation mapping. Carried out vulnerability assessment for risk analysis.
- **Swipe tool:** Developed swipe tool to view maps any where by a link using HTML, JavaScript, CSS.

Junior Research Fellow – Biodiversity Characterization Project

National Remote Sensing Centre, ISRO | *Hyderabad, India* **Sep 2022 – Aug 2023**

- **Change detection:** Performed decadal changes in Land Use Land Cover (LULC) change detection and spatial analysis using QGIS, including raster processing, vector editing, classification analysis, and map preparation, Landscape analysis (FRAGSTATS), Forest fragmentation (Forest Area Density) and Connectivity analysis (Morphological Spatial Pattern Analysis).
- **Species Distribution Model (SDM):** Conducted Species Distribution Model to find the spread out of invasive alien plant species.
- **Transform Divergence Index (TDI):** The TDI was carried out to quantify how separable two classes are based on their spectral

signature in a satellite image. A spectral profile was created for the classes and from that the TDI was calculated. This reduced the time taken for training sample preparation and improves classification accuracy.

- **Invasive Species Mapping using Machine Learning:** Mapped invasive alien plant species named Chromolaena odorata using WorldView-2 data. The following approaches were carried out for mapping: Pixel-based (Maximum Likelihood), Object-based (Multi-resolution segmentation) and Machine learning in QGIS (Random Forest).
- **Burnt Area Mapping:** Mapped Forest fire affected areas over a decade.
- **Fire hotspots trend Analysis:** Analyzed trends in fire hotspots using space time pattern mining techniques.
- **Field Studies on Forest Biodiversity:** Field surveys were carried out in two different forests. In one forest, surveys were conducted in two 1-hectare plots and six 0.1-hectare plots (19 days), and in the other, surveys were conducted in six 1-hectare plots (15 days).
- **Phenology metrics:** Calculated and analyzed phenology metrics using NDVI (Normalized Difference Vegetation Index) to track the vegetation growth cycle and monitor vegetation health.
- **Alpha Diversity mapping:** Mapped species diversity at the community level.

Technical Service Engineer

North Eastern Space Applications Centre, Dept. of Space | *Meghalaya, India* **Aug 2020 – Sep 2022**

- **Geo-tourism project (July 2021 to Sep 2022):** Mapping of Tourism assets at 1:5000 scale using tourism sites, tourism infrastructure, transport connectivity network and topography. Generation of tourism potential index using, multi-criteria overlay analysis, spatial homogeneity test, 360 image capturing and geo-tagging of tourist sites. Developed webpage using HTML, JavaScript, CSS for the tourism site.
- **Village resource mapping project (Mar 2021 to Apr 2021):** Database preparation and interpretation using KOMSAT 2 satellite imagery in 1:2000 scale like land use land cover
- **Preparation of Wetland mapping using UAV data (Nov 2020 to Feb 2021):** Collection and processing UAV data, GCP setup using DGPS, Database preparation and Interpretation of LULC on 1:300 scale
- **Coal mining project (Aug 2020 to Oct 2020):** Database preparation and interpretation using Triple satellite imagery in 1:500 Scale like LULC, drainage, settlement, roads and networks and mining holes extraction

Education

M.E., Remote Sensing and Geomatics – CEG Campus, Guindy, Anna University 2018 – 2020
B.E., Civil Engineering – SVCET, Anna University 2014 – 2018

Publications

- *GLOF in the South Lhonak Lake, India: Photogrammetric Analysis and Estimation* – Journal of Water and Climate Change, 16(1):127–141 (Dec 2024)
- *Exploring the Untapped Potential: Using AHP and GIS to Identify Suitable Areas for Tourism Development in Meghalaya* – IJIRSES, Vol. 3, Issue 3 (Mar 2023)
- *Estimation of Dam Subsidence using D-InSAR Method* – Devaraj R. et al., Journal of the Indian Society of Remote Sensing (peer review, 2026)
- *Mapping of Invasive Alien Plant Species: Chromolaena odorata using WorldView-2 Data* – Conference Paper, Siddipet College – 3rd Prize (Apr 2023)

Languages & Soft Skills

- **Languages:** Tamil (Native) | English (Fluent) | Hindi (Basic)
- **Soft skills:** Leadership, Communication, Problem Solving, Interpersonal Skills, Critical Thinking, Project Management, Creativity, Team Collaboration, Adaptability, Time Management, Attention to Detail, Customer Service Orientation