PRINCE

Spatial Data Science & Earth Observation Researcher

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LinkedIn | Portfolio

Profile

Quantitative geographer and spatial systems architect working at the intersection of satellite Earth Observation, computational terrain science, and data-driven environmental resilience. My scholarly focus centers on bridging physical geography with modern spatial intelligence, formulating multi-criteria analytical frameworks and processing satellite telemetry to address climate vulnerability. Operating with an architecture-first engineering philosophy, I combine domain-driven geospatial logic with high-velocity AI-assisted synthesis to design scalable decision-support ecosystems. Deeply dedicated to open science and empirical reproducibility, I am pursuing graduate research in geodata science, cartography, and satellite earth observation.

Education

University of Delhi – Dr. Bhim Rao Ambedkar College *Expected July 2027*

BA (Hons.) Geography with Research (4-Year Track) | *First Class Standing* *New Delhi, India*

- **Core Quantitative Modules:** Remote Sensing & GIS, Geostatistics, Cartography & Geovisualization, Environmental Geomorphology, Terrain Modeling, Quantitative Research Methodologies.

Publications & Empirical Research

Community Isolation Risk along the NH-7 Himalayan Transport Corridor *Sept 2026*

Lead Spatial Researcher | *Department of Geography, University of Delhi* *Uttarakhand, India* **Official Citable Record:** Zenodo DOI: 10.5281/zenodo.23670659 | **Esri India User Conference 2026 Selection**

- Formulated a spatial gravity model evaluating village accessibility exposure across **3,419 rural settlements** along the NH-7 arterial corridor within a 15 km buffer.
- Integrated **ESA Copernicus GLO-30 DEM** (slope gradient and elevation), OpenStreetMap friction surfaces, and Census demographics using an Analytic Hierarchy Process (AHP) multi-criteria framework: **Road Accessibility (46.91%)**, **Healthcare Proximity (20.10%)**, **NH-7 Proximity (20.10%)**, **Slope Gradient (8.62%)**, and **Elevation (4.27%)**.
- Conducted in-situ hazard ground-truthing in Rudraprayag (Mastura landslide corridor); published full open-access citable dataset on CERN/Zenodo.

Nepal Glacial Lake Outburst Flood (GLOF) Early Warning & AI Dynamics *Ongoing Thesis*

Undergraduate Dissertation | *Advising Faculty: Department of Geography, DU* *Nepal Himalayas*

- Architecting an Earth Observation monitoring pipeline combining **Sentinel-1 SAR** backscatter (VV/VH polarizations) and **Sentinel-2 multispectral imagery** (NDWI/MNDWI indices) to track moraine-dammed glacial lake expansion in high-altitude catchments.
- Implementing deep learning segmentation to detect lake boundary fluctuations and predict sudden outburst flood risk.

Systems Architecture & Professional Experience

CamAI – Real-Time Visual Intelligence Ecosystem *Jul 2026 – Present*

Founder & Chief Systems Architect | *Live Platform:* ***camai.princesite.in*** *Delhi, India*

- Designed and architected an end-to-end vision AI platform (camai.princesite.in) for intelligent edge surveillance, real-time object tracking, and spatial telemetry.
- Orchestrated the inference pipeline utilizing **TensorRT FP16**, **ByteTrack Re-ID**, and custom Python/FastAPI microservices connected to an Electron/TypeScript dashboard; currently in enterprise acquisition negotiations.

Independent Geospatial Consultant *Jan 2025 – Present*

Lead Consultant & Spatial Analyst *Remote / Client-Facing*

- **Post-Mining Brownfield-to-Solar Reclamation (Active Client Project):** Conducting 3D terrain and techno-economic suitability modeling for a decommissioning open-cast mine to repurpose degraded land into a utility-scale Solar PV park. Utilizing DEM slope/aspect masking ($< 5°$ threshold), shadow analysis, and Global Horizontal Irradiance (GHI) modeling to calculate net installable Megawatt (MW) capacity and grid evacuation routing.
- **Utility Solar Siting (Pune):** Executed Multi-Criteria Decision Making (MCDM) across **20+ geospatial layers** (solar irradiance, grid proximity, slope, land-use zoning) for utility-scale solar siting.
- **Healthcare Accessibility (Ludhiana):** Modeled travel-time isochrones and service-area catchments to identify optimal emergency medical facility placement.

Carbon X Services Pvt. Ltd. *Mar 2026 – Jun 2026*

GIS Analyst *Remote*

- Processed multi-temporal satellite imagery to evaluate biomass carbon sequestration potential and land-cover dynamics for commercial climate-tech applications, standardizing spatial ETL workflows across siting projects.

Terra AI – Autonomous Spatial Intelligence Engine *Dec 2025 – Apr 2026*
Founder & Lead Developer | Completed R&D Proof-of-Concept *Delhi, India*

- Architected a proof-of-concept autonomous spatial AI system exploring multi-agent LLM swarms for geospatial ETL automation, coordinate re-projection, and raster algebra.

Technical & Architectural Skills

Earth Observation & GIS: Copernicus DEM GLO-30, Sentinel-1 SAR, Sentinel-2 Optical, ArcGIS Pro, QGIS, Google Earth Engine, ESA SNAP, GDAL, GeoPandas.

Spatial Modeling: AHP Multi-Criteria Analysis (MCDM), 3D Terrain Modeling, Slope/Aspect Friction, Solar PV Siting, Post-Mining Reclamation.

Systems & AI Architecture: End-to-End System Design, AI-Assisted Software Synthesis, Edge Inference (TensorRT, ByteTrack), FastAPI, React/TypeScript.

Research Methodologies: ICMR Exposure Modeling, In-Situ GPS Ground-Truthing, Stratified Sampling, Open Science Workflows (Zenodo, ORCID).

Research Training & Certifications

- **ICMR & ESDA India:** Capacity Building Workshop on Environmental Health, Exposure Assessment, and Data-Driven Modelling (Hands-on Scientific Training supported by Ministry of Health and Family Welfare, Govt. of India).
- **United Nations University (UNU-IAS):** Net Zero 101 – Carbon Policy, Measurement & Climate Modeling (2026).
- **The Open University (OpenLearn):** Climate Change and Renewable Energy Spatial Modeling (2026).
- **Esri India User Conference 2026:** National Call for Maps Selection & Showcase Certificate.

Field Research Expeditions & Leadership

- **Landslide and its Mitigation Strategies (Rudraprayag, Uttarakhand):** A study of landslide causes, susceptibility, and mitigation strategies in Rudraprayag, Uttarakhand, India. The research focuses on GIS and remote sensing applications for landslide risk assessment and disaster management in the Himalayan region.
- **Arid Socio-Economic Survey (Jaisalmer, Rajasthan):** Administered GPS spatial sampling and field surveys to analyze rural demographic adaptation in arid ecosystems.
- **Academic Technical Exhibits Leadership:** Headed technical coordination, digital spatial exhibits, and visual conference communications for University Geo Fests (BHŪ-CHETNA 2024, 2025).

Academic Referees

- **Supervising Faculty & Institutional Referees:** Formal academic Letters of Recommendation (LoR) and institutional verifications from the Department of Geography, University of Delhi, available immediately upon request.