Abdul Najah

Geospatial Data Scientist | EO Consultant | Technical Lead in Environmental AI

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Employment

Geospatial Experience

Senior Data Scientist (Technical Lead) **vertify.earth / Vertical 52** *June 2024 – Present*
Data Scientist *Oct 2023 – May 2024*

Led the development of applied machine learning pipelines for environmental monitoring and satellite-based media intelligence. Served as the technical focal point across teams, guiding EO product design, mentoring analysts, and deploying reproducible workflows at scale.

Leadership & Consulting

- Acted as primary technical consultant across interdisciplinary teams, advising on geospatial ML, satellite data integration, and reproducibility
- Guided organizational shift from GUI-based workflows (**GEE**, **ArcGIS**) to scalable, automated pipelines in **Python**
- Designed cloud infrastructure for EO delivery on **AWS**, with prototyping on **Google Cloud**, and standardized **STAC/COG** adoption
- Mentored junior analysts and non-technical users (e.g. exiled journalists) in reproducible pipelines and satellite-based conflict monitoring
- Represented the organization at high-level international events including **COP28 (Dubai)**, **SatSummit (Lisbon)**, **ESA EO Workshop (Rome)**, and **GeoMob (Berlin)**

Flagship Projects

- **Biomass Estimation via Deep Learning Ensemble:**
  Developed a custom deep learning ensemble to estimate forest biomass and carbon sinks in India using multi-sensor EO data. Constructed training datasets from **airborne LiDAR** and **ISRO ground-truth**. Achieved $\mathbf{R^2 = 0.97}$ and **RMSE = 7**, enabling early-stage public tool prototypes.
- **Impervious Surface Detection (Computer Vision):**
  Designed and deployed ML pipelines to detect impervious surfaces across German cities using RGBI (50cm), PlanetScope, and Sentinel-2 imagery. Integrated preprocessing, classification, and validation stages for scalable, city-level mapping products.
- **Soil Organic Carbon (SOC) Prediction:**
  Built machine learning models to estimate SOC for climate and restoration projects in India (GIZ India) and Germany (EU LUCAS dataset), using EO predictors (Sentinel-2, DEMs, climate layers) and partner-provided ground truth. Hosted reproducible outputs on **GitHub** and **Hugging Face**.

Additional Contributions

- Created operational **SAR-based damage proxy maps** for humanitarian response in Gaza, Ukraine, and Turkey (2023 earthquake), combining coherence change analysis, infrastructure overlays, and rapid event timelines
- Produced **flood impact assessments** for the Rhine River overflow in Germany, using Sentinel-1 time-series analysis and terrain-aware flood delineation
- Developed workflows to estimate **affected infrastructure and critical assets** (buildings, hospitals, roads) by integrating **OpenStreetMap**, **Microsoft**, and **Google building footprints** with geospatial damage layers
- Delivered high-quality EO outputs and maps used by journalists, humanitarian analysts, and partner organizations — see highlights in Media Contributions
- Validated results through multi-source overlays and remote verification techniques, ensuring defensibility for both public reporting and internal review

Tools & Stack : Python, R, QGIS, Google Earth Engine, PyTorch, Hugging Face, Git, STAC, COG, AWS

Research Assistant **Centre for Climate Change & Sustainability** *May – Oct 2023*

- Worked with Prof. Meghna Agarwala (Ph.D., Columbia University) on remote sensing and **wildfire detection** in central India.
- Developed a machine learning pipeline to detect burned area from **wildfires and agricultural fires** using Sentinel and MODIS data.
- Created training datasets, engineered spectral indices, and tuned ML models for **burned area classification**.
- Co-authored a peer-reviewed publication in *Frontiers in Forests and Global Change*: *"Evaluating Methods to Map **Burned Area** at 30-Meter Resolution in Forests and Agricultural Areas of Central India."*

Research Assistant **Ashoka University** *Oct - Dec 2023*

- Collaborated with Prof. Anustubh Agnihotri (Ph.D., University of California, Berkeley) on spatial metrics for **urban growth** and fiscal policy analysis.
- Built **urban expansion metrics** for Indian municipalities using **built-up detection** and proxy data sources.
- Compared Google Dynamic World, VIIRS night lights, and ESRI WorldCover datasets.
- Deployed Random Forest and SVM classifiers for time-series analysis.

GIS Data Science Intern **Gramener, Hyderabad** *May – June 2022*

- Conducted spatial analysis on over **1 million consumer records** for a Fortune 100 U.S. company.
- Applied Exploratory Spatial Data Analysis (ESDA) to investigate **regional purchasing trends** tied to store location and revenue.
- Delivered geospatial insights used for **business strategy refinement**.

Leadership, Teaching & Capacity Building

Teaching Assistant **AshokaX (Online, funded by data.org)** *2023–2025*

- Supported two professional cohorts for the course **Data Science for Social Impact**, focused on applying data science to **climate**, **public health**, and **development challenges**.
- Led **weekly live discussion sessions** and mentored participants on **project development**.
- Worked with instructors from **leading global institutions** and contributed to **curriculum delivery** and **logistics**.

Teaching Fellow **Ashoka University, India** *Jan – May 2023*

- Taught the undergraduate course **Data Science for Social Science** to ~80 students from **political science** and **economics** in **Asia's #1 economics department** (Ashoka University).
- Delivered **weekly lab and discussion sessions** on **statistics**, **R programming**, and **data engineering workflows**.
- Held **5+ hours/week** of office hours and received a **4.5/5 student rating** for **teaching effectiveness**.

Teaching Assistant **Ashoka University (Prof. Meghna Agarwala)** *2022*

- Supported delivery of an undergraduate course focused on **environmental GIS** and **remote sensing**.
- Provided technical assistance, office hours, and logistical coordination for a diverse cohort of students.

Research Associate **Centre for Policy Research (CPR)** *June 2020 – Dec 2021*

- Worked under the mentorship of Dr. Rahul Verma (Fellow, CPR) on multiple academic research projects focusing on **Indian elections**, **political behavior**, and **public policy**.
- Designed and implemented robust data science workflows using R, combining statistical modeling, spatial analysis, and web scraping (PDF + HTML) across diverse datasets.
- Conducted advanced analyses including logistic regression, survival models, and spatial autocorrelation (Moran's I) to study **voting trends** and **demographic patterns**.
- Maintained reproducibility and transparency through use of Git, R Markdown, and custom documentation protocols.
- Supported **publication-quality research** outputs and collaborated closely with academic co-authors across institutions.
- Project funded by **Rosa Luxemburg Stiftung – South Asia**.

Projects

Burned Area Prediction using Landsat 5 and Machine Learning View on GitHub

End-to-end pipeline to classify **burned areas** using satellite imagery and ML in Python.

Compare Spectra App View Project

Google Earth Engine–based tool for exploring and comparing **spectral signatures** interactively.

Certifications

Beyond the Visible: Introduction to **Hyperspectral Remote Sensing** — EO College
Crop Mapping using SAR & Optical Remote Sensing — NASA ARSET
Earth Observations for **Humanitarian Applications** — NASA ARSET
ENVI Analytics — Esri India

Education

M.Sc. Geodesy and Geoinformation — Technische Universität Berlin — *2024 – Present*

- Specialisation in **Computer Vision**
- Coursework includes: **Automated Image Processing**, **Photogrammetric Computer Vision**, **Geodatabases**, **Geoinformation Science**, **Microwave and Radar Remote Sensing**, and **Image Processing for Earth Observation**

B.A. (Hons.) Political Science — Ashoka University, India — *2017 – 2020*

Postgraduate Diploma in Advanced Research (DipSAR) — *2022 – 2022*

- Received a rigorous liberal arts education with a **major in Political Science** and **minors in Sociology and Environmental Studies**, blending disciplinary depth with interdisciplinary range
- Developed strong foundations in **critical thinking**, **academic writing**, and **research design**, guided by Ashoka's emphasis on connecting theory to real-world application
- Focused on **computational and quantitative social science**, with coursework and research spanning **economics**, **empirical political economy**, and **spatial data analysis**
- Gained technical proficiency in **quantitative methods**, **statistical programming**, and **reproducible research workflows**, alongside broad-based exposure to social and environmental issues
- Studied at one of Asia's most selective universities, known for its **research-intensive pedagogy**, **world-class faculty**, and **leading economics and political science departments**

Publications

- **Evaluating methods to map burned area at 30-meter resolution in forests and agricultural areas of Central India**
  Frontiers in Forests and Global Change – with Chandel, Sarwat, Najah, Dhanagare & Agarwala (2022)