

Hayat Ullah Abid

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PROFESSIONAL SUMMARY

As a Geo-Informatics Engineer, I am an inventive spatial data scientist, proficient in GIS, enterprise geospatial systems, IoT-based telemetry, machine learning, and full-stack web development. With a track record of contributing to multiple national-level projects, I bring a wealth of experience and a proven ability to deliver impactful results. Eager to continue achieving more, I am dedicated to leveraging my skills and expertise to drive positive change and innovation.

EDUCATION

Bachelor of Engineering, Geo-Informatics, 2020 – 24 NUST, Islamabad, Pakistan GPA: 3.74/4	High Achiever Scholarship, NUST NUST High Achiever Award
A-levels, Science, 2017 – 2020 Roots IVY International, Islamabad, Pakistan Grade: A	High Achiever Scholarship
O-levels, Science, 2015 – 2017 The Fazle Haq College, Mardan, Pakistan Grade: 7 A's	High Achiever Gold Medal Fully Funded Scholarship, Government of Pakistan (KPK)

RESEARCH PUBLICATIONS

Journal Manuscripts

Abid, H. U., Zafar, M., Siddiqui, M. S., Arslan, M., Shah, W. U. *Machine Learning-Based Land Use and Land Cover Classification for Assessing Land Surface Temperature in Swat Valley, Pakistan.* (Manuscript ready for submission)

Conference Papers & Presentations

Abid, H. U., Farooq, M., Arslan, M., Aslam, A. *Promoting Sustainable Livelihoods in Shangla: A Geospatial Analysis for Organic Farming Suitability*. Accepted for Oral Presentation, SUPTM 2026 (MDPI / Sciforum)

Abid, H. U., Zafar, M., Arslan, M., Essa, M. *Unlocking the Potential of Blockchain Technology for Land Parcel Tokenization in Pakistan*. IC-WEES 2023, Islamabad, Pakistan

SELECTED RESEARCH PROJECTS

GeoMetro Cockpit: Multi-Country Territory Planning & Web GIS Platform *07/2024 – present*
Geometro GmbH, Barbing, Germany

- Developed core features for a multi-country Web GIS cockpit supporting Germany, Austria, Switzerland, France, Belgium, and Italy
 - Implemented ZIP-code mapping, instant visualization, legends, pop-ups, export tools, and country-specific viewers
 - Improved data handling, UI workflow, and backend performance for enterprise geo-marketing use cases
 - Collaborated on scalable geospatial architecture to support large, multi-national datasets

Cross-Border Logistics Tracking & Geo-Analytics Platform

10/2025 – present

NUST, Pakistan

- Developing a microservices-based geospatial system for real-time truck tracking and routing
- Implemented offline GPS synchronization and telemetry analytics across CIS, Iran, Azerbaijan, Georgia, and Turkey
- Integrated AWS IoT, Valkey, S3, and GraphHopper for scalable routing and data ingestion
- Designed system architecture to support cross-border logistics and real-time decision-making

AI-Based Military Common Operating Picture

07/2023 – 05/2024

Final Year Design Project

- Designed an AI-driven battlefield management system for real-time situational awareness
- Automated operational workflows using computer vision and deep learning techniques
- Reduced manual intervention by enabling intelligent machine-assisted decision support
- Focused on optimizing efficiency, coordination, and strategic execution in field operations

Precision Agriculture: Remote Sensing-Based System Characterization

03/2024 – 02/2025

NUST, Pakistan

- Developed remote sensing-based methodologies to optimize agricultural inputs at small farm scales
- Processed high-resolution satellite datasets for crop system characterization
- Designed and validated input-management strategies for economically significant crops
- Contributed to sustainable precision agriculture practices through data-driven analysis

Glacier and Glacial Lake Inventory of Northern Pakistan (GLOF-II Project)

11/2023 – 07/2024

Pakistan Meteorological Department, Islamabad

- Created updated glacier and glacial lake inventories for northern Pakistan
- Generated standardized geospatial datasets describing glacier extent and characteristics
- Contributed data to the Global Glaciers Inventory for climate risk assessment
- Supported hazard analysis related to Glacial Lake Outburst Floods (GLOFs)

Canada Day Night Planner – Location-Intelligent Event Planner

05/2025 – 06/2025

Freelance Project

- Built a full-stack event planning application using React, Express.js, and Google Maps/Places APIs
- Developed intelligent venue routing based on user profiles (Singles, Couples, Families)
- Integrated Stripe for secure multi-item checkout and dynamic product customization
- Delivered a responsive, map-driven platform with downloadable itineraries

National Common Operating Picture for Disaster Management

05/2023 – 09/2023

National Disaster Management Authority (NDMA), Islamabad

- Developed a web-based geospatial platform for multi-hazard disaster management
- Implemented early warning and risk assessment capabilities
- Integrated spatial data pipelines using GeoServer and GDAL
- **Technologies:** React, Django, GeoServer, GDAL

Reserve Sites Management Plan, AlUla, Saudi Arabia

09/2023 – 12/2023

International Union for Conservation of Nature (IUCN)

- Delineated conservation zones using spatial optimization techniques

- Applied CLUZ and Marxan to assess land-use patterns and biodiversity priorities
- Identified high-value preservation areas for sustainable ecosystem management
- Skills: Marxan, Spatial Analysis, Conservation Zoning, ArcGIS Pro, Excel

Sustainable Rural Development in Shangla: Organic Farming Site Selection

09/2023 – 01/2024

Spatial Decision Support System Project

- Developed a Spatial Decision Support System (SDSS) using GIS, Python, and AHP
- Identified optimal sites for organic farming to support rural employment
- Addressed coal-mining-related unemployment through sustainable land-use planning

Real-Time Geo-Environmental Monitoring System

09/2023 – 01/2024

Integrated Geo-Technologies, Term Project

- Developed a real-time monitoring system using NodeMCU, DHT11, and GPS sensors
- Streamed live environmental and location data into a Linux-based VM database
- Built a Django dashboard for visualization and analysis of sensor data

Cropland Mapping Using Random Forest and ANN

09/2023 – 01/2024

Machine Learning, Term Project

- Applied Random Forest and Neural Networks on fused optical–radar datasets
- Achieved 99.62% accuracy (RF) and 99.82% accuracy (ANN) for cropland classification
- Evaluated model performance and identified optimization opportunities

Intel Image Classification Using CNN

01/2024 – 01/2024

Machine Learning, Term Project

- Developed a CNN-based image classification model using the Intel dataset
- Achieved 95.5% training accuracy and 80% testing accuracy over 20 epochs
- Fine-tuned convolutional, pooling, and dense layers with pre-trained weights

Loan Repayment Rate Prediction

10/2023 – 11/2023

Machine Learning, Term Project

- Analyzed multivariate loan applicant data to predict repayment probability
- Implemented KNN, Decision Tree, and Logistic Regression models
- Supported data-driven risk assessment for banking operations

Map Shop

02/2023 – 06/2023

Web GIS, Term Project

- Developed a web-based platform for on-demand customized map creation
- Enabled drag-and-drop map design, data integration, and secure payment
- Automated map generation and download post-purchase

Network Analysis for Electric Pole Placement

02/2023 – 06/2023

GIS Applications, Term Project

- Conducted point-to-point, coverage, fleet optimization, and OD cost matrix analyses
- Optimized electric pole placement and electricity distribution planning

Topographic Mapping of NUST Using GPS

02/2023 – 06/2023

GPS Surveying, Term Project

- Collected field data using GPS surveying techniques
- Processed spatial data in MicroSurvey CAD to generate a topographic map
- Supported campus planning and infrastructure development

R Shiny Financial Dashboard

09/2022 – 01/2023

Spatial Data Analysis, Term Project

- Developed an interactive financial dashboard using R Shiny
- Visualized spatial distribution of financial indicators through maps
- Enabled real-time exploratory data analysis

Aviation Star: Pilot's Logbook

09/2022 – 01/2023

Database Management Systems, Term Project

- Built a flight planning and logging platform for pilots
- Enabled spatial analysis of pilot experience across regions
- Supported strategic assignment of expert pilots

Site Suitability for Hospital Using 3D Photogrammetry

02/2022 – 06/2022

Photogrammetry, Term Project

- Generated high-resolution DEMs from drone imagery using Pix4D
- Produced a 3D model of Askari 7 from stereoscopic imagery
- Identified optimal hospital sites based on multi-criteria analysis

Web-Based Routing Platform

02/2022 – 06/2022

Data Structures & Algorithms, Term Project

- Developed a routing platform for walking, cycling, and driving modes
- Implemented shortest-path algorithms with multi-parameter optimization

3D Design of Two-Seater Bicycle for Himalayan Terrain

09/2021 – 01/2022

Computer Aided Drawing, Term Project

- Designed a two-seater bicycle optimized for high-altitude environments
- Considered center of gravity, elevation constraints, and structural stability

Vegetation Analysis of Punjab, Pakistan

09/2021 – 01/2022

Introduction to Remote Sensing, Term Project

- Analyzed satellite imagery to assess crop quality and temporal variation
- Provided insights into agricultural trends for sustainable crop management

WORK EXPERIENCE**Full Stack GIS Developer**

07/2024 – present

Geometro GmbH, Barbing, Germany

- Contributed to GeoMetro Cockpit, ASB Viewer, and multiple Web GIS modules across enterprise platforms

- Delivered 50+ feature enhancements including ZIP-code management, dynamic visualization, authentication, and country-wide layers
- Implemented PDF and CSV export tools for geospatial data reporting
- Improved application performance, usability, and backend stability across geospatial systems

GIS Engineer

05/2023 – 07/2024

KFA Software Pvt. Ltd., Islamabad, Pakistan

- Developed GIS algorithms for automated weather map interpolation
- Engineered a web-based disaster management platform for multi-hazard early warning systems
- Contributed to national glacier and glacial lake inventories for Pakistan
- Prepared standardized geospatial datasets for integration into the Global Glaciers Inventory

Web GIS Intern

06/2022 – 03/2023

GIS Plus Total Solution Pvt. Ltd., Islamabad, Pakistan

- Collaborated on Web GIS application development and spatial analysis projects
- Performed map digitization and geospatial data preparation
- Assisted in GIS programming and visualization tasks across multiple client projects
- Gained hands-on experience in end-to-end geospatial workflows

AWARDS AND ACHIEVEMENTS

Winner – Partnership for Climate Action (NUST, 2024): Led team to 1st place, proposing climate-resilient solutions (carbon tax, water treatment, EIA) for climate-induced migration crisis.

Finalist – FICS 2024 (Finding Innovative & Creative Solutions): Presented startup idea at global pitching event; aligned with UN SDGs and COP29 initiatives.

IDEAS 2024 Showcase: Final Year Project featured at Pakistan's premier defence exhibition.

TECHNICAL SKILLS

- **Programming & Frameworks:**
JavaScript (React, Node.js, Express, Google Earth Engine, React Native)
Python (Django, ArcPy, GDAL, Rasterio, NumPy, GeoPandas)
C++, C#, R, Git
- **Databases & Backend:**
PostgreSQL / PostGIS, MySQL, MongoDB
AWS (RDS, DynamoDB, S3), REST API development, Spatial indexing & optimization
- **ESRI & GIS Software:**
ArcGIS Desktop, ArcGIS Pro, ArcGIS Server (publishing & service management), ArcGIS Enterprise / Portal, ArcScan
QGIS, Erdas Imagine, Marxan, Pix4D, Meshroom, AutoCAD, MicroSurvey CAD, GIMP, LISA
- **Web Mapping & OGC Services:**
Leaflet, React-Leaflet, Mapbox, MapLibre, OpenLayers, MapQuest, OSM
GeoServer, WMS/WFS/WMTS, Tile caching & scale optimization
- **Machine Learning & GeoAI:**
TensorFlow, PyTorch, YOLO, CNN, ANN, Computer Vision, LLM Integration

- **IoT & Embedded Systems:**
 AWS IoT Core, ESP32/Arduino
 GPS (NEO-6M), Accelerometer (ADXL345)
 DHT11/22, Gas/Environmental/Sound sensors
 MQTT / HTTP Telemetry, Real-time tracking & sensor integration

CO-CURRICULAR ACTIVITIES

Office Bearer (Treasurer) , Adventure Club, NUST Islamabad, Pakistan	09/2023 – 05/2024
Office Bearer (Treasurer) , Book Club, NUST Islamabad, Pakistan	09/2022 – 08/2023
Team Lead , Admin Coordination and Verification, Wall of Hope, NUST, Pakistan	2021 – 2024
Team Lead , Admin Coordination, SDG STUDENT HUB, NUST Islamabad, Pakistan	09/2021 – 08/2023
Director , Finance, Adventure Club, NUST Islamabad, Pakistan	09/2022 – 08/2023
Director , Admin Events, Adventure Club, NUST Islamabad, Pakistan	09/2021 – 08/2022
Team Member , Finance, Adventure Club, NUST Islamabad, Pakistan	09/2021 – 08/2022
Team Member , Parliamentary Debates, Debating Society, NUST Islamabad, Pakistan	10/2020 – 08/2022
Team Member , Finance, NUST Cyber Security Club, NUST Islamabad, Pakistan	10/2020 – 08/2022
Team Member , Capital Civilization, Pakistan Ideological Civilization, Pakistan	08/2021 – to date
Team Member , School Organizing Committee, Orientation NUST Islamabad, Pakistan	09/2021 – 08/2022
Director , Sponsorships, GIS Day NUST, Pakistan	08/2021

REFERENCES

Dr. Ejaz Hussain

Associate Dean, Professor, Institute of Geographical Information Systems
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Associate Professor, Institute of Geographical Information Systems
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