Zain Ul Abdin

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Education

Master of Science in Remote Sensing & Geo-Information Science — *[2020 – 2022]*
Institute of Space Technology, Islamabad — *Islamabad Capital Territory, Pakistan*

Experience

Geospatial Engineer — [April 2024 – July 2025]
Farmdar Pvt. Ltd.

- Develop and implement GIS-based solutions to address complex spatial challenges
- Automate GIS tasks using Python to enhance efficiency and productivity
- Deploy and maintain GIS-based web applications
- Designed and implemented a novel Brown Plant Hopper (BPH) disease detection method
- Coded the BPH detection algorithm in Python, automating the entire process from data acquisition to final results
- Deployed the BPH detection solution on GitHub and AWS for wider accessibility
- Developed a real-time, pixel-level disease detection method using NDVI for precise identification of affected areas in agricultural fields
- Optimized and automated model for biomass detection, significantly improving execution speed for AgromAI
- Leverage expertise in geospatial technologies, remote sensing, and programming to drive innovation in agricultural monitoring and management

Geographic Information Systems (GIS) Analyst — [Oct 2022 – March 2024]
Zoneomics Pvt. Ltd.

- Automated the complete QA workflow with Python, leveraging core QGIS and GIS libraries such as Rasterio, Shapely, and Fiona.
- Conducted daily quality assurance on zoning maps to ensure accuracy and compliance.
- Digitized zoning maps, converting them into structured, digital formats for further analysis.
- Provided training for newly recruited team members, equipping them with essential skills and workflows.

Geographic Information Systems (GIS) Developer — [July 2019 – June 2021]
Kaspar Consulting Services

- Developed custom QGIS plugins tailored to meet specific requirements of telecom clients.
- Built the main GIS data visualization dashboard in QGIS using Python for comprehensive spatial data insights.
- Automated the data fetching process, replicating Azenqos (AZM file) functionality, by integrating SQLite with Python GIS libraries.

Projects

- Habitat Suitability Analysis using Sentinel-2 Satellite Imagery and Global Biodiversity Information Facility GBIF data using maximum entropy algorithm on Google Earth Engine
- Suitability Analysis for Installing Solar Power Plant in Islamabad using Multicriteria Evaluation on Landsat Satellite Imagery
- Impact assessment of Hydropower plant on Kullu Block, Kullu District, Himachal, India using Land Cover Classification and Land Use LCCLU from 1992 to 2019 using Google Earth Engine
- Digitization of Lithuania, Anyskciai to visualize socio-economic dynamics of the country on a map
- QGIS Plugin : Dashboard for telecom company for drive test data
- QGIS Plugin : Automate the entire QA process at Zoneomics to apply all required checks

- Web GIS Full Stack App: Interactive Responsive Fuel consumption calculator using Leaflet Maps, ReactJS and NodeJS
- Web GIS App: React based Geo-coding web application

Technical Skills

- **Front-End Development:** HTML5, CSS3, JavaScript, TypeScript, React.js
- **Geospatial Technologies:** Google Earth Engine, Leaflet.js, OpenLayers, ArcGIS API for JavaScript, QGIS, ArcGIS Pro, ArcMap, Raster Analysis with indices like NDVI, NDRE, etc.
- **Core Geospatial Python Libraries:** GDAL/OGR, GeoPandas, Shapely, Fiona, Rasterio, ArcPy
- **Geocoding:** GeoPy, Reverse geocoding, address parsing
- **Spatial Databases:** PostGIS / PostgreSQL
- **Version Control & CI/CD:** Git, GitHub
- **Cloud Platforms:** AWS, Google Cloud Platform
- **Development Tools:** Visual Studio Code, Docker, Airflow
- **GIS Analysis Techniques**:
  - Terrain Analysis (DEM, slope, aspect, hillshade)
  - Hydrological Modeling (watershed, stream network, flow direction)
  - Suitability Analysis (multi-criteria decision analysis)
  - Network Analysis (routing, service areas using pgRouting / ArcGIS Network Analyst)
  - Viewshed and Line-of-Sight Analysis
  - Change Detection using multi-temporal raster data
  - Zonal Statistics (mean, sum, majority etc.)
  - Proximity and Buffer Analysis
  - Interpolation Techniques (IDW, Kriging, Spline)
- **Remote Sensing Tools**: SNAP, ENVI, Sentinel Hub
- **Time Series Analysis in GIS**: Dask, pandas, xarray with raster data, Temporal NDVI trends
- **Crop Monitoring and Health Assessment**
  - NDVI, NDRE, SAVI, EVI calculations for vegetation health
  - Crop classification using remote sensing & machine learning
  - Phenology tracking (crop emergence, maturity, harvesting dates)
  - Plant stress detection (e.g. water, nutrient, pest stress)
  - Chlorophyll content estimation using spectral indices
  - Yield prediction models based on weather, soil, and NDVI trends
  - Leaf Area Index (LAI) estimation
- Remote Sensing and Satellite Analytics
  - Multi-temporal analysis for seasonal comparison and change detection
  - Land use / land cover classification (supervised/unsupervised)
  - Cloud masking & atmospheric correction
  - High-resolution monitoring using Sentinel, Landsat, PlanetScope imagery
  - Time series analysis for crop dynamics and forecasting
  - Object-based image analysis (OBIA) for field boundary extraction
- Weather and Climate Analysis
  - Rainfall pattern analysis
  - Drought monitoring using indices like VCI, SPI
  - Heat stress analysis
  - Growing Degree Days (GDD) calculation for crop stages
  - Frost risk & temperature anomaly detection
  - Microclimate mapping for local decisions
- Geospatial Decision Support
  - Suitability analysis for crops based on soil, climate, terrain
  - Risk zone mapping (flood, drought, pest zones)
  - Land evaluation & ranking
  - Scenario modeling for farm-level planning

Certifications

Web GIS and Spatial Database Development using Free and Open Source Software	20 July 2022	Inter-Islamic Network on Space Sciences and Technology (ISNET)
ArcGIS Online Basics	April 1 2020	ESRI
Exploring GIS Maps	4 April 2020	ESRI

Getting Started with Spatial Analysis	2 April 2020	ESRI
Using GIS to Solve Problems	4 April 2020	ESRI
GIS Data Acquisition and Map Design	12 March 2022	University of Toronto
Cartography	23 March 2022	ESRI
Getting Started with GIS	31 March 2020	ESRI
Python for Everyone	1 April 2020	ESRI
Python Programming From Scratch	28 March 2020	Eduonix
Spatial Data Science: The New Frontier in Analytics	6 December 2020	ESRI
Introduction to GIS Mapping	17 Nov 2020	University of Toronto
Introduction to Python	19 Nov 2020	Coursera Project Network
Python Geospatial Data Analysis	14 Nov 2020	Coursera Project Network
Git For Beginners	20 August 2024	Udemy
R Programming for Beginners	18 Dec 2021	Udemy