

Muhammad Sohail Akbar

Geospatial Solutions & AI Leader | Enterprise GIS Architect | 2D/3D Web GIS, GeoAI & Spatial Data Platforms

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EXECUTIVE SUMMARY

Geospatial Solutions & AI Leader with 15+ years of experience designing enterprise GIS platforms, spatial databases, backend APIs, 2D/3D web GIS applications, and government decision-support systems. Current work in Riyadh combines ArcGIS Online, ArcGIS Experience Builder Developer Edition, ArcGIS Web Maps and Web Scenes, StoryMaps, Orbit 3DM, point-cloud and reality-mesh workflows, and applied GeoAI with established expertise in ArcGIS Enterprise, PostGIS, GeoServer, Python/Flask, vector tiles, COG/TiTiler, MapLibre, and Leaflet. Strong record of translating complex spatial data into reliable, scalable solutions for government, real estate, infrastructure, and smart-city operations.

CORE TECHNICAL STRENGTHS

- Enterprise GIS solution architecture across ArcGIS Enterprise/Server, ArcGIS Online, Experience Builder, Web Maps, Web Scenes, StoryMaps, GeoServer/GeoWebCache, PostGIS, and QGIS.
- 2D/3D geospatial integration combining ArcGIS custom widgets, Orbit 3DM, point clouds, reality meshes, 360 imagery, synchronized views, feature selection, and measurement tools.
- Spatial backend engineering using Python/Flask, Django, Laravel, CodeIgniter, PHP, REST APIs, authentication, ERP integration, and ETL-style data pipelines.
- Spatial data architecture for parcels, POIs, imagery indexes, feature services, coordinate systems, spatial QA/QC, analytics, and reporting.
- Map performance optimization using WMS/WMTS, raster mosaics, Mapbox vector tiles, COG/TiTiler imagery, MapLibre GL, Leaflet, and cache-aware delivery.
- Technical leadership across requirements, architecture, prototyping, implementation, stakeholder demos, production support, documentation, and developer mentoring.

GEOAI, EO & 3D DATA CAPABILITIES

- Developed and evaluated Python/PyTorch and Ultralytics prototype pipelines for building segmentation, building classification, and solar-panel extraction using GeoTIFF imagery, patch processing, YOLOv8-seg, U-Net++/EfficientNet, ResNet18, and ArcGIS pretrained models.
- Assessed imagery fitness, AOI selection, confidence thresholds, masks, polygonization, GIS-ready exports, and spatial QA; connected model outputs to PostGIS and map-based review workflows.
- Evaluated multi-date point-cloud change detection using CloudCompare C2C and M3C2 methods, with emphasis on registration, alignment accuracy, noise control, scalability, and workflow automation.
- Worked with Orbit 3DM, point clouds, reality meshes, and 360 imagery, including assessment of textured OBJ, 3SM, and 3MX conversion into web-ready scalable 3D meshes.

PROFESSIONAL EXPERIENCE

Geospatial Solutions & AI Leader | Precision Geomatics | Riyadh, Saudi Arabia | Aug 2026 - Present

- Lead the design and prototyping of enterprise geospatial solutions combining ArcGIS Online, Experience Builder Developer Edition, 2D/3D visualization, Orbit 3DM, and GeoAI workflows.
- Built ArcGIS Online Web Maps and Web Scenes and an Experience Builder dashboard with synchronized 2D/3D views, layer controls, search and identify, swipe comparison, measurement tools, and responsive panels.
- Embedded the Orbit 3DM viewer and designed a custom-widget/SDK architecture for two-way synchronization between ArcGIS features, Orbit assets, filters, camera focus, selection, and map highlighting.
- Created ArcGIS StoryMaps and map-based project narratives to communicate technical workflows, findings, and decision-ready geospatial outputs.
- Configured the Experience Builder Developer Edition development and deployment stack using custom widgets, ArcGIS Maps SDK for JavaScript, Node.js, npm, network access, and Nginx hosting planning while retaining ArcGIS Online services.
- Evaluated GeoAI and 3D-data workflows for solar-panel extraction, point-cloud change detection, reality-mesh optimization, and web delivery of point clouds, meshes, and 360 imagery.

Information Systems Analyst / GIS Solution Leader | Wedo Solutions | Riyadh, Saudi Arabia | Nov 2024 - 16 Jul 2026

- Lead enterprise GIS and spatial backend delivery for Saudi government and enterprise programs, aligning ArcGIS Enterprise, PostGIS, Flask APIs, GeoServer services, dashboards, and secure map publishing.
- Integrated ArcGIS Enterprise, PostGIS, Flask APIs, and ERP/data workflows to support controlled feature publishing, spatial analytics, and enterprise map-service access.
- Developed rental hotspot scoring using PostgreSQL/PostGIS, lease transaction volumes, rental trends, POI/infrastructure indicators, Flask APIs, and dashboard-ready spatial analytics.
- Optimized GeoServer, GeoWebCache, WMS/WMTS, raster mosaics, Martin vector tiles, Tiler/COG services, MapLibre GL, and cache-aware delivery patterns for smart-city and imagery review scenarios.
- Built QGIS/URBI plugin workflows, backend APIs, GeoJSON packaging tools, Arabic/bilingual layer handling, and POI/mobile mapping support for Makkah/Hajj and MOMRA smart-city GIS use cases.
- Contributed to applied AI/EO prototype and visualization workflows by connecting detection/building outputs with PostGIS, vector tiles, MapLibre map review, and GIS QA processes.

Assistant Director GIS | DHA Lahore | Pakistan | May 2022 - Nov 2024

- Led backend and GIS delivery of a centralized Land Records ERP for DHA Lahore, automating ownership records, plot tracking, parcel verification, and audit-ready data access.
- Designed PostGIS/PHP-backed parcel workflows with searchable land records, map services, role-based dashboards, zoning/ownership reports, and planning/legal review support.
- Integrated Android field data collection through REST APIs, validation rules, and near-real-time synchronization for parcel updates, field verification, and data quality control.
- Delivered cached map tiles, controlled ETL pipelines, reporting workflows, and multi-zone deployment support for land administration operations.

GIS Development Manager | The Urban Unit - Govt. of Punjab | Lahore, Pakistan | Feb 2012 - Apr 2022

- Led delivery of 20+ government GIS/MIS projects across land management, property tax, transport, health surveillance, price monitoring, and urban governance.
- Designed MIS/GIS platforms combining web applications, Android field apps, PostgreSQL/PostGIS databases, automated reporting, and map-based dashboards for public-sector departments.
- Managed mobile mapping and field workflows for parcel/POI collection, validation, spatial QA/QC, operational reporting, and stakeholder review.
- Delivered COVID-19 Planning Tool, Price Control Monitoring System, Urban Property Tax systems, and other decision-support dashboards with spatial tracking and reporting layers.
- Guided development teams through requirements, database design, backend implementation, testing, demos, production support, and cross-department coordination.

Full Stack Developer | HCT Solutions | Pakistan | Jul 2011 - Jan 2012

- Built database-driven real estate web applications using PHP, MySQL, CodeIgniter, reporting dashboards, and interactive map components.
- Worked with design and sales teams to deliver property portals, client workflows, reporting features, and maintainable web application modules.

SELECTED MAJOR PROJECTS

ArcGIS Experience Builder, ArcGIS Online & Orbit 3DM Integration

- Developed a dashboard architecture linking ArcGIS Online Web Maps and Web Scenes with an embedded Orbit 3DM viewer, including synchronized 2D/3D navigation, layer control, feature information, swipe comparison, and measurement.
- Defined a custom widget and SDK approach for two-way focus, selection/highlight, and filtered-asset synchronization, supported by a Developer Edition and self-hosted deployment model.
- Used ArcGIS StoryMaps to present map-driven project narratives, technical workflows, and geospatial findings to non-technical stakeholders.

GeoAI & Multi-Date 3D Change Analysis

- Assessed solar-panel detection and segmentation with YOLOv8-seg, finloop segmentation, and ArcGIS pretrained models; documented imagery-quality, training-data, model-selection, and output-QA requirements.
- Evaluated C2C and M3C2 point-cloud change detection, registration accuracy, large-dataset automation, and web-ready reality-mesh conversion for multi-date 3D datasets.

Enterprise Map Services, Tile Performance & Imagery Delivery

- Optimized GeoServer/GeoWebCache WMS and WMTS publishing, raster mosaics, cache strategy, and troubleshooting for enterprise GIS and smart-city map layers.
- Designed Martin vector tile and COG/TiTiler imagery delivery patterns for responsive MapLibre GL, QGIS, and web dashboard visualization.
- Improved map responsiveness by separating dynamic services, cached tiles, vector tiles, and raster imagery delivery based on workload and user need.

Real Estate Rental Hotspot Score Engine

- Designed a PostgreSQL/PostGIS scoring model combining rental trends, lease transaction volumes, POI/infrastructure accessibility, and spatial aggregation.
- Exposed analytics through Flask APIs for dashboard filtering, ranking, hotspot identification, market comparison, and real estate decision support.

Hajj / MOMRA / Makkah Smart City GIS Support

- Delivered POI layers, mobile mapping workflows, government dashboard support, and control-room-ready map layers for Hajj/Makkah smart-city use cases.
- Integrated Balady/URBI workflows, GeoServer/vector tile services, Arabic/bilingual layer handling, data packaging, and operational GIS QA.

Land Records ERP & Parcel Workflows

- Designed GIS-enabled land records ERP and parcel verification workflows for DHA Lahore and Pakistan Army Housing Authority contexts.
- Connected Android GIS collection, backend APIs, spatial databases, map tiles, and parcel reports to support ownership review and field verification.

Punjab Government MIS/GIS Programs

- Delivered provincial GIS/MIS programs spanning property tax, price monitoring, COVID-19 planning, passenger/NGO tracking, and urban management dashboards.
- Combined web systems, mobile field data collection, spatial databases, spatial QA, and map-based analytics into department-ready workflows.

INDEPENDENT GIS PRODUCTS & PLATFORMS

- **GeoReminder QGIS Plugin:** Designed and published a QGIS plugin for spatial task reminders tied to vector features, with task export, time-based popups, and map-driven notifications. <https://plugins.qgis.org/plugins/georemind/>
- **GISSchools.com:** Founded a practical GIS learning platform with tutorials, open-source demos, smart-city case studies, portfolio material, and career resources for geospatial professionals. <https://gisschools.com/>
- **GISITTools.com:** Built a GIS/IT tools resource site supporting practical utilities, references, and learning material for geospatial developers. <http://www.gisittools.com>
- **YouTube Channel: GIS Schools:** Produced 50+ tutorials covering QGIS, PostGIS, vector tiles, Flask APIs, spatial analysis workflows, and applied GIS development. <https://www.youtube.com/@GISSchools>

TECHNICAL SKILLS

- **GIS & Spatial Platforms:** ArcGIS Enterprise/Online/Pro, Experience Builder Developer Edition, StoryMaps, GeoServer/GeoWebCache, QGIS/QField, Orbit 3DM, and Balady/URBI SDKs
- **Backend & APIs:** Python/Flask, Django, Laravel, PHP, REST APIs, authentication, ERP integration, pg_featureserv, and ETL
- **Spatial Databases:** PostgreSQL/PostGIS, MySQL, SQL Server, MongoDB, Oracle Spatial, spatial SQL, analytics, and QA/QC
- **Web Mapping & Visualization:** ArcGIS Maps SDK for JavaScript, Experience Builder custom widgets, synchronized 2D/3D dashboards, MapLibre GL JS, Leaflet/OpenLayers, vector tiles, and GeoJSON
- **Raster, COG & Tile Services:** COG/TiTiler, raster mosaics, WMS/WMTS, Martin vector tiles, GeoWebCache, and cache-aware delivery
- **3D, Point Clouds & Reality Data:** Orbit 3DM, CloudCompare, point clouds, reality meshes, 360 imagery, C2C/M3C2, registration, and OBJ/3SM/3MX workflows
- **AI / EO / Computer Vision:** Python/PyTorch, Ultralytics, YOLOv8/YOLOv8-seg, U-Net++/EfficientNet, ResNet18, ArcGIS pretrained models, masks, polygonization, and classification
- **Programming, DevOps & Tools:** Python, PHP, JavaScript, SQL, C++, Git, Postman, Nginx, Node.js/pnpm, WebStorm/VS Code/PhpStorm, Figma, and QGIS plugin development

CERTIFICATIONS

- **AI, Python & Remote Sensing:** Complete Python Based Image Processing and Computer Vision | Remote Sensing Basics in Python and Colab | Survey of Python for GIS Applications | Data Structures and Algorithms in Python (DSA)
- **GIS, Web GIS & PostGIS:** Enterprise GIS Made Easy | QField Quickstart | Display and Analyze GIS Data on the Web with Leaflet | Server-side Web GIS Applications with Leaflet and PostGIS | Spatial SQL with Postgres: A Language for Geographers | Mobile GIS and Mapping Applications with Leaflet
- **Databases & Data Quality:** Understanding Data Quality and Reference Data Management | Database Design and Management
- **Web Development:** Web Engineering with PHP | PHP - Advanced Features | Building a Chat System in AJAX & PHP | Angular Fast Crash Course
- **Project / Management:** A Beginners Guide to Project Management Essentials

EDUCATION

- **Master of Science in Computer Science (MCS)**, Lahore Leads University (2013-2015)
- **Master of Science in Geographic Information Systems (MSc GIS)**, Punjab University Lahore (2009-2011)
- **Bachelor of Commerce in Information Technology (B.Com IT)**, Islamia University Bahawalpur (2007-2009)