Gamze Gül MUNGAN

Geospatial Data Specialist | AI Reliability Auditing & Spatial Analysis
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RESEARCH INTERESTS

Empirical reliability auditing of deployed AI and GeoAI systems · Evaluation methodologies for high-stakes geospatial decision-making · Human-oversight design for AI-assisted mapping · Data quality and ground-truth verification in data-scarce environments

PROFESSIONAL SUMMARY

Geospatial specialist who measures whether deployed AI systems can be trusted in high-stakes, real-world decisions. Recently completed an independent, instance-level reliability audit of a commercial GeoAI building-extraction system (Abuja, Nigeria), quantifying the gap between aggregate coverage and per-building reliability and ground-truthing failure modes with street-level imagery. Background of 10+ years inside safety-critical geospatial decision pipelines — flood-propagation modeling (TÜBİTAK), geothermal exploration, municipal utility networks, and multi-country critical-infrastructure integration — with a consistent focus on data integrity, validation, and decision-support quality. Python (GeoPandas/Shapely) applied in reliability analysis; actively deepening ML and coding foundations.

INDEPENDENT RESEARCH

AI Reliability Audit of a Deployed GeoAI System — Independent Study | 2026

*Designed and executed an **instance-level accuracy audit** of AI-generated building footprints (Mapflow.ai) against OpenStreetMap reference data over a defined 4.28 km² study area in Abuja, Nigeria.

*Built a **greedy one-to-one spatial matching** pipeline (IoU-based) in Python/GeoPandas; quantified recall (56.4%), geometric agreement (mean IoU 0.458), and positional offset (mean 6.03 m), with full IoU-threshold **sensitivity analysis**.

***Ground-truthed a false-positive misclassification** (concrete infrastructure labeled as buildings) via street-level imagery demonstrating that overhead-only verification is insufficient for oversight design.

*Authored a technical report positioning findings against **NIST AI RMF** and **EU AI Act Annex III** requirements; analysis code and data reproducible on request.

SKILLS

Spatial Analysis & Reliability Metrics	Remote Sensing
Geodatabase Management & Data Integrity	Utility Network Mapping (Water & Sewer)
Cartography & Map Design	Field Work & Ground-Truth Verification

•**Technical Skills;** ArcGIS Pro, QGIS, Python (GeoPandas/Shapely — applied in reliability analysis; actively developing), spatial statistics (IoU, recall, threshold sensitivity), Geodatabase Domains & Attribute Rules, Raster Processing & Remote Sensing, GPS & Engineering Drawing Interpretation

EXPERIENCES

GIS Specialist & Sub-Team Lead – Tomkulak Consortium (Remote, Voluntary Work) | September 2024 – May 2025

*Led GIS sub-teams on the **ASEAN Energy Grid Integration Project**, harmonizing national energy-infrastructure datasets of all **10 ASEAN member states** into a coherent regional framework.

*Designed and executed **multi-criteria spatial suitability analyses** for critical-infrastructure siting in **Antarctica** (energy, logistics, communications, scientific facilities), integrating environmental, logistical, regulatory, and sustainability constraints.

*Processed OpenStreetMap & DEM data in ArcGIS Pro for energy flow-path modeling; produced decision-ready maps used for system-level regional comparison.

*Prepared weekly data-quality reports and ensured topology integrity across all utility datasets.

Project Assistant for EU Funded Projects, Aegean Exporters' Associations, Izmir | September 2021 – April 2025

*Supported an EU-funded OHS project for the natural stone mining sector to reduce workplace accidents.

*Coordinated digital product marketing and sustainability activities for industrial exports.

*Built strong stakeholder relations across mining industry networks.

*Increased project outreach and awareness, reaching **100+ industry members** through training and visual materials.

GIS Expert, Menderes Municipality, Izmir | February 2015 – August 2019

*Developed and maintained the municipal GIS infrastructure under the "Tek Tuşla Menderes" project.

*Digitized and validated **water and sewer networks**, ensuring schema compliance and topology accuracy.

*Designed geodatabases with domain and attribute rule validation, achieving full data integrity.

*Ensured real-time data access for **10+ municipal departments**, reducing reporting time by **30%**.

*Enhanced public service efficiency by improving decision-making tools.

GIS Expert, Hitay Energy Holdings | April 2013 – December 2014

*Managed GIS database of **6 geothermal fields in Indonesia**.

*Conducted spatial analyses and created decision-support maps in ArcGIS.

*Collaborated with international energy teams on geothermal exploration.

*Accelerated project planning by delivering high-accuracy exploration maps.

GIS Expert, Izmir Institute of Technology, İzmir | February 2012 – April 2013

*Contributed to a **TÜBİTAK** project on **flood-propagation modeling** after simulated Ürkmez Dam failure — validation of model outputs feeding directly into flood-risk decision scenarios.

*Performed digitization, spatial analysis, and hydrological modeling using ArcGIS.

*Developed maps representing topography and infrastructure for flood risk scenarios.

*Improved **model validation** through detailed GIS-based visualizations.

ArcGIS Trainer & GIS Technical Support Specialist, ESRI Türkiye, Ankara | April 2010 – April 2011

*Delivered beginner and advanced ArcGIS training to private and public institutions.

*Guided participants with practical exercises in ArcGIS and QGIS.

*Provided instruction on data input, map creation, spatial analysis, and geoprocessing.

*Trained **200+ professionals**, enhancing institutional GIS capacity across Türkiye.

EDUCATION

Bachelor's Degree, Dokuz Eylul University, Geological Engineering, 2003 – 2008

LANGUAGES

Turkish – Native

English – B2 (Upper-Intermediate), Fluent in technical and project communication

PROJECTS

*AI Reliability Audit of GeoAI Building Extraction, Independent Research, Abuja, Nigeria, 2026 (see Independent Research)

*Mesleğim Elimde Project, EU Promoting of Lifelong Learning In Turkey Program, Sept 2016 – Aug 2019

*Two-dimensional numerical modeling of flood wave propagation in an urban area due to Ürkmez Dam-break, Izmir, Turkey, TUBITAK, Izmir Institute of Technology, Oct 2012 – Apr 2013

*Development of Gülbahçe Geothermal Resource Project, Izmir Development Agency, Feb 2012 – Oct 2012

PUBLICATIONS

*Uzelli, T., Baba, A., Mungan, G. G., Dirik, R.K., Sözbilir, H. (2017). Conceptual model of the Gülbahçe geothermal system, Western Anatolia, Turkey: based on structural and hydrogeochemical data. **Geothermics**, 68, pp. 67-85. doi: 10.1016/j.geothermics.2017.03.003

*Filiz F., G., Baba, A., Mungan G.G. (2018). Radon in Geothermal Fluid and its Effects: Case Study: Western Anatolia. Conference presentation, 23.04.2018.

*Uzelli, T., Baba, A., Mungan, G. G., Sözbilir, H. (2014). Structural Controls on Gülbahçe Geothermal System and Its Hydrogeochemical Properties (Western Turkey). Conference presentation, 13-17 October 2014.

*Baba, A., Mungan, G.G., Tarcan, G., Sözbilir, H. (2012). Hydrogeochemical properties of Gülbahçe (Urla-Izmir) Geothermal System, Karaburun Peninsula, western Turkey. Conference proceedings, 1-5 October 2012, Izmir, Turkey, p.219.

**Selected Publications available upon request*

SCIENCE COMMUNICATION

*Produce public technical content on GIS and GeoAI reliability (YouTube & LinkedIn), including a documented walkthrough of the Abuja building-extraction comparison that seeded the independent research above.