

Reza Safarzadeh

Spatial Data Scientist | GIS Specialist

+1 (403) 708-5652 | reza.sz70@gmail.com | safarzadeh-reza.github.io | linkedin.com/in/safarzadehreza | Location: Calgary

PROFILE

Spatial data scientist with 8+ years delivering geospatial analytics and decision-support products across financial services and logistics. Builds production-grade spatial workflows from raw data to risk mapping, forecasting, and optimization using Python, PostgreSQL/PostGIS, and open-source GIS tools. Experienced translating complex spatial analyses into stakeholder-ready dashboards and actionable business insights.

EXPERIENCE

Aviva Canada

Spatial Data Scientist

Calgary, Canada

May 2026 - Present

- Developing probabilistic wildfire ignition and spread models using **XGBoost, GAMs, and ensemble decision trees** over high-dimensional feature spaces (climate reanalysis, fuel moisture, topographic gradients, human-activity proxies); models estimate ignition likelihood and burn probability at the **property and community level** for catastrophe-risk pricing.
- Building spatiotemporal hazard prediction pipelines in **Python (Scikit-learn, XGBoost, GeoPandas, Rasterio)** and **PostGIS** that fuse multi-resolution raster and vector inputs into parcel-level risk scores, replacing coarse postal-code segmentation with continuous hazard surfaces.
- Designing property-vulnerability scoring frameworks that combine structural exposure attributes with modelled fire intensity to quantify expected loss severity; outputs feed directly into underwriting risk tiers and portfolio-level accumulation analysis.
- Implementing dynamic-programming-based fire spread simulation to estimate community-scale burn scenarios under varying wind, fuel, and suppression assumptions; simulation outputs serve as synthetic training labels and validation benchmarks for the ML pipeline.
- Establishing model validation workflows with spatially stratified cross-validation, out-of-sample lift analysis against historical claims and existing catastrophe-model outputs, and geographic bias diagnostics to ensure predictive robustness across heterogeneous landscapes.

University of Calgary

Postdoctoral Researcher

Calgary, Canada

Jan 2026 - May 2026

• Geospatial Data Pipeline Development | City of Calgary

- Built an end-to-end spatial data pipeline to transform **180M+ GPS records** into analysis-ready features (map matching, stop detection, trip segmentation); automated data QA and reproducible processing in **Python and SQL/PostGIS**.
- Created spatial risk metrics and exposure indicators by applying density-based clustering (**DBSCAN**) on citywide movement data; produced interpretable cluster features used in downstream risk and routing analysis.
- Developed a spatiotemporal traffic forecasting model (**GCN+GRU**) to predict link-level traffic conditions; achieved **9.86** RMSE on a holdout week, supporting time-sensitive decision inputs.
- Delivered an interactive planning dashboard using **ArcGIS Dashboards** plus a **Flask API and web maps (Leaflet, Mapbox GL JS)**, enabling corridor drilldowns, scenario comparison, and stakeholder-facing decision support.
- Communicated model results and spatial findings to both technical teams and non-technical stakeholders through presentations, reports, and interactive visualizations.
- **Related:** [IJGIS paper](#), [ACM SIGSPATIAL paper](#), [Demo](#).

• Fleet Optimization & Spatial Modelling | Bison Transport and Suncor Energy

- Designed a spatial optimization framework using a reinforced genetic algorithm with neighborhood operators; reduced pilot transportation costs and fuel use by about **20%** compared to past operations.
- Built a hybrid solver combining bipartite assignment with deep learning for vehicle routing and scheduling; reduced total travel distance by about **10%** and delivery delays by about **33%** in simulation scenarios.
- Developed the **Smart Route** web dashboard using **ArcGIS Online, ArcGIS Dashboards, ESRI Experience Builder**, to operationalize what-if tradeoffs (cost, emissions, service levels) for partner teams.
- **Related:** [TGIS paper](#), [NRC feature](#).

PARSA Co. (FANAP ICT Group)

Spatial Data Scientist & Team Lead

Tehran, Iran

2018 - 2021

- Built a national-scale GIS optimization framework for **ATM placement and servicing** using spatial analysis and meta-heuristics; improved average ATM performance by about **15%** across regions.
- Designed and implemented a **PostgreSQL/PostGIS** geodatabase architecture supporting **15,000+ locations**; enabled scalable spatial KPI monitoring, exposure mapping, and scenario-based decision support.

- Developed demand forecasting models using **LSTM, CNN, and GCN** with spatial, temporal, and demographic features; improved forecasting accuracy by about **20%** versus the prior baseline.
- Implemented optimization workflows for cash dispatching and replenishment; reduced operational cost by **12%** while improving service reliability.
- Led the development of a real-time GPS tracking and fleet analytics system using **Flask, GeoServer, Java, and JavaScript**, supporting real-time monitoring for about **150 to 200 vehicles** (live tracking, trip playback, driver-behavior reporting).
- Led and mentored a team of **4** GIS professionals, setting delivery standards for spatial modeling, QA, and production releases.

AvayarSanat Co.
GIS Specialist

Tehran, Iran
2017 - 2018

- Produced **10+** thematic cartographic map products for planning projects using **ArcGIS Pro and QGIS**, improving map readability for stakeholder decision-making.
- Consolidated **20+** heterogeneous spatial datasets into a centralized **PostgreSQL/PostGIS** database, improving interoperability and reducing duplicate data handling.

TECHNICAL SKILLS

- **GIS Platforms & Mapping:** QGIS, ArcGIS Pro, ArcGIS Online, ArcGIS Dashboards, GeoServer, web mapping with JavaScript, Leaflet, Mapbox GL JS, cartographic design, REST APIs.
- **Databases & Data Engineering:** PostgreSQL/PostGIS, spatial ETL, large dataset processing, automated pipelines, data quality checks, reproducible experimentation, Git.
- **Programming & Machine Learning:** Python (Pandas, GeoPandas, Scikit-learn, PyTorch, TensorFlow), SQL, spatiotemporal forecasting (GCN, GRU, LSTM, CNN), feature engineering, model validation.
- **Geospatial Analytics:** Spatial risk assessment, exposure analysis, trajectory analytics (map matching, stop detection, trip segmentation), road-network analysis, spatial clustering (DBSCAN), spatial statistics.

EDUCATION

University of Calgary
PhD. | Geomatics Engineering - Geospatial Information Science (GIS)
Focus: AI-driven spatial optimization, machine learning for transportation systems, and intelligent decision support tools

Calgary, Canada
2021 - 2025

K. N. Toosi University of Technology
MSc. | Geomatics Engineering - Geospatial Information Science (GIS)

Tehran, Iran
2013 - 2017

Iran University of Science and Technology
BSc. | Geomatics Engineering

Tehran, Iran
2009 - 2013

HONORS/AWARDS

Alberta Innovates Graduate Student Scholarships Award, Alberta Innovates
Esri Student of the Year Award, Esri Canada Centre of Excellence (ECCE)
Lab2Market Alberta Mitacs Business Strategy Award, Lab2Market and Mitacs
Alberta Machine Intelligence Institute (Amii) Talent Award, Alberta Machine Intelligence Institute (Amii)

2025
2022
2024
2023