REZA SAFARZADEH

Calgary, AB, T2P5M5 │ +1 (403) 708-5652 │ reza.safarzadeh@ucalgary.ca │ LinkedIn │ Homepage

Ph.D. student at the Department of Geomatics Engineering, University of Calgary, Canada, specializing in spatial data science. A spatial data scientist with a robust track record in crafting innovative AI algorithms and logistics solutions, including smart route recommendation systems. Backed by four years of hands-on experience in data analysis roles, consistently leveraging geospatial data to extract valuable insights that drive informed decision-making.

EDUCATION

PhD University of Calgary, Geomatics Engineering   Ongoing
Dissertation: "Smart Route Recommendation for Goods Transportation Under Extreme Weather Conditions"
Advisor: Prof. Xin Wang

MS K. N. Toosi University of Technology, Geomatics Engineering   May 2017
Thesis: "Optimization of Urban Land use allocation using meta-heuristic algorithms and spatial metrics"
Advisor: Prof. Mohammad Karimi

BS Iran University of Science and Technology, Geomatics Engineering   May 2013

HONORS AND AWARDS

Evolve to Innovate (e2i) 23-24 Research Funding Award   **2023**
Issued by Innovate Calgary
The e2i program is a transformative initiative that offers researchers a pioneering avenue for the conversion of successful research outcomes into tangible and practical solutions. It encourages researchers to explore uncharted territories, paving the way for groundbreaking innovations and meaningful contributions to various fields.

Alberta Machine Intelligence Institute (Amii) Talent Bursary Award   **2023**
Issued by Amii
Amii Talent Bursary awards are designed to empower emerging research talent and industry professionals within the field of AI, fostering growth and innovation.

Student of the Year Award   **2022**
Issued by Esri Canada Centre of Excellence
The Esri Canada Centre of Excellence (ECCE) acknowledges exceptional GIS students who align with its mission and vision and offers the opportunity for them to be nominated as Student of the Year. The ECCE designation is given to leading university departments that inspire students to create custom GIS applications using the ArcGIS platform.

International Graduate Student Award   **2021**
Issued by University of Calgary
The International Graduate Student Award scholarship acknowledges both outstanding academic achievements and significant international contributions to research and studies.

Best Demo Paper Award   **2023**
Issued by 18th Symposium on Spatial and Spatio-Temporal

Best Paper Publication Award   **2017**
Issued by 2nd National Conference on Geospatial Information Technology (NCGIT)

RESEARCH AND WORK EXPERIENCE

Postgraduate Researcher   **2021 – Present**
University of Calgary
Main responsibilities:
- Developing Deep Learning-based algorithm for traffic forecasting across city roads
- Developing Reinforcement Learning algorithm for personalized smart route planning
- Developing Deep Reinforcement Learning-based algorithm for data-driven truck trajectory map matching
- Performing spatial trajectory analysis of truck drivers' behavior and drivers route choice prefrence modeling

Skills achieved:
Python programming (PyTorch, TensorFlow, CUDA, SciPy, scikit-learn, GeoPandas, Shapely, GeoPy, NetworkX, etc.), ESRI Products (ArcGIS Desktop, ArcGIS Pro, ArcGIS Server, ArcSDE), QGIS, PostgreSQL (PostGIS extension), MSSQL Server

Spatial Data Scientist   **2018 to 2021**
PARSA Co. (FANAP ICT Group), Tehran, Iran
Main responsibilities:
- Developing Deep Learning based model (LSTM-CNN) for time series prediction for ATM demand prediction
- Designed and implemented a GPS tracking server and fleet management system, providing real-time vehicle positioning on a map, along with detailed mission reports, fuel consumption rates, speed limits, and other requested information.
- Developed a real-time route planning service for replenishment vehicles, utilizing Python and various packages such as NetworkX, Shapely, SciPy, Scikit-learn.
- Designed and implemented a GIS-based approach for identifying suitable locations for establishing Automated Teller Machines (ATMs) and optimizing the ATM network.
- Employed spatial and statistical models, ArcGIS, QGIS, ArcGIS Model Builder, and Python scripting. Utilized PostgreSQL for data storage and PostGIS for spatial queries.

Skills achieved:
Spatial Vehicle Movement Analysis, Trajectory Analysis, Clustering, Spatial Computing, Python programming (Packages: Pandas, NumPy, PyTorch, TensorFlow, NetworkX, Shapely, SciPy, Scikit-learn, etc.), JavaScript, HTML, CSS, ESRI Products (ArcGIS Desktop, ArcGIS Pro, ArcGIS Server, ArcSDE), QGIS, PostgreSQL, Flask, Django, GeoServer, MapServer, MapBox.

Spatial Data Analyst   **2017 to 2018**
AvayarSanat, Tehran, Iran
Main responsibilities:
- Developing interactive web-based maps with seamless navigation and multiple layer overlays, integrating spatial analysis tools for in-depth geospatial analysis.

- Demonstrated expertise in geospatial data management by effectively overseeing geodatabases and feature datasets in both ArcGIS and QGIS, guaranteeing data precision, accessibility, and seamless integration into diverse projects.
- Producing precise georeferenced imagery and maps, meeting specific requests, while contributing to data enrichment through digitization using ESRI products software.
- Performing research and giving contributions and feedback to improve the outcome of the team. Preparing comprehensive reports of the progress of the work.

Skills achieved:
Geospatial Analysis, Spatial Data Management, Georeferenced Imagery and Mapping, Skilled in working with a range of geospatial software and tools, including ESRI Products (ArcGIS Desktop, ArcGIS Pro, ArcGIS Server, ArcSDE), QGIS, PostgreSQL, MSSQL Server, and AutoCAD

TEACHING EXPERIENCE

University of Calgary, Calgary, Alberta, Canada   Sep 2023 to Dec 2023
Instructor, Schulich School of Engineering
Responsibilities:
- Instructed "Programming with Data (ENDG 233)" an undergraduate course with an average of 70 students per semester, focusing on the Python programming language.
- Coordinated active learning sessions, featuring live coding during lectures and tutorial examples.
- Administered quizzes, exams, and assignments to assess student understanding and progress.
- Oversaw grading and laboratory activities with the support of a team of 4 teaching assistants.

University of Calgary, Calgary, Alberta, Canada   Sep 2023 to Dec 2023
Teaching Assistant, Geomatics Engineering
- Served as a teaching assistant for the undergraduate course "Geomatics Engineering Design and Communication (ENDG 401)" at the University of Calgary, working with an average of 40 students per semester.
- Facilitated instruction and guidance in the design and implementation of GIS systems and maps, utilizing surveying data.
- Developed course-specific assignments in alignment with the curriculum.
- Conducted tutorials on software design and technologies.
- Offered dedicated support to students in problem-solving and skill development.

PUBLICATIONS

Journal Publications

Kalantari, S., **Safarzadeh, R**., Wang, Y., Sun, S. and Wang, X., 2023. Trailer allocation and truck routing using bipartite graph assignment and deep reinforcement learning. Transactions in GIS.

Safarzadeh, R., Karimi, M. and Alaei, S., 2018. Multi objective optimization of urban land use allocation using meta-heuristic algorithms and spatial metrics. Journal of Geomatics Science and Technology, 7(3), pp.189-212.

Journal Papers in Review

> **Safarzadeh, R**., Wang, X., "Multi Intention Deep Inverse Reinforcement Learning for Map Matching on Low Sampling Rate Truck GPS Trajectories," Submitted to: International Journal of Geographical Information Science (IJGIS).

Conference Papers
(Peer-Reviewed)

> **Safarzadeh, R**., Wang, Y., Sun, S. and Wang, X., 2023, August. An Interactive Map-based System for Visually Exploring Goods Movement based on GPS Traces. In Proceedings of the 18th International Symposium on Spatial and Temporal Data (pp. 180-184).

> **Safarzadeh, R**., Mozhdehi, A., Kalantari, S., Wang, Y., Sun, S. and Wang, X., 2022, November. Multi-task graph neural network for truck speed prediction under extreme weather conditions. In Proceedings of the 30th International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL) (pp. 1-11).

(Abstract-Reviewed)

> **Safarzadeh, R**, Yunli Wang, Sun Sun, and Xin Wang. "Spatial and Temporal Truck Travel Pattern Analysis Using a Large Stream of GPS Data." Transportation Association of Canada 2023 Conference and Exhibition-Lessons and Leadership. 2023

> Bahrehdar, R, **Safarzadeh, R**, Kim, B.S.S, Yunli Wang, Sun Sun, and Xin Wang. "The Impact of Extreme Weather Condition on the Transportation System in Calgary" Transportation Association of Canada 2023 Conference and Exhibition-Lessons and Leadership. 2023

> Kim, B.S.S., **Safarzadeh, R**. and Wang, X., 2023. Quality Assessment of the OpenStreetMap Road Network in Calgary, Alberta. Abstracts of the ICA, 6, p.124.

PRESENTATIONS AND INVITED LECTURES

Paper Presentation:
- "Spatial and Temporal Truck Travel Pattern Analysis Using a Large Stream of GPS Data", Transportation Association of Canada 2023 Conference and Exhibition-Lessons and Leadership. 2023
- "The Impact of Extreme Weather Condition on the Transportation System in Calgary", Transportation Association of Canada 2023 Conference and Exhibition-Lessons and Leadership. 2023
- "An Interactive Map-based System for Visually Exploring Goods Movement based on GPS Traces", 18th International Symposium on Spatial and Temporal Data. 2023
- "Multi-task graph neural network for truck speed prediction under extreme weather conditions", 30th International Conference on Advances in Geographic Information Systems(ACM SIGSPATIAL)

Workshop:
- "Truck Traffic Prediction under extreme weather condition", Canada National Research Center (NRC) AI for Logistics (AI4L) Conference, 2023
- "Spatial-Temporal Truck movement Analysis", Canada National Research Center (NRC) summer student workshop, 2022

Member of Iran's National Elites Foundation, (2018-2020)
- Contributed to the development of comprehensive roadmaps for nationwide projects and conducted research bridging the gap between academia and industry.

Vice President Academic of the Geomatics academic committee, Iran University of Science and Technology, (2011-2012)
- Collaborated with fellow committee members to conceive and execute initiatives and programs dedicated to enhancing the academic journey of our students.

PROFESSIONAL SERVICE

Peer-Reviewed Articles for:
- ISPRS International Journal of Geo-Information (IJGI) - 2023
- 27th Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD) - 2023
- 26th Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD) - 2022
- ACM Transactions on Knowledge Discovery from Data - 2021

VOLUNTARY EXPERIENCES

- Multiple leadership experiences such as supervision, teaching, and mentoring at the University of Calgary (2021 - current)
- Help organizing the 18th International Symposium on Spatial and Temporal Data, Calgary, Alberta, Canada, 2023
- Awards Committee Member at Graduate Students' Association, University of Calgary (2022 - 2023)
- Student Associate at Esri Canada GIS Centers of Excellence (2021 - 2023)
- Mentoring Grade 11 students in Applied Science course (2021 - 2022)
- Help organizing the 1st National Conference on Geospatial Information Technology, Tehran, Iran, 2017

LANGUAGES

Persian: Native Language
English: Fluent Listener, Fluent Speaker, Advanced Reading and Writing

COMPUTER SKILLS

Programming Languages: Python (CUDA, TensorFlow, PyTorch, Scikit-learn, NetworkX, Shapely, SciPy, Geopandas), Java, MATLAB

Web Programming: HTML, CSS, JavaScript, PHP, Django, Flask, D3.js, Google Maps, OpenLayers, Leaflet, MapServer, GeoServer, ArcGIS Server

Database: MySQL, PostgreSQL, PostGIS

Software: ESRI Products (ArcGIS Desktop, ArcGIS Pro, ArcGIS Server, ArcSDE), Quantum GIS, GRASS, GDAL, Many Python-based GIS packages

OTHER

Interests and Hobbies:
- Enthusiastic about playing ping pong, squash, and tennis.
- Passionate about watching movies and series in my leisure time.

REFERENCES

Dr. Xin Wang, Professor
Department of Geomatics Engineering
Schulich School of Engineering
University of Calgary
2500 University Drive NW
Calgary, Alberta T2N 1N4
Tel: (403)220-3355
Email: xcwang@ucalgary.ca

Dr. Mohammad Karimi, Professor
Department of Geomatics Engineering
K. N. T. University of Science and Technology
No. 1346, Vali-asr Ave, Mirdamad Cross
Tehran, Iran
Email: mkarimi@kntu.ac.ir

Dr. Yunli Wang, PhD
Senior Research Officer
Digital Technology Research Centre
National Research Council Canada
1200 Montreal Rd
Ottawa, ON, K1A 0R6
Email: yunli.wang@nrc-cnrc.gc.ca