Mohammad Aghdami-Nia

Curriculum Vitae

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Professional Summary

Geospatial data scientist with expertise in remote sensing data processing, GIS, and geospatial analysis. Experienced in developing scalable solutions for land cover mapping, change detection, and big data processing. Proficient in Python, deep learning, and high-performance computing. Skilled in working with various remote sensing data types especially LiDAR and optical.

Skills & Technologies

Coding:	Python (main), MATLAB, JavaScript, R
Packages:	TensorFlow (main), PyTorch, GDAL, Rasterio, GeoPandas, Fiona, Shapely, LASpy, h5py, Matplotlib
Programming:	Version Control (Git), Machine Learning, Parallel Processing
Remote Sensing:	LiDAR (point cloud: NEON, TLS – waveform: LVIS, GEDI), Optical (Landsat, Sentinel-2, MODIS, PlanetScope), SAR (Sentinel-1), DEM (SRTM, 3DEP)
Platforms:	Linux (Ubuntu), Google Earth Engine (GEE), Google Colab
Software:	QGIS, ArcGIS Pro, Microsoft Office, Mendeley

* Code examples on my GitHub (github.com/mo-agh).

Experience

Research Assistant – GEDI Science team, University of Maryland Aug 2023 – Present

- Conducted biomass loss analysis using Landsat-8 and LiDAR data fusion with machine learning regression.
- Developed a machine learning approach to detect outliers in forest height estimates from LiDAR data, achieving 96% accuracy.
- Created a global map of gaps in GEDI LiDAR data using Uber's H3 indexing system.
- Designed a framework to improve ground detection in LiDAR data using a convolutional neural network, enhancing ground detection accuracy by 8%.
- Developed a Python tool for generating crossovers between LiDAR sensors, utilizing parallelization to efficiently process large datasets.
- Mapped changes in forest canopy height in Gabon using LiDAR data, with the mean and standard deviation of canopy height change being 0.7 and 3.7 meters, respectively.
- Corrected GEDI LiDAR data for slope using Airborne Laser Scanning (ALS) ground truth data.
- Simulated data for NASA's upcoming spaceborne LiDAR mission, EDGE, using Airborne Laser Scanning (ALS) data.
- Identified optimal ground tracks for data collection of NASA's GEDI LiDAR sensor onboard the International Space Station (ISS).

Research Assistant – University of Tehran Sep 2020 – Feb 2023

- Developed an emulator for MODTRAN radiative transfer model using a deep learning autoencoder, achieving an R^2 of 98.23%, a 3.16% improvement over Random Forest.
- Enhanced the performance of the standard U-Net deep learning model by modifying its architecture, achieving an 8.95% improvement in classification accuracy.
- Designed an accurate automated framework for extracting coastlines from sea-land classification maps of Landsat satellite images.
- Mapped flooding on SAR images using U-Net and X-Net deep learning models, with U-Net improving Jaccard classification accuracy by 2.97%.
- Developed an automated framework for active fire detection using deep learning, achieving an F1-score of 91.62%
- Mapped urban changes from high-resolution aerial images using transfer learning and a Siamese Neural Network, improving the accuracy by 12.43%.
- Classified land cover land use using hyperspectral remote sensing data.

* Maps and visualizations on my website (mo-agh.github.io).

Selected Certifications

GIS & RS:	Introduction to GIS Mapping (Coursera)	2021
	Applied Plotting, Charting & Data Representation in Python (Coursera)	2022
ML & AI:	Neural Networks and Deep Learning (Coursera)	2021
	Custom and Distributed Training with TensorFlow (Coursera)	2021

* Full list on my LinkedIn (link).

Education

M.Sc. in Geographical Sciences, University of Maryland, MD, USA	Aug 2023 – Present
M.Sc. in Remote Sensing Engineering, University of Tehran, Tehran, Iran	Sep 2020 – Feb 2023
B.Sc. in Geomatics Engineering, University of Tabriz, Tabriz, Iran	Sep 2016 - Aug 2020

Selected Publications

Mohammad Aghdami-Nia, Reza Shah-Hosseini, Amirhossein Rostami, Saeid Homayouni
"Automatic coastline extraction through enhanced sea-land segmentation by modifying Standard U-Net", (link)

Mohammad Aghdami-Nia, Reza Shah-Hosseini, Mohammad Salmani
"Effect of Transferring Pre-Trained Weights on a Siamese Change Detection Network", (link)

* Full list on my Google Scholar (link).

Honors & Awards

Research Assistant for NASA's Global Ecosystem Dynamics Investigation (GEDI) LiDAR Space Mission.
Awarded a full scholarship to pursue a M.Sc. at the University of Tehran

About

Language	Azerbaijani (mother tongue), Persian (national), English (IELTS score 8/9)
References	Available upon request.
Sponsorship	Eligible to work without visa sponsorship.