





Keyhan Gavahi


Geospatial Data Scientist


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 kgavahi

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SUMMARY

Highly skilled geospatial data scientist with over 7 years of experience in ML/DL. Possess expertise in working with large volumes of remote sensing data, totaling over 100TB during my Ph.D. Proficient in developing advanced Deep Learning and Machine Learning models to analyze, assess, and predict spatiotemporal patterns within remote sensing data. Leveraging a Master's degree in Computer Science along with specialized knowledge in hydrology and water resources, I effectively bridge the gap between these two realms.

PROJECTS

Precipitation Data Fusion Through Deep Learning

- Developed a DL framework for Spatiotemporal data fusion of 7 satellite precipitation products over CONUS.
- The fused product improved the accuracy by 30%.

DeepYield: Crop Yield Forecasting using Deep Learning

- Using 20 years of MODIS images as inputs, developed a combined 3DCNN and ConvLSTM architecture to forecast crop yield over 1836 counties in the US.
- DeepYield significantly outperformed competing approaches including Decision Trees, CNN + GP, and CNN-LSTM.

Downscaling SMAP Data Over CONUS using Random Forest

- Developed and operationalized a python package to downscale SMAP soil moisture data from 36km to 1km spatial resolution.
- The package automatically downloads, preprocess, and postprocess remotely sensed data from multiple sources to downscale SMAP over CONUS in minutes.

Data Assimilation of Remotely Sensed Data for Drought Monitoring

- Developed a fully parallelized framework using a novel parallel divide-and-conquer algorithm to assimilate two remotely sensed datasets, SMOPS, and MODIS16 ET, into the VIC land surface model. The final paper is featured on NOAA's CPO website.
- The Evolutionary Particle Filter algorithm which is based on Sequential Bayesian theory was employed and significantly improved the performance of the DA approach.

AWARDS

- Graduate Council Fellowship from the Graduate School of the University of Alabama
- Best presentation award from the AGU Precipitation Committee
- Featured in Pillar Two: Prominence story of the University of Alabama Rising Tide fundraising campaign
- Graduate Research Studentship (GRS) - System Design Engineering Department, University of Waterloo
- Top student among 95 graduate students of the Department of Civil and Environmental engineering, AmirKabir University of Technology

SELECTED PUBLICATIONS

- K. Gavahi* and co-authors (2023). A deep learning-based framework for multi-source precipitation fusion. Remote Sensing of Environment (Accepted).
- K. Gavahi* and co-authors (2022). How does precipitation data influence the land surface data assimilation for drought monitoring? Science of the Total Environment.
- K. Gavahi* and co-authors (2021). DeepYield: A combined convolutional neural network with long short-term memory for crop yield forecasting. Expert Systems with Applications.
- K. Gavahi* and co-authors (2020). Multivariate assimilation of remotely sensed soil moisture and evapotranspiration for drought monitoring. Journal of Hydrometeorology.

EDUCATION

Ph.D. in Civil and Environmental Engineering (GPA: 4.0)

University of Alabama

2019 - 2023

M.Sc. in Computer Science (GPA: 4.0)

University of Alabama

2021 - Aug 2023

M.Sc. in Civil and Environmental Engineering (GPA: 4.0)

AmirKabir University of Technology

2015 - 2018

B.Sc. in Civil and Environmental Engineering (GPA: 3.7)

Shiraz University

2010 - 2014

SKILLS

Technical

Python: (Tensorflow, PyTorch, Keras, OpenCV, Scikit-Learn, Xarray, Numpy, Pandas, h5py, Pyhdf, Matplotlib, Seaborn, Geopandas, Rasterio, Multiprocessing)

ArcGIS/QGIS, arcpy MATLAB C/C++

Bash SLURM

Analytical

Machine Learning Deep Learning

Remote Sensing Object Detection

High-Performance Computing

Clustering and Classification

Regression Statistical Analysis

Time-series Forecasting Image Processing

Bayesian Modeling Data Assimilation

COURSEWORK

Data Science Advanced Deep Learning

Deep Learning & Process Modeling

Computer Algorithms

High-Performance Computing

Programming Languages