Mostafa Riazi | CV

📍 Laleh Shomali Blvd, Isfahan, Iran

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Google Scholar ● ℝᴳ ResearchGate ● in LinkedIn

Skills

- Proficient in **Python programming language** and its data analysis libraries such as Numpy, Pandas, Matplotlib, Seaborn, etc.
- Proficient in **Hydrologic Modeling** of the watersheds using a) the **SWAT** (Soil and Water Assessment Tool) model used for hydrological processes simulation, agricultural conservation practices, best management practices (BMPs), climate change modeling, water quality modeling, b) IHACRES (Identification of unit Hydrographs and Component flows from Rainfall, Evaporation and Streamflow data) model, and c) machine learning models, etc.
- Skilled in **Machine Learning modeling** using Scikit-learn and Keras for building models such as Tree-based algorithms, Boosting-based algorithms, K-Nearest Neighbors (KNN), Artificial neural networks (ANN), Long short-term memory (LSTM), Convolutional neural network (CNN), etc.
- Expertise in using **Geospatial Science tools** such as Geospatial Data Abstraction Library (GDAL), Rasterio, GeoPandas, and Whitebox for spatial data analysis and processing
- Proficient in using **Google Earth Engine (GEE)** for Image Analysis, Geospatial Analytics, Temporal Analysis, Machine Learning modeling implementation, Data Visualization, etc.
- Experienced in **climate change** assessment procedures including downscaling and bias correction procedures and exporting data from NetCDF files

Research interests

- Hydrological/ Hydrogeological processes assessment (quality and quantity)
- Climate change impact evaluation
- Spatial and spatio-temporal natural hazards analysis
- Remote sensing (RS) applications
- Watershed management and BMPs
- Change detection using Machine Learning and RS

Education

- M.Sc. in Civil Engineering, Water Resources Management, Islamic Azad University (IAU) (Sep. 2019 -Jan. 2023) of Khomeini Shahr Isfahan, Iran (#2 in Best Uni in Iran, US News), GPA: 4/4 (i.e. 19.47/20) Thesis topic: Evaluation of a watershed hydrology using three types of hydrologic modeling approaches
- B.Sc. in Agricultural Engineering; Water, Imam Khomeini International University (Sep. 2012 -Sep. 2016) Qazvin, Iran

Publications

- ❖ Published
  - M.Riazi, et al., **Enhancing flood susceptibility modeling using multi-temporal SAR images, CHIRPS data, and hybrid machine learning algorithms**, Science of the Total Environment (IF=10.754), Feb 2023; **(DOI)**
    - o Flooded and non-flooded areas were detected based on Sentinel-1 decibel images and used to prepare a flood inventory map.
    - o The importance of predictor variables in flood occurrence was identified using mutual information, and machine learning models were trained and tuned.
    - o Flood susceptibility maps were prepared, and developed machine learning models were evaluated using the test dataset
  - M.Riazi, et al., **Comparative assessment of advanced machine learning techniques for simulation of lake water level fluctuations based on different dimensionality reduction methods**, Earth Science Informatics (IF=2.705), Jan, 2023; **(DOI)**
    - o Several standalone and hybrid machine learning models were trained and tuned to quantitatively assess Iran's Lake Urmia
    - o Different dimensionality reduction methods were tested to carry out sensitivity analysis
  - M.Riazi, et al., **An index-based investigation on groundwater drought vulnerability in Central Asia using SWAT model and baseflow separation methods under CMIP6 climate change projections,** Groundwater for Sustainable Development (IF=4.9), Apr 2024, (**DOI**)
    - o A SWAT model was configured and calibrated based spatial and spatio-temporal data including satellite-based and reanalysis data
    - o Using the Quantile mapping method, five GCMs were downscaled (i.e. bias corrected) and the streamflow of future periods was estimated under various climate scenarios.
    - o Using seven methods of baseflow separation, groundwater recharge values were estimated.
    - o Based on a drought index called and the Run theory method, the groundwater drought situation in the a watershed was investigated under different climate scenarios.
- ❖ Under review
  - M.Riazi, et al., **Enhancing Rainfall-Runoff Simulation in Data Poor Watersheds: Integrating Remote Sensing Data and Hybrid Decomposition for Hydrologic Modelling**
    - o Ground truth, remote sensing, and bias corrected remote sensing data were used as input to hydrological models.
    - o In order to increase the accuracy of machine learning hydrological models, the input data were decomposed by a novel method called Gaussian-Wavelet decomposition technique.
    - o Machine learning models including Voting regressor and CatBoost regressor algorithms were used for rainfall-runoff modeling.

Language proficiency and scores

- English: Advanced level
  - TOEFL iBT: 104 (R: 30, L: 24, S: 25 , W: 25)
  - GRE General: 330 (Q: 170, V: 160, W: 4)
- Persian: Native/Fluent

Experience

- ❖ Academic experience

  Applied Computing and Geosciences/ Acta Geophysica (AGPH)   Switzerland
  Reviewer   (May 2023-Present)
  - Evaluated manuscripts on water resources management, focusing on machine learning, hydrological modeling, and remote sensing, ensuring scientific rigor and journal standards.
  - Provided feedback and recommendations to authors, improving methodology, analysis, discussion, and presentation.
  - Contributed to advancing research by ensuring the publication of high-quality, impactful articles.
  - Expanded knowledge in water resources management by reviewing diverse research, enhancing understanding of current trends and methodologies.

- ❖ Work experience

  Ministry of Energy and Water (MoEW) of Afghanistan   Kabul, Afghanistan
  Water Resources Management Specialist   (Sep.2020-Jul. 2021)
  - Field work
    - Engaged in the process of gathering meteorological data
    - Examined and evaluating the levels of water in rivers and streams
    - Engaged in maintenance of weather instruments for accurate readings
    - Worked together with other experts in the same industry
    - Carried out investigations on the science of water movement
  - Office work
    Conducted assessment of water resources in Kabul river basin and developed models to estimate water quality and quantity:
    - Derived satellite-based precipitation and temperature data
    - Used Google Earth Engine and Python for analysis, preparing land use, cover maps, flood, etc.
    - Used SWAT model for runoff estimation
    - Assessed climate and land use change scenarios

Awards, Achievements, and Certificates

- Top student at Department of Mechanics, Civil Engineering, and Architecture at Islamic Azad University of Khomeini Shahr, 2022
- Top student at Department of Mechanics, Civil Engineering, and Architecture at Islamic Azad University of Khomeini Shahr, 2020
- Membership in the American Society of Civil Engineers (ASCE), 2023
- "Python for Everybody" course at School of Information, University of Michigan (Coursera), 2022
  - Programming for Everybody (Getting Started with Python)
  - Python Data Structures
  - Using Python to Access Web Data
  - Using Databases with Python
  - Capstone: Retrieving, Processing, and Visualizing Data with Python
- "Machine Learning" course at Computer Science Department, Stanford University (Coursera), 2022
- "Deep Learning Specialization" course at Computer Science Department, Stanford University (Coursera), 2022
  - Neural Networks and Deep Learning
  - Improving Deep Neural Networks
  - Structuring Machine Learning Projects
  - Convolutional Neural Networks
  - Sequence Models
- Elementary Workshop of The Soil Water Assessment Tool (SWAT) model at Tarbiat Modares University, Tehran, Iran, 2022
- Advanced Workshop of The Soil Water Assessment Tool (SWAT) model at Tarbiat Modares University, Tehran, Iran, 2022
- Workshop of modeling and forecasting climate changes using CMIP6 models at Kharazmi University, Tehran, Iran, 2023

References

- Dr. Khabat Khosravi
  - School of Climate Change and Adaptation, University of Prince Edward Island, Charlottetown, Canada
  - Department of Earth and Environment, Florida International University, Miami, USA
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- Dr. Saeid Eslamian (Distinguished professor)
  - Department of Water Engineering, College of Agriculture, Isfahan University of Technology, 8415683111 Isfahan, Iran
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- Dr. Majid Riahi Samani
  - Department of Civil Engineering, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Iran,
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