

Hadi Shokati

SOIL SCIENTIST – RESEARCH & DEVELOPMENT, University of Tübingen, GERMANY

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Summary

I am a Soil Scientist specializing in integrating **complex environmental and agricultural systems** with **Machine Learning and Deep Learning**, advanced **Statistical Methods**, and **Geospatial Data Analysis**. My background includes extensive experience in **Remote and Proximal Sensing**, **Precision Agriculture**, **development of predictive models (regression and classification)** and **Data Visualization**, making me well-equipped to handle diverse data sources and translate findings into actionable insights. By leveraging robust analytics and programming expertise, I help organizations make informed decisions, implement sustainable practices, and effectively communicate results.

Experience

Soil Scientist, Department of Geosciences, University of Tübingen, Germany 2023–Present

- Fine-tuned vision models for rapid extraction of environmental events (e.g., flooding, erosion).
- Developed hybrid models for soil erosion modeling.
- Forecasted future soil erosion susceptibility under climate change scenarios.
- Collaborated with computer scientists to develop advanced deep learning models.
- Served as academic advisor to master students.

Data Scientist, Department of Geosciences, University of Tübingen, Germany 2023

- Applied machine learning models for surface soil moisture estimation from UAV and satellite imagery.
- Performed geospatial analysis using GIS, remote, and proximal sensing techniques.

Geospatial Data Analyst, Soil Conservation and Watershed Management Research Institute, Iran 2022

- Integrated remote sensing and UAV data to identify freshwater springs in the Persian Gulf.
- Collected and analyzed UAV data for precision agriculture and watershed management.

Education

PhD, Soil Science and Geomorphology, University of Tübingen, Germany 2023–Present

- Applied advanced deep learning models for soil erosion segmentation from aerial orthophotos.
- Developed hybrid deep learning and physically based models for soil erosion prediction.
- Implemented transfer learning techniques to address data scarcity in soil erosion studies.
- Forecasted rainfall erosivity and corresponding soil erosion susceptibility under future climate scenarios.
- Mapped flood-affected areas using state-of-the-art deep learning models.
- Attended domain-specific conferences to expand professional networks.

MSc, Water Engineering and Sciences, Tarbiat Modares University, Iran 2019

- Designed rainwater harvesting systems using UAV imagery.
- Performed and evaluated economic analysis of rainwater harvesting systems.
- Attended domain-specific conferences to expand professional networks.

BSc, Water Engineering and Sciences, University of Mohaghegh Ardabili, Iran 2017

- Performed lab experiments to build foundational scientific competencies.
- Interpreted fieldwork data to support collaborative research projects.
- Completed group assignments to enhance teamwork and communication skills.

Projects

Advanced Machine Learning Techniques and Data Science Skills

2017-present

Over the past several years, I have advanced predictive analytics in soil and water sciences through the development of hybrid deep learning models. By employing techniques such as CNNs, ConvLSTMs, and transfer learning, I have achieved accurate mapping and forecasting of soil erosion. My work involves extensive data collection, cleaning, and preprocessing to build high-quality datasets that ensure robust model training and evaluation. Utilizing Google Earth Engine, cloud computing, and advanced data visualization tools, I have streamlined spatial analysis workflows and improved predictive performance. Furthermore, by incorporating explainable AI methods, I have enhanced the transparency and interpretability of model outcomes. Collectively, these efforts support sustainable soil and water management and deliver actionable insights for environmental monitoring and agricultural development.

- Enhancing Future Soil Erosion Susceptibility Mapping through Spatiotemporal Modeling
- Boosting Deep Learning Model Accuracy via Transfer Learning Techniques
- Enhancing Soil Erosion Prediction through Hybrid Deep Learning and Physically Based Modeling
- Advanced Geospatial Data Analysis and Automation using Google Earth Engine

Applied Machine Learning Solutions for Real-World Challenges

2017-present

I apply machine-learning methods to address environmental challenges, demonstrating problem-solving and interdisciplinary communication. Projects, including soil moisture prediction, soil erosion detection and forecasting, flood mapping, land suitability assessment, and forest fire susceptibility mapping, have produced sustainable, operational outputs. These projects involved data analysis, model development, and collaboration with domain scientists. Using multi-source geospatial data, I produced timely maps and reports to support irrigation and field management, contributing to climate-resilient decision-making. Translating complex insights into actionable strategies has been central to optimizing agricultural operations and promoting sustainable land management.

- Enhancing Agricultural Sustainability Through Predictive Machine Learning Models
- Comparing Hyperspectral UAV Imagery with Multispectral Satellite Data for Soil Moisture Modelling
- Hybrid Deep Learning Models for Precise Soil Erosion Prediction
- Integrating Spectroscopy into Machine Learning Workflows for Soil Moisture Prediction

Certifications & Training

ELLIS Summer School: AI for Earth and Climate Sciences	2025
DeepLearn 2025: 12th International School on Deep Learning	2025
13th EARSel Workshop on Imaging Spectroscopy	2024
German Japanese exchange workshop	2023

Technical Skills

Programming: Python (Professional), MATLAB (Intermediate), R (Beginner), JavaScript (Beginner)

GIS and Remote Sensing: ArcGIS Pro, QGIS, ENVI, SNAP, SAGA and Google Earth Engine (Professional)

Machine Learning: Regression, Classification, Data Analysis, Image Processing, Image Segmentation, Transfer Learning, Fine-Tuning, TensorFlow/Keras, PyTorch

Languages: English (Professional), German (Beginner), Turkish (Intermediate), Persian and Azerbaijani (Native)

UAV Piloting: Flight Operations, Photogrammetry, Spatial Data Analysis

Honors & Professional Service

Visiting Researcher Grant, Ministry of Science, Iran	2023
Selected for a National Elites Foundation talent program, Iran	2023
Ranked 5th nationwide in the Ph.D. entrance exam, Iran	2019
Top M.Sc. Student, Tarbiat Modares University, Iran	2018

Additional Experience

Teaching Assistant at University of Tehran, Iran

2020–2023

- Courses: Fluid Mechanics, designing surface irrigation systems, Designing drainage and irrigation networks, Surface irrigation hydraulics.
- Taught and mentored students in machine learning fundamentals.

Workshop Lecturer

- UAV Piloting and Aerial Mapping, University of Tehran, Iran

2023

- UAV Photogrammetry and Mapping, Soil Conservation and Watershed Management Research Institute, Iran

2022

Field Works

- Soil Spectroscopy, Soil Sampling, UAV Piloting, Soil Erosion Surveys

Iran