Zhouyayan Li

zhouyayan.li@gmail.com | (319) 512-3523 | Iowa City, Iowa (Available to relocate nationwide)
Google Scholar | LinkedIn | GitHub

Personal Profile

I have 4 years of experience in quantitatively modeling, analytics, and visualization on large-scale dataset with mathematical and GIS models and approaches. I also have 2 years of experience working with advanced deep learning models and techniques on computer vision problems, such as image classification and generation.

Skills

- Programming and Analyzing: Python (PyTorch, TensorFlow, Sklearn), R, SPSS, MATLAB, JavaScript
- Data Processing and Visualization: SQL, PostgreSQL, BigQuery, Tableau, Observable, D3, Google Maps API
- Geo-Software and Packages: ArcGIS, ArcGIS Pro, Erdas Imagine, ArcPy, QGIS, GDAL, Rasterio
- Cloud Platforms and Repositories: Amazon Web Services, Google Cloud, Google Earth Engine, GitHub

Selective Academic Research Projects

Physics-Informed Flood Inundation Mapping and Analyzing using Deep Learning and GIS   Dec. 2021 – Now

- Gathered, investigated, and screened the relevance and significance of dozens of potential physical variables, such as rainfall and land use, using statistical approaches, such as multi-collinearity tests and VIF score.
- Developed classification models using CNN-based structures (i.e., U-Net, DeepLab, and EfficientNet). Successfully classified pixels in radar images into flood areas, permanent water pixels, and background (dry) areas with higher accuracy compared with state-of-the-art benchmark models and datasets.
- Conducted image synthesis with ConvLSTM, Deep CNN, and attention mechanism to project the combination of physical factor information to reflectance values in satellite images.
- Created data preprocessing pipeline using Google Earth Engine on Google Colab platform and automated results post-processing and inspection using ArcPy and GIS software.

Model Evaluation & Web-Based Flood Mapping System Designing   Jun. 2019 – Dec. 2021

- Collaborated with US federal agencies, such as NOAA, to provide quantitative comparisons in terms of data requirement, computational cost, and prediction quality for a mathematical flood model named HAND.
- Quantitatively investigated the performance sensitivity of the HAND model under the impacts of various model configurations through a state-wide case study in Iowa using GIS modeling.
- Developed a web-based interactive flood inundation mapping system for the HAND with advanced features that is especially beneficial to stakeholders and local communities. The system generates fast (20s to compute about 17 million pixels) and accurate flood maps on common desktops instead of HPCs and is equipped with a user-friendly GUI.
- Proposed a multi-depth inundation mapping framework for the HAND, which significantly reduced over and under estimations by more than 10 % compared to the original model, especially under complex topographic conditions.

Working Experience

Assistant Water Conservancy Designer in Techand Co., Ltd   *Full-time*   Jul. 2018 – Feb. 2019

- Quantitatively investigated the impacts of tidal fluctuation and rainwater loads on sediment movement using mathematical models and GIS software in a gulf area in China. Assisted in site dredging operation and planning for future data collection by communicating effectively modeling results to the construction team and data acquisition team.
- Collaborated with farm-owners and local administrations in Ding Hu, China in assessing and designing local channels and ditches to meet the needs of clean water delivery and wastewater transportation while minimizing adverse effects on the local environment.
- Determined the most advantageous operations for a tidal gate by quantitatively analyzing local tidal, geomorphic, and hydro-meteorological data.

Education

Ph.D. in Civil Engineering, The University of Iowa, GPA 3.87   Aug. 2020 –May 2024 (expected)
B.S. in Water and Hydropower Engineering, Hohai University, GPA 3.77   Sep. 2013 – Jun. 2018