Zhouyayan Li

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Google Scholar | LinkedIn

Objective

I am a third-year Ph.D. candidate at the University of Iowa Hydro-Informatics Lab. I have 2 years of experience in deep learning applications on computer vision, satellite imagery processing, and geospatial modeling. I am seeking a data scientist internship for summer 2023.

Skills

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

Selective Academic Research Projects

Physics-Informed Deep Learning in Flood Inundation Mapping with Satellite Imagery   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 tests, such as multi-collinearity tests and VIF score.
- Developed semantic 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 benchmark models and datasets.
- Conducted image synthesis with ConvLSTM, Deep CNN, and attention mechanism to project the combination of physical factor information recorded in the raster format 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.

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

- Collaborated with National Oceanic and Atmospheric Administration (NOAA) to provide a quantitative comparison in terms of data requirement, computational cost, and prediction quality for a simplified 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.
- Proposed a multi-depth inundation mapping framework for the HAND using plain JavaScript, which significantly reduced over and under estimations compared to the original model, especially under complex topographic conditions.
- Developed a web-based interactive flood inundation mapping system for the HAND with advanced features, such as data stream management, online computation, comparison, and visualization, as well as hydro-spatial analysis tools, using JavaScript, HTML, PHP, and CSS. The system can extract accurate flood extent for millions of pixels on-the-fly on a common PC within a few seconds.

Working Experience

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

- Investigated the impacts of tidal fluctuation and rainwater loads on sediment movement using 2D MIKE mathematical models 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 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