Miranda Lv

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SUMMARY

A self-motivated, fast-learning, and detail-oriented geospatial data science professional with over 10+ years of expertise in geospatial data analytics and machine learning, complemented by over 5+ years of experience in artificial intelligence and deep learning. Committed to closing the gap between research and technology through advanced analytics, with a focus on delivering actionable insights and fostering innovative decision-making to advance sustainable development.

TECHNICAL SKILLS

Languages: Python, R, SQL, MATLAB, Delphi
Packages: Pandas, scikit-learn, PyTorch, TensorFlow, geoPandas, shapely, rasterio, matplotlib, seaborn.
Others: Git, Jupyter, ArcGIS, Quantum GIS, Google Earth Engine, IDRISI, High-Performance Computing (HPC), Convolutional Neural Networks in Computer Vision, MySQL, PostGIS/PostgreSQL, Linux/Ubuntu, Microsoft Azure, AWS;

PROFESSIONAL EXPERIENCES

Virginia Institute of Marine Science

Data scientist/ Senior geospatial researcher *2021 - Present*

- Leading the new shoreline inventory data collection by designing and developing computer vision algorithms and machine learning model architectures with Python (PyTorch) to automatically extract useful features from remote sensing imagery;
- Accomplished an open-source tool (written in Python) for mapping and classifying shoreline stabilization structures from remotely sensed imagery, with two peer-reviewed first-author papers published by Q1 journals and many others under review; The product and tool shortened the traditional data collection procedure from over a decade to weeks;
- Secured over $370,000 in funding from DEQ, Virginia Coastal Zonal Management Program as Co-PI: Advancing the use of spatial data and coastal modeling in implementing adaptive management to support coastal community resilience.

AidData

Geospatial Researcher *2016 - 2021*
Geospatial Data Analyst *2014 - 2016*
GIS Analyst Intern *2014*

- Worked on geospatial impact evaluation projects by designing and developing parallel computing methods and tools to process satellite imagery, economic, health, environmental, and other geospatial datasets using HPC clusters. The product (GeoQuery) enables individuals and organizations of all skill levels to freely find and aggregate over 50+ global level satellite, economic, health, conflict, and other spatial data into a single, simple-to-use file in minutes. GeoQuery has been widely used by 1000+ researchers and stakeholders across the globe, including the WorldBank, Millennium Challenge Corporation (MCC), and USAID. Peer-reviewed article and open-source data extraction tool.
- Led the development of tools and the framework for object detection, land use, and land change mapping projects with state-of-the-art deep learning and computer vision techniques (image detection and instance segmentation) using Python.
- Produced an extensible spatial data framework in Python using open-source tools capable of automating the management, integration, and processing of many types of datasets including satellite imagery, open-source geospatial data, geospatial subnational boundaries, and international aid finance data.
- Led annual GIS/open data training provided to interns (>100), and offered data science mentorship to research fellows.

Clark Labs

GIS Software Developer *2013*

- Developed and designed analytics modules in IDRISI for complex mathematics calculations and image processing.
- Enhanced algorithms, UI, and UX to effectively optimize overall performance and efficiency.

EDUCATION

William and Mary, Applied Science Department 2019 - Exp. May 2024

Ph.D. Candidate [ABD], Computational Geography/Geospatial Data Science

Cl**ark University, Geography Department** 2013

M.S., GIS for Development and Environment

M.S., Environmental Science & Policy

North University of China, Engineering Department 2010

B.E., Environmental Engineering

PEER-REVIEWED PUBLICATIONS

- ***Under Review:*** *Brewer E., …,* ***Lv Z.****, …* Granularity at Scale: Estimating Neighborhood Well-Being from High-Resolution Orthographic Imagery and Hybrid Learning.
- ***Accepted:*** *Runfola D., Stefanidisb A.,* ***Lv Z.****, Baiera H.* A multi-glimpse deep learning architecture to estimate socioeconomic census metrics in the context of extreme scope variance. International Journal of Geographical Information Science. 2023.
- ***Accepted:*** ***Lv Z.****, Nunez K., Brewer E., Runfola D. Mapping the tidal marshes in coastal Virginia: A hierarchical transfer learning approach. GIScience & Remote Sensing. Nov, 2023. doi: 10.1080/15481603.2023.2287291*
- ***Lv Z.****, Nunez K., Brewer E., Runfola D.* pyShore: A deep learning toolkit for shoreline structure mapping with high-resolution orthographic imagery and convolutional neural networks. Computers & Geosciences 171, 105296.
- *Goodman S., BenYishay A.,* ***Lv Z.****, Runfola D.* GeoQuery: Integrating HPC systems and public web-based geospatial **data tools. 2019. Computer and Geosciences.**

REPORTS, COMPUTER CODE, DATASETS, AND METHODOLOGIES

- *Mitchell M.,* ***Lv Z.****, …* 2023. Enhancing the development of strategies for coastal wetland conservation prioritization in Virginia under climate change: Final Report. Virginia Institute of Marine Science, William & Mary.
- *Brewer E.,* ***Lv Z.****, Runfola D.* Tracking the industrial growth of modern China with high-resolution panchromatic imagery: A sequential convolutional approach. arXiv. 2023. doi: https://doi.org/10.48550/arXiv:2301.09620.
- *BenYishay, A., Goodman, S.,* ***Lv, Z.****, Runfola, D.* 2019. Endline Report: Impact Evaluation of Road Improvement in Tanzania. Millennium Challenge Corporation / Mathematica. Annex C7.
- *BenYishay, A., Goodman, S., Runfola, D.,* ***Lv, Z****.* 2019. Final Report: Evaluation of investments in the road infrastructure of Ghana. Millennium Challenge Corporation / Mathematica. Annex E7.
- *Runfola, D.,* ***Lv, Z.****, BenYishay, A.,* 2017. GeoMatch: A R Package for Propensity-Score Matching in Conditions of Intervention Spillover. https://github.com/itpir/geoMatch
- *BenYishay, A., Rotberg, R., Wells, J.,* ***Lv, Z.****, Goodman, S ., Kovacevic, L., Runfola, D.* 2017. Geocoding Afrobarometer Rounds 1 - 6: Methodology & Data Quality. AidData.
- *Desai, H.,* ***Lv, Z.****, Perla, C., & Parks, B.* 2016. An Open-Source Methodology for Tracking Natural Resource Concessions in Liberia: Version 1.0. AidData.

SELECTED PRESENTATIONS & INVITED TALKS

- ***Lv, Z.*** Harnessing deep learning and high-resolution overhead imagery in Coastal Resource Management. ACM/IEEE Supercomputing Conference 2023. Denver, CO. November 2023.
- **Lv,** ***Z.*** Implementing a hierarchical transfer learning approach for tidal marsh mapping in coastal Virginia*. SEDAAG. Norfolk, VA. November 2023.*

- ***Lv, Z.****, Nunez K, Brewer E, Runfola D.* A deep learning approach to map shoreline structures with high-resolution imagery and convolutional neural networks. York River and Small Coastal Basins Symposium, Virginia Institute of Marine Science. May 2023.
- ***Lv, Z.****,* Mapping shoreline structures with high-resolution imagery and deep learning. 13th National Monitoring Conference, Virginia Beach, VA. April 2023.
- ***Lv, Z.****,* Hybrid Object-Based Image Analysis and Convolutional Neural Network Approach to Computer Vision for Satellite Image Analysis. William & Mary Graduate Research Symposium, August 2021.
- ***Lv, Z.****,* Environmental Application of Geographic Information Science in Project Measurement and Evaluation. Green Climate Fund (GCF) Independent Evaluation Unit (IEU). Incheon, South Korea. January 2019.
- *Runfola, D., Goodman, S.,* ***Lv, Z.****,* Practical Spatial Data Analysis for Everyone: Introducing GeoQuery. World Bank, Washington DC. 2017
- *Goodman, S., Runfola, D.,* ***Lv, Z.****,* High-Performance Computation for Everyone: Integrating Web-portals and HPC. GeoComputation '17. Leeds, UK. September 2017.
- *Runfola, D., Goodman, S.,* ***Lv, Z.****,* Ariel BenYiShay. Machine Learning and Heterogeneity in Impact Effects: A Case Study of the GEF. GeoComputation '17. Leeds, UK. September 2017.

LICENSES AND SPECIALIZATIONS

- Microsoft Certified: Azure AI Fundamentals (2023)
- Datacamp Certified: Data Engineer (2023)
- Microsoft Certified: Azure Data Science Associate (2023)
- Generative Adversarial Networks (GAN) - Coursera (2023)
- Machine Learning - Coursera (2022)
- Deep Learning.AI TensorFlow Developer Specialization (2021)
- Deep Learning Specialization - Coursera (2021)

TEACHING EXPERIENCES

- **Instructor**. Introduction to GIS and Geospatial Data - Using GeoQuery and QGIS for Spatial Data Analysis. Green Climate Fund (GCF), Independent Evaluation Unit (IEU). Incheon, South Korea. Spring 2019.
- **Instructor**. Introduction to GIS and Geospatial Data. William & Mary. Summer 2015 & 2016 & 2017.
- **Teaching Assistant**. 1). Python Programming 2). Computer Programming for GIS. Clark University. Fall 2013.