Will (Zheng) Wang, PhD

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EDUCATION

Newcastle University — Newcastle, UK
PhD in Earth Observation — 2015 – 2019
The Best Doctoral Thesis of 2019 awarded by the UK's Remote Sensing and Photogrammetry Society.

Wuhan University — Wuhan, China
Bachelor & Master of Engineering in Photogrammetry and Computer Vision — 2008 – 2015

SKILLS & EXPERTISE

Programming languages: Python, C/C++, Matlab.

Frameworks: PyTorch, TensorFlow, Spark, Lightning-Hydra-Template, CUDA, OpenCV, Scikit-learn, GEE.

Certifications: Machine Learning, Deep Learning, AWS Fundamentals, Kubernetes, GAN, RL.

Others: Linux, HPC Cluster, Jenkins, Git, Quobyte, Modelling, Sematic Segmentation, Image Classification, Denoising, Self-supervised Learning, Anomaly Detection, Time Series Analysis, GIS, GPS, Object-oriented Design.

WORK EXPERIENCE

Senior Data Scientist, Catalyst Earth — Markham, On — Oct 2023 - Now

- Revamped the company's InSAR technology for measuring precise Earth's surface deformation from satellite radar images. Guided the InSAR team, providing mentorship to developers and scientists, fostering excellence in programming and problem-solving mindsets. Designed a sophisticated pipeline with models to correct geometric and atmospheric errors and mitigate noises, significantly enhancing precision from the centimeter level to the millimeter level.

Scientific Developer II (MLE), 3vGeomatics Inc. — Vancouver, BC — Jul 2022 - Sep 2023

- Led the full lifecycle of self-supervised deep learning projects as an OKR team leader. Proposed an innovative random masked autoencoder approach to perform self-supervised learning (prior to Meta's masked autoencoders) for InSAR phase denoising and amplitude despeckling. Implemented a Mixture Density Network to efficiently learn probability distributions of residuals rather than signals, optimizing the model's learning process.
- Initiated the adoption of the lightning-hydra-template AutoML framework on a HPC cluster and automated model training with a robust multi-node and multi-GPU training pipeline. Deployed models to the company's operational environment, contributing to the creation of over 100 monthly product deliveries to contracted clients. Delivered an oral presentation on research findings derived from synthetic and real-world data at the IEEE GARSS 2023 Conference.
- Developed InSAR coherence and amplitude change detection pipelines by integrating the AI denoising models. Created proof-of-concept products enabling near-real-time monitoring of wildfire and flooding events.

Data Scientist, 3vGeomatics Inc. — Vancouver, BC — Jul 2019 - Jun 2022

- Led the collaboration with the MRC lab at the University of Alberta, applying AI techniques to address challenges in the Earth Observation field. Conceptualized three research projects in SAR image analysis, focusing on semantic segmentation for water/land classification, phase unwrapping, and the development of a deep generative (GAN) model for deformation map simulation. Published peer-reviewed journal papers from each project.
- Optimized waterbody data labeling by transitioning from a traditional workstation-based pipeline to Google Earth Engine (GEE), resulting in a remarkable 99% reduction in overall time cost (from one week to just five minutes for a 3000 km^2 site).
- Automated a quality control pipeline by creating ~50 anomaly detection metrics to inspect critical operational InSAR data analysis steps. Developed models and tools to characterize seasonal displacement signals in the Arctic, driving the first industry InSAR permafrost degradation monitoring product template. Developed a global snow coverage detection tool for SAR data selection by leveraging optical MODIS imagery, resulting in a 15% reduction in the company's commercial data costs.

Independent Developer, GRInS Software (Startup) — Newcastle, UK — Dec 2018 - Jun 2019

- Designed and developed a comprehensive ground-based radar interferometric processing desktop software system. Implemented core modules with CUDA C++ and GUI with QT. Sold three commercial licenses to end users, showcasing effective client relationship management.