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

WORK EXPERIENCE

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

- Established Python coding and testing standards and devised an architecture of Synthetic Aperture Radar (SAR) interferometry software on local and cloud based HPC clusters.

Scientific Developer II, *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 SAR amplitude image despeckling and phase denoising.
  - Implemented a Mixture Density Network to efficiently learn probability distributions of residuals/noises rather than signals, optimizing the model's learning process.
  - Initiated the adoption of the lightning-hydra-template AutoML framework on a local 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 SAR amplitude and coherence image change detection products from concept to rollout on top of the denoised models and filled an important gap in the company's product suite.

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

- Led the collaboration with the MRC lab at the University of Alberta as a mentor of junior researchers, applying AI techniques to address challenges in the remote sensing 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 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 (a cloud-based geospatial analysis platform), resulting in a remarkable 99% reduction in overall time cost (from one week to just five minutes for a 3000 km^2 site).
- Developed models and tools to characterize seasonal displacement signals in the Arctic, driving the first industry interferometric SAR permafrost degradation monitoring product template.
- Automated a quality control pipeline by creating ~50 anomaly detection metrics to inspect critical operational interferometric SAR data analysis steps.
- 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 sales skills and client relationship management.

SKILLS & EXPERTISE

Programming languages: Python, C++, Matlab, HTML5.

Frameworks: PyTorch, TensorFlow, Lightning-hydra-template, CUDA, OpenCV, NumPy, Multiprocessing.

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

Other Skills: Linux, HPC cluster, Jenkins, Git, Modelling, Anomaly Detection, Time Series Analysis.