Hillson Ghimire

Machine Learning | Computer Vision | Geospatial Data Science

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Technical Skills

Machine Learning and AI: PyTorch, scikit-learn, object detection and segmentation (YOLO, RT-DETR, SAM, U-Net), transfer learning, LLMs and agentic coding tools (Claude Code, OpenAI Codex)

Data Science and Computing: Python, SQL, PostgreSQL/PostGIS, ETL, Bash, Git, Linux, Docker, Google Cloud, HPC

Geospatial: Google Earth Engine, ArcGIS Pro, QGIS, FME, GDAL, SAR and InSAR analysis, UAV photogrammetry

Experience

Doctoral Researcher, Rice University, Houston, TX — Aug 2026 – Present

- Integrating satellite observations, land surface models, and ML for high-resolution soil moisture prediction.

Teaching Assistant, Beaver Works Summer Institute (BWSI), MIT Lincoln Laboratory — Jun 2026 – Aug 2026

- Built Jupyter notebooks and programming exercises, and delivered a guest lecture on hailstorm damage assessment.

Graduate Research Assistant, South Dakota State University, Brookings, SD — Aug 2024 – May 2026

- Automated wheat spike and spikelet counting with oriented YOLO detectors trained on new benchmarks of 48,521 spikes and 60,404 spikelets, reaching 95.8% and 99.0% mAP@0.5 and r = 0.993 for spike counting.
- Benchmarked four YOLO-OBB architectures across seven UAV image modalities from four field sites, finding that input modality affected accuracy more than architecture.
- Co-developed WheatAI, a public cloud platform serving nine computer vision models with single-image and batch inference on smartphone, UAV, and microscope imagery.
- Contributed to vision pipelines for sub-millimeter kernel morphology, Fusarium disease severity, and stomatal traits to reduce manual measurement.

Research Associate, Geoinformatics Center, Asian Institute of Technology, Thailand — Feb 2022 – Aug 2024

- Cut flood mapping for Sentinel Asia disaster response from about one week to under 24 hours by automating extent mapping from ALOS-2 SAR, and developed SAR, InSAR, and machine learning damage assessment workflows.
- Unified hundreds of heterogeneous geospatial datasets in PostgreSQL/PostGIS with ETL pipelines, improving reproducibility and quality control.

Geospatial Intern, Geoinformatics Center, AIT: deep learning for SAR flood extent extraction — Jun 2021 – Oct 2021

Geospatial Intern, SkyTruth (Remote): U-Net road extraction from Sentinel-2 imagery — Sep 2020 – Mar 2021

Education

PhD, Earth, Environmental and Planetary Sciences, Rice University — Aug 2026 – Present

MS, Geography (GIS Specialization), South Dakota State University, 4.0/4.0 GPA — Aug 2024 – Jul 2026

BE, Geomatics Engineering, Institute of Engineering, Tribhuvan University — 2016 – 2020

Publications

- **H. Ghimire**, M. Maimaitijiang, S. Thapa, et al. Wheat spike and spikelet detection and counting from high-resolution digital imagery using YOLO with oriented bounding boxes. *Scientific Reports*, 16, 27355, 2026. Paper | Dataset
- M. Maimaitijiang, **H. Ghimire**, S. Thapa, et al. WheatAI v1.0: An AI-powered high-throughput wheat phenotyping platform. *arXiv:2601.08863*, 2026. Paper | Platform

Honors

- Ken Kennedy Institute Computational Science and Engineering Recruiting Fellowship ($15,000), Rice University, 2026
- USDA North Central SARE Graduate Student Grant ($19,999) for AI-based wheat tiller density mapping, 2025
- 3rd Place, UAV Track, NDSU AgTech Hackathon, 2026: UAV vision pipeline with LLM reports in 48 hours