Krishna Prasad Panthi

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| Github | Google Scholar | LinkedIn |

MS student in Computer Science at Clemson University, currently a research assistant at the HHR Lab working on simulation, reinforcement learning, and deep learning. Formerly a software engineer with 3 years of experience working in the industry.

Research interests: Reinforcement Learning, Deep Learning, Computer Vision, Control, and Robotics.

Education

Clemson University, Clemson, SC, USA
M.S. in Computer Science
2024 - 2025 (Expected)

- GPA: 3.875/4.0
- Thesis: Development of Aquacrop-Richards and irrigation optimization with deep reinforcement learning

Tribhuvan University, Pulchowk Campus, Kathmandu, Nepal
B.E. in Computer Engineering
2016 - 2021

- Grade: 78.99 % aggregate
- Thesis: Tracking People across multiple cameras

Research Experience

Graduate Research Assistant
Clemson University | Advised by Dr. Vidya Samadi and Dr. Carlos Toxtli-Hernández
2024 - 2025

- Developed AquaCrop-Richards, a new crop simulation model that integrates the Richards equation with AquaCrop. The Richards equation was solved using a finite difference scheme with modified Picard iteration and Anderson acceleration. (Paper submitted to *Agricultural Water Management*)
- Implemented Proximal Policy Optimization (PPO), a deep reinforcement learning algorithm, to optimize irrigation strategies using the AquaCrop and AquaCrop-Richards models with data parallelism.
- Contributed to a comparative study of Quantum LSTM (QLSTM) and classical LSTM for time series prediction in hydrological data. (Paper published at *Environmental Modelling & Software*)
- Benchmarked deep learning-based time series prediction models, including TiDE, N-HiTS, and PatchTST, against LSTM models. (Paper under review at *Journal of the American Water Resources Association*)

- Prepared workshop materials for WaterSoftHack 2025, covering time series prediction models (ARIMA, SARIMA, LSTM, Transformer) and hyperparameter optimization techniques for hydrological applications.

Publications

- Saberian, M., Zafarmomen, N., Neupane, A., **Panthi, K.**, & Samadi, V. (2025). HydroQuantum: A New Quantum-driven Python Package for Hydrological Simulation. *Environmental Modelling & Software, 106736*.
- **Panthi, K.**, Samadi, V., Toxtli, C. (2025). Paper on the development of AquaCrop-Richards. *Submitted to Agricultural Water Management*.
- **Panthi, K.**, Samadi, V., et al. (2025). Paper on benchmarking of deep learning based time series prediction models. *Under review at Journal of the American Water Resources Association*.
- **Panthi, K.** (2025). Exact Diffusion Inversion via Coupled Transformations (EDICT) within Gaussian Shading Watermarking. *arXiv:2501.08604*.

Conference Presentations

Panthi, K., Samadi, V., & Saberian, M. (2024, June). *Flood Gauge Height Prediction Using Advanced Deep Learning Approaches*. Oral Presentation at the 12th International Congress on Environmental Modelling and Software, East Lansing, MI.

Panthi, K., Samadi, V., & Toxtli, C. (2025, May). *Deep Reinforcement Learning for Irrigation Optimization*. Poster Presentation at the Clemson AI Symposium, Clemson, SC.

Professional Experience

Software Engineer | MutualArt | Israel (Remote from Kathmandu, Nepal)
February 2022 - December 2023

- Developed full-stack web applications using .NET Core (C#), Vue.js (JavaScript), SQL Server, and GraphQL.
- Engineered a prototype NLP entity extraction system with Python, spaCy, and the GPT API, achieving 90% precision on unstructured text.
- Migrated an image processing pipeline from Python 2 to Python 3, improving latency from 3 seconds to 300 milliseconds.
- Containerized legacy applications using Docker, significantly reducing deployment time from hours to minutes.

Software Engineer | Dolphin Dive Technology | Kathmandu, Nepal
April 2021 - January 2022

- Implemented custom UI components in Angular, successfully migrating business logic from a WPF application to the web.
- Optimized database query latency by refining stored procedures and integrating a Redis cache.

Selected Projects

- Robust Watermarking with Diffusion Models: Implemented Exact Diffusion Inversion via Coupled Transformations (EDICT) within a Gaussian Shading Watermarking technique, improving the method's robustness by 2%.
- Multi-Camera Person Tracking: Utilized YOLOv3 for real-time person detection in video streams, employed deep learning for person re-identification across different camera feeds, and used a Kalman Filter for trajectory tracking as part of undergraduate research thesis.
- Domain Name Generation LLM: Fine-tuned a 3.8 billion-parameter LLM using LoRA to generate domain names from business descriptions. The model was fine tuned for edge-case handling and to safely reject unsafe content, achieving 95% accuracy in identifying safe descriptions.
- AI Minesweeper Solver: Modeled the game of Minesweeper as a Constraint Satisfaction Problem (CSP) and implemented a solver using a backtracking algorithm.
- Analog Circuit Design and PCB Implementation: Designed and simulated amplifier circuit in Proteus and implemented it on a custom PCB board.

Skills

- Programming Languages: Python, C#, SQL, Javascript/Typescript, HTML/CSS, C/C++
- Machine Learning: PyTorch, Tensorflow, Pandas, spaCy, GPT API, Diffusion Models, Darts, CUDA, Gymnasium
- Cloud/DevOps: AWS (EC2, S3, Lambda), Azure (Functions, App Service), Docker, Git, Linux
- Databases: MS SQL, MySQL, MongoDB, Redis, Elasticsearch
- Miscellaneous: Open MPI, SIMD, IIS, Mixpanel, Angular, Vue.js, GraphQL, Paraview

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Awards and Accolades

- Awarded scholarship to present my research at the International Environment Modeling and Software Society (IEMSs) Conference, 2024 in East Lansing, Michigan.
- Scholarship for top academic performance in semesters 1 and 3 during undergraduate studies.
- Ranked 114 out of 14,000 in the nationwide undergraduate entrance examination.
- Awarded ‘Physics Topper’ in high school among 900 students.
- Valedictorian, Arjun Boarding High School (2013).

References

Available upon request from Dr. Vidya Samadi (samadi@clemson.edu) and Dr. Carlos Toxtli (ctoxtli@clemson.edu) at Clemson University.