KSHITIJ POUDEL

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Driven computer science professional with four years of experience, committed to transform knowledge into modern engineering solutions, creating sustainable impact across industry, government, and academia.

Educational Background

Master of Science in Computer Science Aug. 2024 – May 2026

Major in Information Engineering and Cybersecurity, ***Kentucky State University*** *Frankfort, KY*

Ongoing Thesis: *Detecting cyber-physical attacks in networked 3D printing using G-code sequence learning and parameter optimization*

Bachelor's Degree in Computer Engineering Jan. 2018 – Aug. 2022

Major in Computational Science, ***Tribhuvan University*** *Kathmandu, Nepal*

Thesis: *DevOps-driven deployment of Traffic Sign Classification system*

Technical Skills

Programming Languages: Python, C/C++, HTML/CSS, JavaScript(ES6+),TypeScript, SQL(Hive/Impala), Bash, MATLAB, G-Code, M-Code, LaTeX

Frameworks and Libraries: Scikit-learn, Scikit-bio, TensorFlow, Keras, Flask, MLOps, Arcpy, Bootstrap, React, Django, Biopython, Nextflow, Galaxy, Unity, QIIME2, BLAST and others.

Developer Tools: Git, Docker, Wireshark, Heroku, New Relic, Datadog, Linux, Arduino, RPi, RoboDK, Gazebo, Azure, AWS SageMaker, Figma, Adobe Illustrator, Blender, AutoCAD and others.

Professional Experience

Graduate Research Assistant Aug. 2024 – Present

School of Mathematics and Computer Science, Kentucky State University *University Dr, Frankfort, KY*

- Collaborated with thesis committee to curate and preprocess network traffic, sensor telemetry, and logger data from additive manufacturing systems, enabling datasets for training threat intelligence and optimization models.
- Designed and deployed ML models for threat detection and 3D-printing parameters optimization, leveraging hyperparameter tuning, adversary simulations, and algorithmic approaches to minimize print time and material waste.
- Developed and tested secure methods for protecting 3D printing workflows, including cyberattack simulations, firmware debugging, and defensive AI strategies to ensure resilience in networked manufacturing environments.
- Applied expertise in G-code, M-code, and letter codes as printing parameters to optimize additive manufacturing processes using multiple statistical approaches, balancing efficiency, sustainability, and product integrity.

Aquaculture Research Center, Kentucky State University *103 Athletic Dr, Frankfort, KY*

- Engineered scalable NGS pipelines by integrating bio-informatic tools (Qiime2, Mothur) with computational and statistical approach, reducing processing runtime for terabyte-scale microbial datasets.
- Applied GATK-based variant calling and Monte Carlo methods to reveal rare microbial variants driving amplicon sequencing and metagenome ecosystem resilience in aquaponics systems.
- Conducted diversity and functional profiling against RNA-seq and DNA-seq datasets, achieving 91% accuracy in microbial abundance, diversity and variation estimates.
- Developed predictive microbial models with Naive Bayes and Random Forests algorithms, improving functional pathway classification accuracy.
- Produced reproducible, FAIR-compliant workflows with python and Linux shell scripting on HPC clusters, ensuring robust data integration and visualization.

Data Engineer Apr. 2023 – Jul. 2024

Alpha Design and Development Incorporation *Kathmandu, Nepal*

- Built scalable ETL pipelines using PySpark, SQL, and AWS Glue, optimizing ingestion of multi-source traffic and urban time-series datasets.
- Engineered real-time data lakes on AWS S3 with Parquet format, ensuring high-throughput storage, retrieval, and compliance governance.
- Designed relational schemas in PostgreSQL and schema-flexible key-value model in MongoDB, enabling robust spatio-temporal queries for urban mobility insights.

- Implemented Trino query optimization and partitioning, reducing latency of large-scale transportation analytics and Ad-hoc queries for reporting.
- Applied ML models especially Bi-LSTM method on urban and traffic time-series raw data, improving peak congestion forecasting accuracy.
- Automated monitoring with Grafana, Prometheus, and custom Bash scripts, enabling proactive anomaly detection aggregating into system's key metrics for alerting.
- Containerized analytics workflows using Docker and Kubernetes, supporting elastic deployment across distributed traffic management.

UX Developer May. 2022 – Aug. 2022

Wiseyak Incorporation *Kathmandu, Nepal*

- Designed and developed the front-end of Sajilo Doctor, a patient-doctor centered AI-enabled telehealth web application supporting live video consults, patient–doctor chat, medical report analysis, and secure health record management.
- Built responsive interfaces in Django using Bootstrap, JavaScript, semantic HTML/CSS from Figma prototypes, improving usability and accessibility.
- Integrated backend REST APIs (Python/Django) for real-time chat, video, and diagnostic modules; optimized data storage in PostgreSQL and MongoDB for structure and unstructured clinical data for fast, HIPAA-compliant access.
- Collaborated on system design decisions applying caching for Auth tokens and doctor availability, load balancing across API servers, and database sharding to scale patient and transaction records with low-latency services.
- Streamlined deployments by collaborating with DevOps engineers on Docker, Kubernetes, and CI/CD pipelines for distributed workloads.

Conference Proceedings

- Poudel, Kshitij, Fleckenstein, L., Ward, J.C., and Hager, J. (2025). Quality Score Selection Impacts Microbial Abundance and Diversity Outcomes in Aquaponics Microbiome Data Analysis. **World Aquaculture Society 2025,** New Orleans, LA, USA. Book of Abstracts Page 915.
- Adhikari, Lalita., Poudel, D. and Poudel, K.(2024). Climate-Smart Agricultural Technologies for Developing Countries: Solutions to Multiple Barriers. **NAPA**, Ann Arbor, MI, USA Book of Abstracts Page 164.
- Poudel, Kshitij, Sah, A., Poudel, P., Bhandari, P. and Neupane, S. (2023). Implementation of DevOps tools to minimize time and space complexity: An example with Traffic Sign Classification System. World Congress on Undergraduate Research **(WorldCUR 2023),** University of Warwick, Coventry, UK. Book of Abstracts Page 75.
- Acharya, S., Poudel, K. (2022).K&S Apples: Sustainable and Digital Plant for Better Tomorrow – **2nd Dream Big Challenge 2022, NRNA-NCC USA,** Kathmandu, Nepal

Fellowships, Workshops and Awards

- **Summer Institute CyberInfrastructure Enabled Machine Learning 2025** – University of California San Diego, CA, USA
- **RCN 2025 T2T Genome Assembly Workshop** – University of Kentucky, KY, USA
- **Innovation Fellowship** – Kentucky Commercialization Ventures (KCV), KY, USA
- **Delegate Award** – WorldCUR 2023, University of Warwick, Coventry, UK
- **Participant Award** – Non-Resident Nepali Association NCC USA - Science, Technology & Innovation Committee, Kathmandu, Nepal

Professional Affiliations

USAS Student Sub-Unit, World Aquaculture Society, Sorrento, LA, United States
Alumni Student, University of Warwick, Coventry, United Kingdom
Registered Engineer, Nepal Engineering Council (NEC), Kathmandu, Nepal
Sergeant-at-Arm, Rotaract Club of Kathmandu Engineering College, Nepal
Fellow Member, Leo Club of Bharatpur Chautari, Lions Clubs International
Treasurer, Youth Red Cross Circle, Aroma College, Bharatpur, Nepal

References

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