

Kalyan Khattry

Portfolio

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GitHub

LinkedIn

EDUCATION

Oklahoma State University

PhD in Industrial Engineering & Management; Minor in Machine Learning

Stillwater, OK

Present

University of New Haven: Tagliatela College of Engineering

Master of Science in Data Science, CGPA 3.79

West Haven, CT

Dec 2025

University of Wolverhampton

Bachelor of Science in Computer Science, CGPA 4.0

Wolverhampton, UK

June 2023

Reader: Siman Giri

Final Year Project: *BioMedicalCare - Comparative Analysis of Deep Learning Architectures for Breast Cancer Detection*

RESEARCH INTERESTS

Robust and Efficient Machine Learning: Building resilient and optimized deep learning models that maintain performance under adversarial attacks, distribution shifts, and resource constraints for edge deployment.

Explainable AI: Developing interpretable machine learning models and explanation methods to enhance transparency and trustworthiness in AI systems.

Algorithmic Fairness: Designing bias mitigation techniques and fair learning algorithms to ensure equitable outcomes across diverse populations.

AI for Critical Infrastructure: Applying trustworthy and efficient ML methods to transportation networks, energy systems, and smart cities for reliable real-time decision-making.

PUBLICATIONS & PRESENTATIONS

Publications

- **Khattry, K.**, & Samsami, R. (2025, March). Engineering Education in the Era of Generative Artificial Intelligence (Gen AI): Current State and Future Directions. Paper presented at 2025 Northeast Section Conference, University of Bridgeport, Bridgeport, CT. 10.18260/1-2-119.1127-54998
- **Khattry, K.**, Elmi, S., and Samsami, R. (2026). "Automated concrete bridge deck inspection using unmanned aerial system-collected data: A deep learning approach." *ASCE Open: Multidisciplinary Journal of Civil Engineering*, 4(1). <https://doi.org/10.1061/AOMJAH.AOENG-0091>
- **Khattry, K.**, Elmi, S., Brooks, C.N., & Samsami, R. (2026). A Residual Vision Transformer-Based Framework for Infrastructure Crack Detection. Presented at Transportation Research Board (TRB), 2026.

Preprint

- **Khattry, K.** (2026). Comparative Evaluation of Generative Augmentation Techniques for Imbalanced Concrete Damage Segmentation: Classical Methods, GANs, and DiffusionModels. Zenodo. <https://doi.org/10.5281/zenodo.19376795>
- **Khattry, K.**, & Adhikari, P. (2026). *Implementing Big Data Analytics for Predicting City-Level Air Quality Index (AQI) and Examining the Impact of COVID-19 using Comprehensive PM and Gas Emission Data*. Preprint available at ResearchGate. <https://doi.org/10.13140/RG.2.2.17795.67365>

Poster Presentation

- Automated Concrete Bridge Deck Inspection Using Unmanned Aerial System (UAS)-Collected Data: A Deep Learning (DL) Approach – Presented at TCoE Endowment Awards.

RESEARCH EXPERIENCE

Graduate Research Assistant

Samsami's Lab, Construction and Civil Engineering Department

West Haven, CT

Sep 2024 – Sep 2025

- Improved crack detection accuracy by 4% across multiple benchmarks by developing custom Residual Vision Transformer (RvT) model in PyTorch for UAV-captured bridge infrastructure imagery.
- Enhanced model interpretability by integrating explainable AI methods (LIME) to identify and visualize prediction-relevant image regions for infrastructure defect detection.
- Reduced false negatives in defect prediction by performing exploratory data analysis on 40,000+ high-resolution images, identifying spatial and texture-based patterns using OpenCV, Pandas, and NumPy.
- Collaborated on multiple publications resulting in 1 conference paper, 3 accepted papers (ASCE Journal, TRB 2026, CRC 2026) and 1 manuscript under submission (TRR 2026).

Undergraduate Researcher

University of Wolverhampton (Herald College)

Kathmandu, Nepal

Sep 2022 – June 2023

Reader: Siman Giri

- Developed and compared three CNN architectures (LeNet, ResNet50, VGG16) for breast cancer detection from histopathological images, achieving optimal accuracy through hyperparameter tuning and k-fold cross-validation.
- Implemented advanced data augmentation techniques to address class imbalance in medical imaging dataset, improving model generalization and robustness.

TECHNICAL SKILLS

- **Languages:** Python, R, SQL
- **ML/DL Frameworks:** PyTorch, TensorFlow, Keras, Scikit-Learn, OpenCV, NLTK
- **Data Analysis:** Pandas, NumPy, SciPy, Matplotlib, Seaborn, Plotly
- **Tools & Platforms:** Git, AWS, Apache Spark, Power BI, Tableau, Excel, Mixpanel, Jira
- **Core Competencies:** Deep Learning, Computer Vision, Explainable AI, Model Optimization, ETL Pipelines, Statistical Analysis

INDUSTRY EXPERIENCE

Analytics Engineer
Downtown Evening Soup Kitchen

New Haven, CT
Jan 2026 – July 2026

- Designed and maintained data pipelines to collect, clean, and transform operational and donor data from multiple sources.
- Developed interactive dashboards in Power BI to monitor program performance, donor engagement, and service utilization metrics.
- Conducted exploratory data analysis to identify trends and provide actionable insights supporting organizational decision-making.

Graduate Assistant
University of New Haven, Graduate Admissions

New Haven, CT
Mar 2024 – Dec 2025

- Developed Power BI dashboards with custom DAX measures and predictive analytics, enhancing KPI clarity and reducing data interpretation time across departments.
- Handled timely communication and correspondence with hundreds of prospective students, addressing inquiries related to admissions, application procedures, deadlines, and program details.
- Collaborated closely with admission officers to streamline communication workflows, improving response efficiency and maintaining consistency in messaging.

Data Analyst Intern
Downtown Evening Soup Kitchen

New Haven, CT
Jan 2025 – May 2025

- Developed Power BI dashboards with custom DAX measures and predictive analytics, enhancing KPI clarity and reducing data interpretation time across departments.
- Automated data workflows using Python, Zapier, and Excel macros, integrating 4 business systems and reducing reporting time.
- Implemented data validation protocols with Cognito Forms and MSSQL, improving accuracy across 30,000+ monthly records.

Associate Data Engineer
Krispcall Pte. Ltd

Singapore
July 2023 – Dec 2023

- Developed and optimized ETL pipelines, increasing data processing speeds and supporting faster business intelligence decisions.
- Analyzed user behavior patterns using Mixpanel and custom Python scripts, identifying 20+ fraud instances and enhancing platform security.
- Integrated automated data retrieval systems enabling customer insights and market pricing strategies, contributing to increased customer acquisition.

SELECTED PROJECTS

FinRAG: Retrieval-Augmented Generation System for Financial Analysis

- Developed a multi-source RAG system combining 289,642 documents from Reddit financial communities, historical stock data, and financial literature to provide context-aware investment insights.
- Compared three instruction-tuned LLMs (Mistral-7B, Phi-3-Mini, Llama-3.1-8B) for financial query generation, optimizing prompt engineering for domain-specific reasoning and accuracy.

Sentiment Analysis with Recurrent Neural Networks

- Designed and trained LSTM-based Recurrent Neural Networks for sentiment classification on IMDB movie review dataset, implementing sequence modeling techniques for natural language processing.

Data Engineering Pipeline with AWS and Apache Spark

- Implemented scalable data pipelines and ETL processes using AWS Lambda for automated data storage and processing, analyzing large-scale YouTube dataset with Apache Spark for distributed computing.

HONORS & AWARDS

TCoE Endowed Graduate Research Fellowship, University of New Haven	June 2025
Dean’s Scholarship, University of New Haven	Jan 2024
AAA Scholarship, University of Wolverhampton	2021 - 2023

PROFESSIONAL DEVELOPMENT

Introduction to Statistics, Stanford University	Nov 2023
Python: Working with REST and Web Data, Coursera	Sep 2024
Agile Project Management, Google	Jun 2023

LEADERSHIP & SERVICE

Led GameDev Heroes Community, Herald College	June 2022 - June 2023
Rotaract Club of Baneshwor Royal	Jan 2021 - Nov 2023
Nepal Red Cross Society	May 2019 - July 2020

Paper Review

IEEE International Conference on Emerging Trends in Engineering and Computing (ETECOM), 2025