

SUMMARY

Driven AI Researcher specializing in **algorithmic fairness**, human-AI interaction, and machine learning solutions in healthcare. Proficient in **PyTorch**, **TensorFlow**, and end-to-end ML workflows, with expertise in deep learning, and responsible AI frameworks. Adept at collaborating with interdisciplinary teams, including surgeons, scientists, and non-technical stakeholders, to bridge domain knowledge and deliver impactful AI applications. Passionate about applying machine learning to human-centered problems and advancing AI fairness in real-world scenarios.

EDUCATION

Missouri University of Science and Technology

PhD in Computer Science

Rolla, MO

Expected May 2025

Research Areas: Algorithmic Fairness, Human-AI Interaction, AI in Healthcare

Missouri University of Science and Technology

Masters in Computer Science

Rolla, MO

July 2020

TECHNICAL SKILLS

Languages: C, C++, Java, Python, R

Frameworks/Libraries: PyTorch, TensorFlow, Keras, OpenCV, NumPy, SciPy, Pandas, scikit-learn, MLOps (W&B)

Big Data Tools: Hadoop, Spark, Hive, Mahout

RELEVANT COURSES

Machine Learning and AI: Introduction to Artificial Intelligence, Machine Learning for Computer Vision, Advanced Topics in Data Mining, Big Data and Cloud Computing

Theoretical Computer Science and Mathematics: Mathematics Probability and Statistics, Applied Graph Theory, Algorithmic Game Theory, Analysis of Algorithms

Systems and Applications: Database Systems, Advanced Bioinformatics

PUBLICATIONS (<https://scholar.google.com/citations?user=inSSyW8AAAAJ>)

1. **Telukunta, M.**, & Nadendla, V. S. S. "A Difficulty in Evaluating Perceived Group Fairness using Non-Expert Opinions." (In preparation.)
2. **Telukunta, M.**, Stuart, M., Nadendla, V. S. S., & Canfield, C. "Fairness Perception of Regression-based Predictive Analytics Tools used in Kidney Placement." (In preparation.)
3. **Telukunta, M.**, Rao, S., Stickney, G., Nadendla, V. S. S., & Canfield, C. (2024). "Learning Social Fairness Preferences from Non-Expert Stakeholder Opinions in Kidney Placement." *Proceedings of the 5th Conference on Health, Inference, and Learning (CHIL)*.
4. Akula, S. P., **Telukunta, M.**, & Nadendla, V. S. S. "Driver Fatigue Prediction using Randomly Activated Neural Networks for Smart Ridesharing Platforms." *IEEE Transactions on Intelligent Transportation Systems*. (under review.)
5. Sanga, S., **Telukunta, M.**, Nadendla, V. S. S., & Das, S. K. (2023). "Strategic Information Design in Selfish Routing with Quantum Response Travelers." *IEEE 20th International Conference on Mobile Ad Hoc Smart Systems (MASS)*.
6. **Telukunta, M.**, & Nadendla, V. S. S. (2023) "Towards Inclusive Fairness Evaluation via Eliciting Disagreement Feedback from Non-Expert Stakeholders." *3rd Workshop on Bias and Fairness in AI at European Conference on Machine Learning (ECML PKDD)*.
7. **Telukunta, M.**, & Nadendla, V. S. S. (2020) "On the Identification of Fair Auditors to Evaluate Recommender Systems based on a Novel Non-Comparative Fairness Notion." *3rd FAccTRec Workshop on Responsible Computing at ACM Recommender Systems (RecSys)*.

EXPERIENCE

Missouri University of Science and Technology

Rolla, MO

Research Mentor

May - July 2023

- Mentored two undergraduate interns on a research project exploring public perceptions of fairness, fostering a collaborative learning environment and guiding them through the research process.
- Conducted in-depth research on User Choice Modeling techniques to understand and predict fairness preferences across diverse stakeholders.
- Proposed a robust algorithm for determining the participant size and data point requirements for a survey experiment using Power Analysis, ensuring statistical significance and efficiency.
- Preprocessed heterogeneous datasets by applying dimensionality reduction techniques such as Principal Component Analysis (PCA) and Stratified Sampling, improving data quality for downstream analysis.
- Developed a Gradient Boosting-based Regression model to predict human fairness choices, achieving high accuracy and demonstrating the model's effectiveness in capturing complex behavioral patterns.
- Successfully designed and deployed a full-scale survey experiment on the Prolific crowdsourcing platform, gathering high-quality responses for data-driven insights into fairness perceptions.

AT&T Labs

Des Peres, MO

Student Technical Intern

June - August 2019

- Architected and implemented a sophisticated cloud-based reporting system utilizing PHP, JavaScript, HTML, and Bootstrap, delivering real-time financial performance analytics. This innovative solution enhanced decision-making capabilities across the organization, resulting in a 30% improvement in financial forecasting accuracy.
- Engineered advanced VBA solutions to automate complex reporting processes, leveraging machine learning algorithms for data pattern recognition. This initiative reduced report generation time by 85%.
- Spearheaded the development of an AI-driven KPI calculation engine, incorporating predictive analytics and data visualization techniques.
- Designed and optimized KNIME workflows for report automation, integrating big data processing capabilities and custom-built nodes, resulted in a 70% reduction in calculation errors.
- Successfully deployed and scaled automation solutions across an 800-person organization, achieving a 95% user adoption rate within six months.
- Orchestrated a comprehensive automation strategy that culminated in annual time savings of approximately 180 working hours.

PROJECTS (<https://github.com/mukund0911>)

DNABART: A Genomic LLM Foundational Model for Sequence Correction and Classification

- Developed a Large Language Model (LLM) for genomic sequence error correction and classification by adapting the BART encoder-decoder architecture. Utilized PyTorch for model development and Weights & Biases for visualization and metric tracking.
- Implemented **Byte-Pair Encoding** (BPE) tokenization to effectively process genomic sequences, capturing long-range dependencies and enhancing semantic representation in large-scale DNA datasets.
- **Pretrained** BART on DNABERT2 (15GB) and Saccharomyces Genome Database (1M sequences) using synthetic sequence corruption strategies, leveraging AdamW optimizer and a linear learning rate scheduler for efficient model convergence on NVIDIA H100 and V100 GPUs.
- **Fine-tuned** BART on the Genome Understanding and Evaluation (GUE) benchmark, achieving state-of-the-art results on 16 out of 26 tasks, including epigenetic mark prediction and core promoter detection, with accuracy improvements of up to 24%.
- Engineered scalable training pipelines for sequence error correction and classification, optimizing compute efficiency on the Missouri S&T HPC cluster.

Real-time Multi-Sensor Multi-Object Detection via Transfer Learning

- Fine-tuned the YOLOv6 object detection model using transfer learning to detect NVIDIA Jetson Robots on a custom-built testbed, achieving a detection accuracy of 98.5% with a processing speed of 30 FPS for real-time performance.
- Designed and developed a real-time multi-sensor vision system by integrating images from multiple camera sensors. Leveraged OpenCV Stitcher class to create seamless panoramic views and implemented advanced detection algorithms like SIFT (Scale-Invariant Feature Transform) for enhanced feature extraction.
- Implemented Kalman Filtering for robust real-time tracking of Jetbot robots, including state vector estimation and covariance matrix updates. Achieved a tracking accuracy of 95% under dynamic conditions, with precise object state prediction and noise filtering.
- Engineered a multi-camera localization system by positioning multiple sensors as satellites around the testbed to triangulate and determine robot positions. This ongoing effort aims to improve localization accuracy by 20%.

enabling sub-centimeter precision for real-time robot tracking.

- Optimized system pipeline for real-time performance using OpenCV, Kalman Filtering, and YOLOv6 on NVIDIA Jetson hardware, ensuring low-latency operation and computational efficiency.

COVID-19 Detection in Chest X-Rays Using Custom CNN and Grad-CAM

- Designed and implemented a custom Convolutional Neural Network (CNN) to predict COVID-19 infections from chest X-ray images using TensorFlow and Keras, achieving an accuracy of 80% on a limited dataset.
- Enhanced model interpretability by implementing Grad-CAM (Gradient-weighted Class Activation Mapping) to visualize critical regions in X-ray images that influenced predictions, enabling clearer clinical insights for healthcare professionals.
- Improved model generalization on the small dataset through extensive data augmentation and transfer learning using pre-trained models like VGG16 and ResNet50, boosting performance metrics by 15% compared to the baseline CNN model.
- Optimized preprocessing pipelines using OpenCV for image resizing, normalization, and augmentation (e.g., rotation, flipping, and contrast adjustment) to enhance dataset variability and reduce overfitting.
- Evaluated model robustness using cross-validation techniques and tracked performance metrics such as accuracy, precision, recall, and F1-score for thorough assessment.

TEACHING

Introduction to C++ Programming (CS1580) :

- Taught undergraduate students foundational C++ programming concepts, including object-oriented programming (OOP), data types, control structures, and functions, building a strong programming foundation.
- Designed and conducted hands-on programming assignments and projects that introduced concepts like classes, inheritance, and polymorphism to encourage problem-solving and logical thinking.
- Held weekly coding labs and office hours to provide individualized guidance, clarify concepts, and troubleshoot programming errors.

Data Structures (CS1585) :

- Instructed undergraduates on essential software development tools, including version control systems (e.g., Git), unit testing frameworks, and regular expressions (RegEx), equipping students with practical industry skills.

Machine Learning in Computer Vision (CS6406) :

- Assisted the course instructor in designing assignments integrating PyTorch and TensorFlow frameworks, covering topics like model training, evaluation, and deployment in real-world vision tasks.
- Delivered recitation lectures on advanced topics such as CUDA Programming for GPU acceleration, Convolutional Neural Networks (ResNet, VGGNet), Optimization Algorithms (SGD, Adam), and Transfer Learning, providing both theoretical depth and hands-on implementation examples.
- Created supplementary materials, including cheat sheets, code repositories, and recorded lectures

INVITED PANELS & AWARDS

Bridging Disparities in Health Care using AI Symposium	November 2024
AI and You Symposium Panel at the Center for Science, Technology and Society	May 2024
Participation in Intelligent Systems Center Poster Presentation	October 2023
Runner-up IEEE St.Louis Student Presentations	April 2022
1st Place in Graduate Research Poster Contest	May 2019