Mukund Telukunta

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Summary

Ph.D. student at Missouri S&T, specializing in **algorithmic fairness** and **responsible AI** in healthcare. Skills include handling electronic health records (EHR) from diverse sources, designing end-to-end machine learning solutions, and analyzing social biases. Collaborated with surgeons and scientists in the kidney transplant domain, with adept communication with non-technical stakeholders.

Education

Missouri University of Science and Technology — Rolla, MO
PhD in Computer Science — Expected 2024

Relevant Courses: Introduction to Artificial Intelligence, Big Data and Cloud Computing, Probability and Statistics, Machine Learning for Computer Vision, Applied Graph Theory, Algorithmic Game Theory.

Missouri University of Science and Technology — Rolla, MO
Masters in Computer Science — July 2020

Experience

Missouri University of Science and Technology — Rolla, MO
Research Mentor — May - July 2023

- Mentored two undergraduate interns during NSF REU program focusing on public perceptions of fairness.
- Conducted extensive research to study User Choice Modeling techniques.
- Proposed an algorithm to determine the size of participants and number of data points required for the survey based on Power Analysis.
- Preprocessed heterogenous datasets using dimensionality reduction techniques such as Principal Component Analysis and Stratified Sampling.
- Designed a Regression model to predict human fairness choices based on Gradient Boosting.
- Successfully deployed full-fledged survey experiment on Prolific crowdsourcing platform.

AT&T Labs — Des Peres, MO
Student Technical Intern — June - August 2019

- Created cloud-based reports that provide real-time financial performance data and analytics throughout the year, using PHP, JavaScript, HTML, and Bootstrap.
- Developed VBA solutions to automate manual and cumbersome reports efficiently.
- Automated KPI calculations and implemented enhancements for wider tool deployment.
- Designed KNIME flows to automate tedious report calculations.
- Implemented solutions currently utilized by an 800-person organization.
- Saved approximately 180 working hours per year.

Publications

1. Evaluating Regression Fairness with Human-Preferred Divergence Metrics (Ongoing Work)
   Mukund Telukunta, Morgan Stuart, Venkata Sriram Siddhardh Nadendla and Casey Canfield
2. Learning Social Fairness Preferences from Non-Expert Stakeholder Opinions in Kidney Placement
   Mukund Telukunta, Sukruth Rao, Gabriella Stickney, Venkata Sriram Siddhardh Nadendla and Casey Canfield
   Conference on Health, Inference and Learning (CHIL) 2024 | *(Preprint)*
3. Driver Fatigue Prediction using Randomly Activated Neural Networks for Smart Ridesharing Platforms
   Sree Pooja Akula, **Mukund Telukunta**, Venkata Sriram Siddhardh Nadendla
   IEEE Transactions on Intelligent Transportation Systems (Under Review) | *(Preprint)*
4. Strategic Information Design in Selfish Routing with Quantum Response Travelers
   Sainath Sanga, **Mukund Telukunta**, Venkata Sriram Siddhardh Nadendla, Sajal K. Das
   IEEE 20th International Conference on Mobile Ad Hoc Smart Systems (MASS) 2023 | *(PDF)*

5. Towards Inclusive Fairness Evaluation via Eliciting Disagreement Feedback from Non-Expert Stakeholders
   Mukund Telukunta, Venkata Sriram Siddhardh Nadendla
   BIAS Workshop at European Conference on Machine Learning (ECML PKDD) 2023 | *(PDF)*
6. On the Identification of Fair Auditors to Evaluate Recommender Systems based on a Novel Non-Comparative Fairness Notion
   Mukund Telukunta, Venkata Sriram Siddhardh Nadendla
   FAccTRec Workshop at ACM Recommender Systems (RecSys) 2020 | *(PDF)*

Projects

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

- Fine-tuned YOLOv6 object detection model to detect Nvidia Jetson Robots on custom-built test-bed through transfer learning.
- Developed a real-time multi-sensor system by integrating images from multiple camera sensors using the OpenCV Stitcher class with detection algorithms like SIFT (Scale-Invariant Feature Transform)
- Implemented Kalman Filtering for real-time tracking of Jetbot robots, including initialization, prediction, and update steps, to accurately estimate the state vectors and covariance matrices.
- *Ongoing*: Utilizing multiple camera sensors positioned as satellites around the test-bed to triangulate and determine the exact positioning of the robots, aiming to improve localization accuracy.

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

- Developed a custom convolutional neural network (CNN) to predict COVID-19 infection from chest X-ray images, achieving an accuracy of 80% on a limited dataset using TensorFlow and Keras.
- Implemented Grad-CAM (Gradient-weighted Class Activation Mapping) to visualize and highlight the regions in X-ray images that the model focused on for enhancing interpretability.
- Performed extensive data augmentation and transfer learning using pre-trained models (e.g., VGG16, ResNet50) to improve model performance on the small dataset. Employed OpenCV for image preprocessing and augmentation tasks.

Analyzing Human Behavior from NYC Citi Bike Data

- Employed NYC Citi Bike data to predict the number of customers in New York city on a particular day based on climate using Decision Tree Regression model
- Predicted the gender of customers based on their riding performance using a Random Forest Classifier, achieving an accuracy of 86%.

Teaching

Introduction to C++ Programming (CS1580) :

- Instructed undergraduates on basic C++ concepts, including object-oriented programming.

Data Structures (CS1585) :

- Instructed undergraduates on development tools such as version control, unit testing, and RegEx.

Machine Learning in Computer Vision (CS6406) :

- Assisted the course instructor in designing the assignments based on both PyTorch as well as Tensorflow.
- Delivered recitation lectures on CUDA Programming, Convolutional Neural Networks (ResNet, VGGNet), Optimization Algorithms (SGD, Adam), Transfer Learning.

Invited Panels & Awards

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

Technical Skills

Databases: SQL, MongoDB

Languages: C, C++, Java, Python, Hadoop

Data Science: NumPy, SciPy, Pandas, scikit-learn, seaborn

Machine Learning: Classification, Regression, Random Forest, Gradient Boosting, Dimensionality Reduction, Principal Component Analysis, Outlier Detection

Deep Learning: PyTorch, TensorFlow, Keras, OpenCV, CNN, RNN