

# Hua TANG

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## EDUCATION

### Shanghai Jiao Tong University

Sept. 2020 – Jun. 2024 (Expected)

*Bachelor of Engineering in Industrial Engineering*

*Minor in Mathematics and Applied Mathematics*

- **Core Courses:** Stochastic Process, Engineering Statistics, Quality Management(Control Charts, Statistics), Probability and Statistics Linear Algebra, Data Structure, Thinking and Methodology in Programming(C++), Operations Research, Partial Differential Equations, Modeling and Simulation of Production Systems

## PUBLICATIONS

**Hua Tang**, Lu Cheng, Ninghao Liu, Mengnan Du. A Theoretical Approach to Characterize the Accuracy-Fairness Trade-off Pareto Frontier. Submitted to *The Twelfth International Conference on Learning Representations*, 2024.

## SELECTED RESEARCH EXPERIENCES

### Theoretical Analysis on the Trade-off between Accuracy and Fairness

Jul. 2023 – Present

*Supervisor: Prof. Mengnan Du, Assistant Professor, New Jersey Institute of Technology*

- Proposed four categories to characterize the important properties of the accuracy-fairness trade-off Pareto frontier and theoretically proved that under ideal settings where sensitive attributes can be fully explained by non-sensitive attributes, the trade-off curve exhibits continuity in most cases.
- Proved that accuracy may suffer a sharp decline when over-pursuing fairness, where an upper bound is derived, indicating the fact that the trade-off curve may be non-convex, contradicting many previous assumptions.
- Submitted a **first-authored** manuscript to the 12th International Conference on Learning Representations.

### Empirical Strategies for High-frequency Quantitative Trading

Jul. 2022 – May. 2023

*Supervisor: Tongxin Ren, Assistant Professor, Shanghai Jiao Tong University*

- Conducted extensive preprocessing on a large dataset of Bitcoin transactions, including missing-data imputation, differential computation, and cluster analysis, thereby elucidating the inherent data structure within this domain.
- Extracted multiple synthesized factors to capture the momentum and volatility of the data and reflect the dynamics of supply and demand as well as market sentiment, which are valuable for subsequent modeling processes.
- Proposed a novel LSTM-based regression model for price variation prediction, surpassing the conventional technique with a **notable enhancement in accuracy (1.6%)**, as improving prediction accuracy by 0.5% in this field is highly challenging. Code is available here: [link](#)

### Skeleton-based Human Motion Quality Assessment

Mar. 2023 – Sept. 2023

*Supervisor: Prof. Yongxiang Li, Associate Professor, Shanghai Jiao Tong University*

- Implemented the Butterworth denoising filter to reduce noise in our 3D temporal dataset, followed by segmenting the time series by detecting the peaks of motion periods, which often display variations in the original video.
- Introduced an innovative framework based on the hierarchical vanilla Spatial-Temporal Graph Convolutional Networks and integrated the Attention module and bilateral LSTM for extracting temporally symmetric features.
- Revamped the existing code for human motion quality assessment by leveraging matrix operations acceleration techniques and fine-tuned model hyperparameters using grid search, achieving a **substantial reduction in training time from 60s per batch to 45s per batch**. Code is available here: [link](#)

## SELECTED AWARDS & HONORS

2nd Price in 18th National Competition of Transport Science and Technology for Undergraduate Students (NACTrans) (Top 5%)	2023
Meritorious Winner in the Mathematical Contest in Modeling (Top 20%)	2022
1st Price in 17th "Dongfeng Nissan Cup" Tsinghua IE Sword National Industrial Engineering Case Study Competition (Top 8%)	2022

## SKILLS

**Programming:** Python, C/C++, SQL, MATLAB, LaTeX

**Deep Learning Frameworks:** TensorFlow, PyTorch, Scikit-Learn, Keras