Xiang Liu

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SUMMARY

A strong programmer with working level proficiency in building end-to-end NLP/Signal pipelines. I have experience and passion towards developing better machine learning infrastructure and data engineering tools.

EDUCATION

University of Delaware   USA
PhD's in Financial Service Analytics; GPA: 3.7   *Sept 2016 - December 2023*
Courses: Algorithm Analysis, Artificial Intelligence, Natural Language Process, Machine Learning, Big Data in Finance, Data Mining

East Tennessee State University   USA
Master's in Mathematics and Statistics; GPA: 3.8   *Sept 2013 - May 2016*
Courses: Time Series Analysis, Numerical Linear Algebra, Analysis of Algorithm, Modern Algebra, Operation Research, Multivariate Statistics

Beijing Normal University   China
Bachelor's in Psychology; GPA: 3.6   *Sept 2009 - May 2013*

SKILLS SUMMARY

Languages: English; Mandarin
Frameworks: Pytorch, Panda, Numpy, Spacy, Transformer, Optuna, Hydra, Continuous Integration, Unittest/Jest
Tools: SQL, MongoDB, Python, Vim, Git, Linux, Javascript, Bash

EXPERIENCE

Pcoin   Beijing, China
Quantitative Developer   *May 2021 - Sept 2021*

- Developed reinforcement learning algorithm to open and close positions and backtested against rule-based algorithm
- Advanced understanding of cutting-edge research in decentralized finance
- Utilized data with GBM model to find near-optimal call-put strangle that hedges against price fluctuations
- Implemented thread-safe algorithms to identify arbitrage opportunities in multi-chain, multi-asset settings
- Added user-friendly visualizations to company's backtest system as a feature contributor

IN CONFERENCE PROCEEDINGS

Care for the Mind Amid Chronic Diseases: An Interpretable AI Approach Using IoT (with Xie J., Zhao X., and Fang Xiao).
INFORMS Workshop on Data Science, 2022   Best Complete Paper Nominee

    Under review at **Management Science**

Depression Detection in Social Media Using Time-and-knowledge-aware LSTM and Depression Diagnosis-related Entity Extraction (with Zhang W., Xie J., and Zhang Zhu). *INFORMS Workshop on Data Science*, 2022

    Submitted to **MIS Quarterly**

PROJECTS

Assisting in developing an online cognitive experiment ⚯   Mar 01 - Present

- Build a JsPsych module via automated github workflow that effectively delivers surveys, displays historical keyboard presses and counts valid responses
- Jquery is used to allow for dynamic manipulations of HTML contents and stylings on the basis of user reactions
- **Highlights:** Javascript, NodeJS, Continuous Integration, Vite, JsPsych, Jquery

Assisting MBA Class in Operation Management   Feb 2023 - Present

- Designed executable program with Ttkbootstrap to read and solve Chinese Postman problem, including a feature to compare student's proposed solution to optimal solution and visualize missing parts using Pyvis
- Created visualization using Plotly to help understanding of graphical solutions and sensitivity analysis of linear programming
- Wrote a python wrapper to read and solve Linear Programming based on the provided template, and produce Excel-like reports
- **Highlights:** Linear Programming, User Interface, Regular Expression, Interactive Graph

A Knowledge-aware Deep Learning Approach to Trace Depression on Social Media   May 2022 - Feb 2023

- Crawled 1 million plus Twitter data, designed tagging task in Lighttag, and collected responses from students
- Trained a Transformer-based entity extractor to automate negative life events tagging with 90% precision and 80% recall
- I implemented a pipeline that utilizes a pre-trained RoBERTa model for text embedding, and employs CNN-LSTM/Vanilla-LSTM/TransformerEncoder architectures to model sequential and temporal information that surpasses state-of-the-art models by 10%
- Developed a tool on top of Fastserver to manage and compare thousands of hyperparameter tuning experiments
- Developed several Spacy pipelines to clean texts and tell if named entities in the paragraph are negated and describes first-person
- Developed a lightweight and modular library ⓞ that features parallel GPU training (via Concurrent), easy configurations (via Hydra), and numerous flexible functions to facilitate deep learning development
- **Highlights:** Named Entity Extraction, Sequence Classification, Social Media, Long Document Transformer

An Interpretable AI Approach for Depression Diagnosis with Sensoring Data   Feb 2022 - Aug 2022

- Cleaned, matched, and time-aligned patient data from multiple sources including surveys and sensor recordings
- Developed a two-layer model with Segment CNN/GRU, Attention, and Prototype layers that outperformed baseline models with 10% improvement and better interpretability
- Overrode some Skorch classes to ensure compatibility with my parallel learning framework, ⓞ and developed a set of Ignite engines to enable effortless comparisons between PyTorch and Scikit-learn models.
- **Highlights:** Model Stacking, Health Informatics, Model Interpretation, Signal Processing

Imbalanced Classification Problem with Ensemble Selection   May 2018 - Feb 2019

- Implemented many machine learning algorithms including K-nearest neighbor, support vector machine, and decision tree algorithms as my basis models
- Proposed a heuristic-guided hill-climbing selection algorithm to achieve near-optimal performance compared to exhaustive search
- Tested efficacies of noise injection, data sampling, and instance rebalancing methods to improve model robustness
- Implemented nested cross-validation to improve data use efficiencies
- **Highlights:** Imbalanced Classification, Model Selection, Machine Learning

Natural Language Processing Course   Sep 2018 - Nov 2018

- Produced question answering system using regular expression to retrieve information from news articles
- Developed ensemble n-gram models to optimize scanning keyboard layouts for visually impaired patients and achieved 2nd place in class
- **Highlights:** Text Preprocessing, Bag of Words, Ensemble Model, Regular Expression

Honors & Awards

Best Complete Paper Nominee in INFORMS Data Science Workshop   Dec 2022

J.P. Morgan & Chase Graduate Scholarship   2016 - 2020