NICHOLAS CHEN

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EDUCATION

Carnegie Mellon University *Sept. 2021 - Dec. 2022*
M.S. in Machine Learning

University of Illinois at Urbana-Champaign *Sept. 2017 - May 2021*
B.S. in Computer Science
GPA: 3.98, GRE: 169Q, 169V, 5W
Selected Coursework: Trustworthy Machine Learning | Applied Machine Learning | Computational Photography | Systems Programming | Algorithms | Introduction to Bioinformatics | Artificial Intelligence | Data Mining | System Programming | Computer Architecture | Probability and Statistics for Computer Science | Smart Contracts and Blockchain Security | Financial Machine Learning

EXPERIENCE

Aspirant Capital *Sept. 2020 – Ongoing*
Founder

- Built an end-to-end high frequency trading system including low latency market data streaming, deep learning-based price prediction, order execution, and historical back testing
- Currently trade over 30 million dollars of volume daily, $30,000 profit YTD
- Designed an original DNN architecture with separated convolutional blocks for multi-modal input data
- Developed an automated training procedure to systematically optimize hyperparameters and features
- Deployed on AWS Cloud Infrastructure (EC2, S3, Lambda and Cloudwatch for automation)

Susquehanna International Group *June 2020 - Aug. 2020*
Quantitative Trading Intern

- Analyzed financial data to research a profitable machine-learning based trading strategy
- Optimized feature engineering and deep network architecture in Pytorch
- Integrated the model with in-house data pipelines and backtesting systems
- Studied options market making, game theory, probability, forecasting, and behavioral psychology

Google *Sept. 2019 – Dec. 2019*
Software Engineering Intern

- Automated hyperparameter tuning using Vizier, a black box Bayesian optimization algorithm
- Designed and prototyped Gmbed, a YouTube recommendation and search algorithm that represents videos as vector embeddings and trains a Gaussian mixture model on user watch history
- Gmbed facilitates exploration and provides novel suggestions by learning from natural user behavior

The Trade Desk *May 2019 – Aug. 2019*
Software Engineering Intern

- Developed a scalable object embedding pipeline to extract semantically consistent numeric representations for discrete/categorical variables
- Implemented a deep network embedder in Pytorch, paired with Spark and AWS EMR for massive scale distributed computing targeting millions of transactions per second
- Bolstered RTB advertisement bidding with site demographic estimation and user lookalike modeling
- Job submission in AWS Aurora and execution with Apache Airflow

US Securities and Exchange Commission *May 2018 – Aug. 2018*
Quantitative Analyst Intern

- Spearheaded the Commission's implementation of machine learning techniques to more accurately and completely detect market manipulation on U.S. securities exchanges
- Developed methods to visualize trading data and curated a database of live market data
- Designed and trained a convolutional neural network classifier to detect spoofing and layering

RESEARCH EXPERIENCE

Financial Machine Learning for Trading and Portfolio Management *Aug. 2021 – Ongoing*
CMU Auton Lab, Kenanga Investment Bank
Advisor: Prof. Jeff Schneider

- Researching deep learning-based predictive trading algorithms to identify inefficiencies in emerging markets
- Developing risk management and asset allocation strategies with learned uncertainty quantification
- Exploring model architectures (RNNs, GNNs, and Deep RL) to efficiently fuse multi-modal time series data

Super-resolution Augmented Image Compression *Sept. 2020 – Ongoing*
IBM-Illinois Center for Cognitive Computing Systems Research
Advisors: Profs. Jinjun Xiong and Wen-mei Hwu

- Combining super-resolution and deep learning-based compression models to provide higher compression ratios, enhanced quality, and drastically improved compute performance for image files
- Defining quality measurement metrics for evaluating decompressed images and generative adversarial networks
- Quantifying synergy between fine-tuned layers before and after end-to-end training

Safer Illinois and RokWall: Privacy Preserving Health Apps for COVID-19 *April 2020 – Ongoing*
IBM-Illinois Center for Cognitive Computing Systems Research
Advisors: Profs. Sanjay Patel and Andrew Miller

- Leading development of RokWall, an infrastructure for privacy-preserving centralized computation, and Safer Illinois, a decentralized contact tracing and COVID-19 passport application with over 50,000 unique users
- Designed with AWS EC2/Nitro enclaves to guarantee user privacy, even with an untrusted host
- Implemented secure health status and exposure mapping systems to track and combat the spread of COVID-19

PUBLICATIONS

Nicholas Chen, James Wei, Vikram Sharma Mailthody, Jinjun Xiong. *Super-Resolution Augmented Image Compression*. **Patent Pending**.

Vikram Sharma Mailthody*, James Wei*, **Nicholas Chen***, Mohammad Behnia*, Ruihao Yao*, Qihao Wang*, Vedant Agarwal*, Churan He*, Lijian Wang*, Leihao Chen*, Amit Agarwal*, Edward Richter*, Wen-Mei Hwu, Christopher W. Fletcher, Jinjun Xiong, Andrew Miller, Sanjay Patel. *CoTracer and RokWall: Privacy Preserving University Health Apps for COVID-19*. **NDSS CoronaDef 2021**. (*contributed equally)

Presentation: https://www.youtube.com/watch?v=pZOvRl6Yu2U

AWARDS

- IBM-Illinois Center for Cognitive Computing Systems Research URAI Fellowship
- UIUC Chancellor's Scholar (Top 1% per class)
- UIUC James Scholar
- Chicago Mercantile Exchange Award for Student Achievement
- Dell Merit Scholarship Gold Award
- National Merit Scholarship
- Ayn Rand Essay Contest Winner