Ziheng (Jack) Chen

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Education

University of Illinois Urbana-Champaign (UIUC) Aug 2023 – May 2025
Master of Science in Computer Engineering GPA: 4.00/4.00

University of Illinois Urbana-Champaign (UIUC) Aug 2019 – May 2023
Bachelor of Science in Computer Engineering, Minor in Mathematics GPA: 3.99/4.00 (Highest Honor)

Relevant Coursework Data Structures, Algorithms, Machine Learning, Deep Learning for Computer Vision, Dependable AI Systems, Computational Photography, Data Science Analytics using Probabilistic Graph Models, Statistics and Probability, Operating Systems, Communication Networks, Web Programming

Awards Ackmann Family Scholarship, I-Promise Scholarship, Dean's List, James Scholar

Work Experience

Software Engineer Intern (co-op), StoneX Group – Chicago, IL Jan 2023 – June 2023

- Engineered from scratch a comprehensive evaluation pipeline with `pandas` to benchmark prototypical commodity price indices measured by metrics, e.g., bid-ask spread and volatility
- Quantified the potential profitability of commodity indices generated from 200+ index configurations by changing parameters, e.g., rolling period, rebalancing frequency, and contract calendars, surpassed SPGCCI by 23.3% in 10-year total return and 8.8% in Sharpe Ratio with the top-performing tested index
- Expedited benchmarking processes by parallelizing the execution in `Databricks`, reducing waiting time by 3,000%
- Collaborated closely with marketing associates to validate index generation and refine evaluation requirements
- Created an actively utilized `Python` script for `CI/CD` on `Azure DevOps` to automate `Databricks` workflow migration from testing to production environments, eliminated manual operations and greatly enhancing overall productivity

Data Engineer Intern (co-op), StoneX Group – Chicago, IL Aug 2022 – Dec 2022

- Researched and deployed a proxy to integrate `Okta` authentication into an existing cloud application using `Docker`
- Optimized the data curation ETL pipeline for a data-serving application to cut waiting time by 20 times to 5 seconds
- Developed a real-time usage analysis dashboard in `Splunk`, featuring dynamic filters for associates and categories

Data Engineer Intern (full-time), Ecolab – Saint Paul, MN May 2022 – Aug 2022

- Profiled global sales history table in `Snowflake`, identifying 201M invalid rows to enhance data integrity
- Automated `SQL` query generation through `Python` and `APIs` to streamline the evaluation of data quality and usability

Research Experience

Traffic Risk Assessment and Mitigation, *Machine Learning, Autonomous Vehicles* Aug 2023 – Dec 2023

- Proposed innovative method to assign risks to other vehicles in traffic and introduced methods to improve safety
- Utilized `alphashape` in `Python` to calculate the reachable area of a vehicle following a bicycle model to identify risky vehicles in traffic and introduced methods to improve safety in an end-to-end AV simulation
- Executed simulations in parallel with `subprocess` and `ThreadPoolExecutor` in `Python` to generate 30,000+ traces from adverse seed scenarios with varied parameters, e.g., cut-in speed and timing of safety-critical actors, accelerating experiments by 200%
- Engineered a memory-efficient `ResNet` variant, reducing footprint by 50%, achieving 95%+ testing accuracy and F1-score for predicting vehicle trajectory heatmaps
- Cleansed and statistically analyzed generated datasets using `pandas`, and visualized outcomes with `seaborn` and `matplotlib`, proving efficacy of the proposed metric over current state-of-the-art risk assignment methods
- Implemented a Reinforcement Learning Agent in `PyTorch`, leveraging ego-vehicle telemetry and camera-feed from three front-facing cameras to achieve a 72.7% reduction in accidents through emergency braking

Friction Model Improvement in CARLA Simulator, *Autonomous Vehicles* Sept 2022 – May 2023

- Studied the vehicle physics model implemented in `CARLA` and improved the friction model as a function of weather settings following previous literature on vehicle friction
- Generated and analyzed 8,000+ vehicle traces in varying weather conditions, creating 300% more accidents
- Acquired expertise in modifying the perception, control, and planning modules in the `CARLA` simulation platform

Teaching Experience

Graduate Teaching Assistant, University of Illinois Urbana-Champaign (UIUC) Aug 2023 – Dec 2023

- Facilitated discussion sessions on computer science concepts for CS/ECE 374: Introduction to Algorithms
- Conducted weekly office hours of 20+ students to provide individualized guidance and clarification on assignments

Projects

Object Detection Neural Network, *Machine Learning, Object Detection* March 2023 – April 2023

- Implemented a YOLO-like object detector in `PyTorch` on the PASCAL VOC 2007 dataset
- Achieved 1-mAP score of 0.55 locally and 0.448 on Kaggle

GymLog, *Web Application, Frontend, Backend, Full-Stack Development* Oct 2022 – Dec 2022

- Created a responsive cross-platform workout logging web app with `React` and `TypeScript`, deployed on `Heroku`
- Supported user authentication via `Firebase` to facilitate tracking and deliver personalized recommendations
- Established a `MongoDB` database for seamless data synchronization, employing `Mongoose` for frontend integration
- Earned recognition for exemplary prototyping, securing runner-up accolades in class upon project completion

Coffee4Life OS, *Linux System Kernel, System Programming, Low-Level Programming* Mar 2022 – May 2022

- Developed a functional 32-bit `Linux` kernel in `C` and low-level `x86 Assembly`
- Supported paging, RTC, keyboard, terminal, file system, system calls, context switching, and scheduling operations

OpenFlights, *Data Structures, Network Algorithms, Large-Scale Data Processing* Mar 2021 – May 2021

- Designed data structures to host large-scale flight data with 8,000+ airports and 67,000+ routes in `C++`
- Implemented Landmark, PageRank, and Dijkstra's algorithms to search for possible paths with routing options

Skills

Programming Languages	`Python, C, C++, JavaScript, TypeScript, HTML, CSS, SQL, Assembly, CUDA`
Frameworks and Tools	`Git, Linux, Docker, React, pandas, PyTorch, NumPy, Azure DevOps`
Languages	English, Chinese (Mandarin)