Lawrence Zhang

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Education

University of Maryland (3.66/4.00 GPA) College Park, MD

B.S. Computer Science, Minor in Computational Finance *Expected Graduation: May 2025*

Select Coursework & Certificates: Natural Language Processing, Deep Learning, Artificial Intelligence, Data Science, Computer Systems, Parallel Computing & HPC, Cloud Computing, Data Structures & Algorithms, Financial Markets and Datasets, Options & Derivatives Theory

Experience

Amazon Bellevue, WA

Software Development Engineer Intern *May. 2024 – Aug. 2024*

- Worked with Amazon Fulfillment Tech (Capacity Team) to design and create new native AWS architecture to replace a core database service containing warehouse area data for all world wide fulfillment centers.
- Performed live migration on thousands of PostgreSQL tables to DynamoDB using AWS CDKw, SNS & SQS
- Designed and built robust data validation and error handling pipeline with feature flags to automate resolving data inconsistencies between over 1 billion records, leading to significant cost savings and reducing data error rate.
- Created fault-tolerant APIs to handle over 25,000 transactions per second with automatic retries and error logging

UMD MIND Lab College Park, MD

Undergraduate Research (Breathing Analytics) *Jan. 2024 – May 2024*

- Assisted in research lab on time series analysis and segmentation of breath sensor data to identify anomalies in force and acceleration data using Scipy and Statsmodels in order to help predict sickness in patients.
- Optimized code base improving load times by up to 80% on key data visualization platforms by performing data augmentation to identify and condense overlapping force and sleep period data intervals.

AbbVie North Chicago, IL

Software Engineering Intern *May. 2023 – Aug. 2023*

- Designed and created a full-stack internal project request and forecasting tool utilizing SQL and JavaScript.
- Improved the workflow of submitting vendor data by performing regression tests and simplifying existing workflows
- Assisted in creation of testing process and error reporting for external adverse event reporting tool.

Projects

MS-PyCloud - High Performance Proteomics Computing | *Docker, Azure Batch, SQL* bioRxiv Link

- Collaborated with John Hopkins Medical to develop cloud based proteomics data search and analysis application.
- Implemented support for MSFragger (search system) and created automatic deployment pipeline on Azure via docker images allowing for computation speedups on the cloud of over 80% compared to local deployment.
- Optimized data processing with Azure Batch allowing for processing of over 850GB of data at a time at a rate of over 170GB per hour, allowing analysis of entire peptide databases in fewer jobs, vastly improving analysis time.

WeatherNet - Neural Network For Super Resolution | *Pytorch, Numpy, Google Cloud, Xarray* arXiv Link

- Created a novel climate super-resolution model to downscale 1.0 degree resolution Graphcast and ERA5 climate reanalysis data down to 0.5 resolution, allowing for improved detail in climate forecasting and weather prediction.
- Implemented custom CNN model based on a modified SRCNN architecture utilizing skip connections and residual blocks with 76% accuracy on downscaling cloud coverage and temperature data.

Trivial Trivia | *Python, Flask, MongoDB, Llama3, NLTK, Transformers*

- Created full stack web application to test adversarial trivia questions against both humans and gen-AI LLM agents. Additionally created custom fine tuned agents that reduced hallucinatory answers by over 18%.
- Utilized custom tokenization & feature-engineering with RAG to use Wikipedia to increase answer accuracy.

Technical Skills

Languages: Python, Java, C++
Technologies: Linux, AWS, SQL, Pytorch, Pandas, NLTK, NumPy, Git, OpenMP
Concepts: Machine Learning, Data Science, Databases, Backend Engineering, Software Engineering, CI/CD, Agile Development, Big Data, High Performance Computing, Risk Modeling