Resume: Jiachen Liu

7348814120 | amberljc@umich.edu

Objective: PhD Program in CSE

EDUCATION

University of Michigan *Sep 2018 - Jun 2020*

Bachelor of Science in Engineering in Data Science *Ann Arbor*

- **GPA:** 3.9/4.0 ; Minor in Mathematics
- **Coursework:** Data Mining and Machine learning (A), Deep Learning (Grad. A), Database System (A), Numerical Method (A+), Linear Regression (A), Computational Data Science (Grad.)
- **Honors/Awards**: Dean's List (2018), Dean's List (2019), 2019 University Honors

Shanghai Jiao Tong University *Sep 2016 - Jun 2020*

Bachelor of Science in Electrical Computer Engineering *Shanghai, China*

- **Honors/Awards:** Best Technology Award in Design Expo (2017), Distinguished Academic Achievement Award, Dean's List (Top 5, 2017-2018), Undergraduate Scholarship (Top 30%, 2016-2018), Excellent Student Union Member (2017), Champion of the Freshman Cup of women's basketball in SJTU (2016)

Massachusetts Institute of Technology (Full-time visiting researcher in EECS CSAIL) *May 2019 - Sep 2019*

University of Navarra (Exchange Student) *Jun 2018 - Mar 2018*

RESEARCH EXPERIENCES

Computer Science & Artificial Intelligence Lab, MIT *May 2019 - Present*

Advisor: Professor Samuel Madden *Cambridge*

Project: High-dimensional Data Index: Adaptive Product Quantization Supporting Data Streaming

- Proposed an ANN (appropriate nearest neighbor) search model based on product quantization (PQ) to support fast NN searches in high dimensional scalable dynamic databases with high query speed and high accuracy simultaneously.
- Developed two novel designs for product quantization to support index updating: (a) utilizing hierarchical clustering to replace K-Means while indexing and (b) utilizing the tree structure of hierarchical clustering to efficiently split or merge clusters to adapt index to the new data with different distributions.
- Optimized product quantization searching efficiency in two ways: (a) using spherical K-means to build coarse index in order to do data pruning, and (b) using machine learning to identify the dominant features in order to do feature pruning.
- Adapted the dataset to the quantizers by learning the subspaces partition with higher cluster tendency in order to improve the quality of codebook and reduce the searching complexity.
- Implemented the proposed algorithm and state-of-the-art algorithms (LSH, HNSW, PQ) for ANN search tasks, with experiment results showing that our proposed model is 2 - 10 times faster than the baseline, while keeping high accuracy.

Electrical Engineering and Computer Science, University of Michigan *Sep 2019 - Present*

Advisor: Professor Mosharaf Chowdhury *Ann Arbor, Michigan*

Project: Distributed Machine Learning Scheduling

- Proposed a 2-level cluster scheduler that can break Gang scheduling for ML jobs by scaling up/down number of workers.
- Developed a reverse-resource offer model that the framework can give out flexible resources to the cluster scheduler for scheduling incoming jobs.
- Applying to AutoML jobs' scheduling to reduce job completion time and cluster utilization
- Designing the scheduler to make decisions based on jobs' partial information, which contains the predicted runtime and potential resources allocation.

Industry Operation Engineering Department, University of Michigan *Feb 2019 - May 2020*

Advisor: Professor Siqian Shen , Sponsored by Didi Chuxing *Ann Arbor*

Project: Machine Learning Based Route Recommendation System

- Investigated machine learning and robust optimization to build a route recommendation system to predict a customized route choice for ride-sharing.
- Applied a deep neural network approach to cluster customers by mapping the historical data to a deep feature space, and tagging the clustered customers to make a personalized recommendation.

Electrical Engineering and Computer Science , University of Michigan *Feb 2019 - Apr 2019*

Advisor: Professor Honglak Lee

Project: Text-and-Vision-Fused Framework for Academic Paper Review

- Proposed a deep learning-based text-and-vision-fused framework, to distinguish academic papers of lower quality based on contents, vocabulary usage and image quality, aiming to efficiently pre-filter bad papers out of academic paper review.
- Developed a novel hierarchical LSTM structure combined with ResNet to enable the model to understand long text.
- Conducted experiments on the fusion model with the state-of-the-art model and demonstrated high accuracy on the test set.

PROJECT EXPERIENCES

Robust Real-time Object Detection *May 2017 - Aug 2017*

Advisor: Yu Zheng (SJTU Summer Design Expo)

- Implemented a system to support real-time object detection, which was robust to background noise, using SVM, the region-growing method and the HSV background removing method, which was shown robust to background noise.
- Realized real-time data transfers through Internet so that users could monitor the activities in certain area.
- Won the "Best Technology Award" in the Summer Design Expo at SJTU.

Augmented Reality Ghost Hunting *Oct 2018 - Dec 2018*

Alternate Reality Initiative club

- Designed augmented reality games using Unity, aiming to beat a "ghost" enemy without being attacked.
- Engaged in workshops and activities focusing on Augmented Reality and Virtual Reality.

Fog Auto Collection Using Bionics Structure *May 2018 - Aug 2019*

Advisor: Roberto Dugnani (Participation in Research Program)

- Contributed to constructing a testing environment for an auto collecting device that can set the humidity, wind, temperature and sunlight levels using Raspberry Pi.
- Tested the auto collecting materials in different scenarios and tuned the surface structure to increase water adhesion.

EXTRACURRICULAR EXPERIENCES

University of Michigan EECS *Sep 2019 - Present*

Instructional Aide EECS484 Database System *Ann Arbor, MI*

- Lead the weekly recitation classes and hold the office hours.
- Work as part of the Center for Learning and Teaching to support students' in the learning processes.

Student Union of Joint Institute *Jun 2017 - Aug 2018*

Vice President *Shanghai, China*

- Coordinated the work of the various departments under Student Union to ensure the division of labor and cooperation.
- Communicated with all departments' directors weekly to ensure reliable operation.
- Founded the debate team and directed the team to prepare for various competition.

COMPUTER SKILLS

C++ (Proficient), Python (Proficient), SQL (Proficient), R (Proficient), C, Matlab (Proficient)