Zirui (Ken) Deng

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Github: https://github.com/ZiruiDeng *LinkedIn: https://www.linkedin.com/in/zirui-ken-deng-583356171/*
Blog post: https://sql617843007.wordpress.com/2020/11/24/nosql-vs-sql-who-is-better-today/

EDUCATION

Washington University in St. Louis **St. Louis, Missouri**
PhD Candidate in Computer Science August 2021 – Present

Emory University **Atlanta, Georgia**
B.S. in Applied Mathematics and Statistics & B.S. in Computer Science
Highest Honors in Applied Mathematics and Statistics August 2017 – May 2021
·**Major GPA:**3.92 / 4.0
·**GPA:**3.8 / 4.0
·**Relevant Coursework:** Deep Learning, Machine Learning, Numerical Analysis, Multi-variable Calculus, Linear Algebra, Linear Optimization Theory, Non-linear Optimization, Partial Differential Equations, Probability & Statistics, Discrete Structures, Data Structures and Algorithms, Database Systems, Systems Programming

PUBLICATIONS

Z. Deng, V. Ramkumar, N. Raviv, "Perfect Subset Privacy in Polynomial Computation," *IEEE International Symposium on Information Theory (ISIT)*, 2024.

Z. Deng and N. Raviv, "Approximate Private Inference in Quantized Models," *IEEE International Symposium on Information Theory (ISIT)*, 2023.

RESEARCH EXPERIENCE

Predicting Surgical Case Duration Using Neural ODEs
St. Louis, Missouri
Washington University in St. Louis August 2021 – November 2021
·Thoroughly studied the idea of Neural Ordinary Differential Equations (ODEs), performed necessary data preprocessing on available patient case data with both static and time-related dynamic variables, and trained neural ODE models on time series medical data
·Established deep learning long short-term memory (LSTM) network architecture that takes in both static and dynamic variables of patient data and produces a forecast of surgical case duration as a continuous probability distribution
·Incorporated the trained neural ODE time series into established deep learning architecture and evaluated the extent of improvement from addition of ODE layers using the continuous ranked probability score (CRPS) metric

Undergraduate Honors thesis: Fair algorithms in machine learning
Atlanta, Georgia
Emory University May 2020 – April 2021
·Studied the notion of fairness in machine learning with a special care about representing protected groups fairly with respect to a sensitive feature (race, gender, etc.)
·Researched a variety of clustering algorithms that are capable of solving the fair variants of clustering problems with reasonable approximation ratios
·Compared and contrasted different algorithms to see what advantages they bring to the whole picture of fair clustering problems and what situations they may fail to take into account
·Further explored the flexibility of the algorithms by imposing additional constraints on the problems and figuring out if the algorithms would still work without losing much accuracy

Deep Learning Project: Multi-variate Neural Ordinary Differential Equations for Time-series Modeling
Atlanta, Georgia
Remote from Emory University May 2020 – July 2020
·Implemented various models and techniques of deep learning (Batch normalization, CNN, GRU, LSTM, etc.) and applied them to areas like computer vision and natural language processing

·Thoroughly absorbed crucial concepts from key papers on recent areas of deep learning algorithmic development such as neural ODEs and momentum contrast for unsupervised learning
·Performed data augmentation on time-series data sets and then defined contrastive loss on the augmented data examples
·Successfully implemented momentum contrast on the augmented time-series data and achieved experimental results comparable to those presented in the original MoCo paper

Machine Learning Project on Credit Card Fraud **Atlanta, Georgia**
Emory University Nov 2019 – Dec 2019
·Utilized credit card fraud dataset from Kaggle competition and chose recall score and area under the precision-recall curve (AUPRC) as model assessment metrics
·Applied different machine learning classification models to the dataset and computed metrics scores and plotted precision-recall curves of the models
·Compared results of models and analyzed reasons why some models performed at a higher level than others from aspects of dataset and model algorithms
·Reflected upon limitations of the approach and acknowledged the possibility of future work to gain more precise and comprehensive outcomes
Link: https://drive.google.com/drive/folders/1T06JpstXWo0Bp7mjQhbi-Up7-Bjo7hMX

Harvard Machine Learning Online Research Course **Atlanta, Georgia**
Emory University July 2019 – August 2019
·Explored deeply into the key concepts of machine learning during lectures by Harvard professors and implemented core machine learning algorithms in lab sessions
·Successfully fit proper models to make reasonable predictions for real-life problems such as bike sharing usage and cancer classification
·Conducted group presentation about the results attained from model fitting and reflected on which models were more suitable as well as how to further improve our models in future research
·Received recommendation from professor and course mentor

INTERNSHIP

Data Analyst Internship **Nanjing, China**
China Telecom May 2019 – June 2019
·Explored Python crawler technology and deeply understood how to use selenium to achieve automatic login to websites
·Actively participated in the research of the company's financial robot project through firstly getting familiar with the rules of operating the robot and their sample code implementations and then successfully writing code modules corresponding to the rules

Investment Analyst Internship **Shanghai, China**
Ten Billion Research Laboratory in Shanghai May 2018 – June 2018
·Conducted extensive research on various types of blockchain programs, computed SWOT analysis and prepared rating reports on the programs
·Interviewed blockchain leaders, sorted out interview notes and composed summaries and reports on the discussions
·Participated in weekly discussion meetings on current and future trends of the blockchain industry
·Received the recommendation letter from the supervisor at the end of the internship period

ADDITIONAL INFORMATION

Languages: Fluent in English and native language
Technical Skills: Java, Python,Matlab, R, Excel, C/C++, LaTeX
Activities: Bilingual Reading Project, Dongrun-Yau Science Awards
Interests: Basketball, Weiqi---amateur 5 grade in Weiqi, national second-level athlete in Weiqi