Honghao Liu

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Education

Hong Kong University of Science and Technology **Sep. 2020 – Sep. 2022**
Master of Philosophy in Data Science and Analytics GPA: 3.656/4 *Hong Kong*

Wuhan University of Technology **Sep. 2016 – Jun. 2020**
Bachelor of Engineering in Computer Science GPA: 88.4/100 *Wuhan, Hubei*

Research Experience

Supply Chain Optimization with Data Analytics Method **Apr. 2022 - present**
Advisor: Siyuan Liu, The Pennsylvania State University *Online*

- Sorted out the shipment data provided by a chemical logistics company - CLX Logistics.
- Found the exceptional transactions by kernel density function based clustering. The outliers of clusters are the exceptional transactions.
- Analyzed the relations between cluster results and other features by some statistic methods like correlation, entropy and Bayes theorem.

Efficient Radio Interferometric Imaging on GPU (Accepted by IEEE eScience 2022)Oct. 2020 – Sep. 2022
Supervisors: Qiong Luo and Yang Xiang, HKUST *Hong Kong*

- Implemented the non-uniform Fourier transform (NUFFT) which is one of the methods of wide field imaging algorithm in CUDA, parallelized the gridding and degridding which transform information between spatial domain and temporal domain on GPU, and provided python interfaces.
- Optimized the convolution/spreading procedure by removing the locks, increasing the cache hit and speeding up kernel/mask function evaluation by Taylor series approximation.
- Accelerated the NUFFT **3-5** times compared to the fastest parallel algorithms -finufft/cufinufft and speeded **2-4** times up than the interferometric imaging algorithm - W-gridder/ducc.

Nameplate Detection and Text Recognition **Jul. 2019 – Aug. 2020**
Shenzhen Institute of Technology, Chinese Academy of Sciences *Shenzhen, Guangdong*

- Established nameplate dataset by collecting nameplates provided by China Southern Power Grid Company Limited and annotated words and text regions with rectangle bounding boxes in nameplate images.
- Tested the performance regarding the accuracy of the text region detection and word extraction, designed a metric for overall performance and analyzed the reasons for error outputs (poor generalization or data quality).
- Provided a friendly human-computer interaction service for the power grid company.

Course Projects

Privacy Preserving Donation Chain Based on Ethereum **Sep. 2021 – Jan. 2022**

- Analyzed current necessities of decentralized donation procedure and implemented the smart contract by solidity.
- Implementing the Ethereum private network and adopting the clique consensus protocol for creating new blocks.
- Preserving information of detonators by the homomorphic encryption algorithm in the private network.

Spectral Clustering Algorithms Reimplementation and Analysis **Sep. 2020 – Dec. 2020**

- Re-implemented Ultra-Scalable Spectral Clustering and Scalable Spectral Clustering Using Random Binning Features with different programming language - python.
- Compared the execution time with the original implementation based on five real world datasets and five synthetic datasets, and compared those two methods with the basic K-means clustering regarding time consumption and memory footprint based on 5 real world datasets.
- Visualized the experiment results with two different methods - principal component analysis and heat map.

Coursework

- Parallel Programming
- Advanced Algorithmic Techniques
- Data Analysis and Privacy Protection in Blockchain
- Discrete Mathematics

Additional Information

Skills: CUDA C, C++, python, MPI, LaTeX, Git, solidity
Interests: Alternative rock music and volunteering (homeless dogs caring)
Language: Mandarin (native), English (fluent)