Haitian Hao

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EDUCATIONAL BACKGROUND

New York University, NY 09/2021 – 05/2023
M.S. in Computer Engineering
Core Coursework: Principles of Database Systems | Computing Systems Architecture | Internet Architecture & Protocols

University of Maryland, College Park, MD 09/2017 – 05/2021
B.S. in Computer Science, B.S. in Mathematics (Double Degree) | Academic Dean's List | GPA: 3.4
Core Coursework: Design and Analysis of Computer Algorithms | Advanced Data Structures | Deep Learning | Machine Learning | Data Science | Object-Oriented Programming | Computer Vision | Advanced Calculus | Applied Linear Algebra

RESEARCH EXPERIENCE

Optimize and Innovate Algorithms for Estimating Medoids in Large Datasets 09/2020 - 12/2020

- Developed a novel heuristic algorithm for solving the k-medoids problem to allow data clustering with decent robustness to noise and the ability to handle non-numerical values.
- Attained the objective by solving k trivial sub-problems of centrality; proved that the algorithm's time complexity scales with the number of clusters rather than the number of data points.
- Experimentally evaluated the new algorithm against two commonly used algorithms for k-medoids clustering, showing orders-of-magnitude improvement in computational efficiency and noticeable improvement in cluster quality.

WORK EXPERIENCE

Software Developer **| MicroShield Technology (Beijing), China** 05/2021 – 08/2021

- Worked as a part of the development team to achieve key business objectives.
- Extensively worked with Open Source JavaWeb frameworks like Spring, Maven, Servlet.
- Learned and deployed Model-View-Controller design pattern.

Software Engineer Intern **| Dajia Insurance Group (Beijing), China** 06/2019 – 08/2019

- Contributed to building a financial system using Oracle database.
- Employed predictive analytics to aid in employee retention for clients.
- Employed SQL-based relational database to enable efficient internal management of data.

PROJECT

Implementation of Object-Oriented Programming (Java) 09/2020 – 09/2021

- Implemented programming projects of Linked Lists, Blackjack Game, Polymorphic BST, Orders Processor, etc.
- Extensively applied and implemented principles of OOP: Encapsulation, Abstraction, Inheritance, and Polymorphism.
- Worked with Java multithreading.

Stock Price Prediction (Python) 03/2020 – 05/2020

- Designed, trained, validated, and tested a reinforcement learning (RL) model to predict short- and long-term stock prices:
  - Completed an extensive literature review on Google Scholar and arXiv, focusing on the publications related to algorithmic trading, deep learning, etc.
  - Designed a hybrid model integrating 1) an LSTM network for encoding the time series data and 2) RL with policy gradient and reward-to-go for price trend prediction.
  - Optimized the algorithm by tweaking loss function, state/action space, reward function, experience replay, and normalization.

House Price Prediction (Python) 07/2019 – 08/2019

- Completed a systematic regression analysis to predict the house price trend in the city of King Country, US:
  - Performed data cleansing to remove low-quality entries, reduce feature redundancy using PCA, handle missing data points, inflation correction to monetary value, etc.
  - Conducted exploratory analysis on the dataset and provided observations; leveraged scatterplot and histograms to facilitate pattern extraction; built a correlation matrix to quantify and summarize the relationships between the variables.
  - Defined proper performance metrics and prepared training/testing datasets; built, trained, and validated multiple regressor models for house price prediction using learning curves and complexity curves while examining the bias-variance tradeoff; leveraged cross-validation and grid search for hyperparameter optimization.

Implementation of Data Structures (Java) 09/2018 – 01/2020

- Implemented various data structure models with Java, including BST, Binary Heap, Linked List, Priority Queue, AVL-Tree, Red-Black Tree, etc.
- Improved speed and memory usage of data structures and algorithms.

SKILLS

Programming Languages: Java | Python | MATLAB | R | MySQL | Ruby | OCaml | HTML | CSS | JavaScript
Software: PyCharm | Eclipse | IntelliJ | GitHub | GitLab | Jupyter Notebook | MySQLWorkbench
Libraries: Scientific Computing (NumPy, SciPy) | Data Manipulation (Pandas) | Machine Learning (Scikit-Learn, PyTorch, Keras, TensorFlow) | Visualization (Matplotlib, Seaborn)
Others: Fluent with English, Mandarin; Good at basketball, swimming, skiing, ping pong, guitar, singing, etc.