Haitian Hao

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EDUCATION

New York University, NY   09/2021 – Expected 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) | GPA: 3.4
- Multiple semester Academic Dean's List awards
- **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

Certificate: Deep Learning Specialization (Coursera) - Sequence Models, CNN, Hyperparameter Tuning, Network Optimization

SKILLS

Programming Languages: Java | Python | C | MATLAB | R | SQL | Ruby | OCaml | HTML | CSS | JavaScript
Software: PyCharm | Eclipse | IntelliJ | VS Code | GitHub | Jupyter Notebook | Google Colab | MySQLWorkbench
Industry: Web Development (Spring, SpringBoot, Maven) | Databases (SQL) | Scientific Computing (NumPy, SciPy) | Data Manipulation (Pandas) | Machine Learning (Scikit-Learn, PyTorch, Keras, TensorFlow) | Visualization (Matplotlib, Seaborn)

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 back-end developer in the development team to achieve key business objectives.
➢ Extensively worked with JavaWeb frameworks - **Spring**, **SpringBoot**, **Maven**, **Servlet**.
➢ Learned and deployed 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 **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.
➢ Repeatedly applied and implemented principles of OOP: **Encapsulation**, **Abstraction**, **Inheritance**, and **Polymorphism**.
➢ Worked with Java **multithreading** and concurrency, analyzed and optimized runtime and CPU utilizations.
➢ Designed and programmed inclusive test cases for each project via **JUnit** in **IntelliJ IDEA**.

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**, 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**.
   ■ 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 **regression** models for house price prediction using learning curves and complexity curves while examining the bias-variance tradeoff; leveraged **cross-validation** for hyperparameter optimization.

Implementation of Data Structures and Algorithms (Java)   09/2018 – 01/2020
➢ Implemented multiple projects of data structure models in Java, including **BST**, **Binary Heap**, Linked List, **Priority Queue**, **AVL-Tree**, **Red-Black Tree**, etc.
➢ Implemented major algorithms including **Kruskal's Algorithm**, **Prim's Algorithm**, **Dijkstra's Algorithm**, **Bellman Ford's Algorithm**, **Breadth-First / Depth-First Search**, Floyd's tortoise and hare, etc.
➢ Analyzed and Improved **time and space complexity** of data structures and algorithms.