Personal Statement

It was in Pattern Recognition, one of my university courses, that I witnessed the awesome performance of supervised and unsupervised learning models. This first brush with the theory and application of data science fueled my interest and motivated me to dig into this field. Through relentless learning and practice, I earned an opportunity to participate in the TREC Video Retrieval Evaluation held by the National Institute of Standards and Technology, cooperating with other graduate students throughout two consecutive years. In this process, I learned that the limitations of large-scale data science applications are not merely in their unreliability in predicting data but also in the significant costs of processing such huge volumes of data. These challenges whet my curiosity and enticed me to pursue further study in data science.

To embark on my journey to a Master's program in Data Science, I have accumulated fundamental theories, practical experience, and relevant research skills which endowed me with the confidence and ability to succeed. Academically, majoring in Computer Science at Wuhan University, I took systematic training and got a GPA of 3.813/4.0 in major courses which reflected my decent learning ability and firm theoretical foundation.

Beyond soaking up theory, I proactively involved myself in the practice of computer and data sciences, exercising my capabilities in state-of-the-art technologies by solving practical problems. For example, in the Mathematical Contest in Modeling held by the Consortium for Mathematics in the United States, I endeavored to become proficient in applying basic mathematical modeling methods, earning the award of meritorious winner by my desirable model outcomes. Additionally, out of interest, I designed a Telegram chatbot for soccer fans to query game information. In exploring the process of negotiating challenges in natural language parsing and relevant dialogue generation, not only did I get involved in natural language processing but also honed sophisticated hands-on software development skills. The accumulation of this practice laid a robust groundwork for me to easily begin brand-new projects such as an embedded multimedia player designed to be deployed in edge devices like cars and bicycles, and a school bus assistant WeChat applet that provided convenient school bus services for students and bus drivers in my university.

Additionally, one of the projects that brought a major influence on me was the aforementioned TREC Video Retrieval Evaluation. I was engaged in retrieving frames that matched topics from EastEnders, a BBC soap opera and taught myself machine learning and other relevant methods of content-based retrieval. My primary responsibility was to implement scene recognition. I therefore employed local feature-based retrieval methods like the Single Shot MultiBox Detector Method, and global feature-based retrieval methods like fine-tuning pre-trained VGG models to classify frame content. To enhance its accuracy, I extracted features of the target scene that were then applied in late feature fusion. Our efforts and efficient cooperation finally led to a high-accuracy video retrieval service for evaluation.

The hard skills honed, and the learning ability built up through my experiences encouraged me to delve into more complicated research. However, COVID-19 upset my plan in senior year to continue further study in the United States. Fortunately, following my desire to design data science systems for efficient deployment on the industrial scenes, I grasped an opportunity to enroll in Wuhan University's Master's in Computer Science and worked in the Institute of Artificial Intelligence on optimizing and efficiently deploying ML models. During graduate study, I participated in many advanced courses exploring state-of-the-art technologies in computer science, especially data science, and scored an outstanding GPA of 90.03/100.

Aiming to enlighten my research area in graduate school and my future career direction, I seized the opportunity to work as an Intern C++ Software Engineer in Alibaba Cloud which is the best Cloud Service Provider in China, intending to grasp the developing tendency of Data Science infrastructure. As a member of the Virtual Private Cloud team, I shouldered the responsibility to integrate our network platform with VMware NSX, in order to promote Private Cloud Service to China Telecom. Therefore, I deployed the VMware NSX on a single physical server, normalized the procedure of migrating OpenStack into the NSX-T environment, and succeeded in managing and controlling NSX-T transport nodes with our product. What's more, to speed up our software iteration process, I refactored the program which is designed with C language for virtual gateway management, successfully decreasing the code lines by 60% and reducing the workload of incremental functions by 80%. Through the internship, I realized that the feasibility of industrial-level applications considerably relies on the optimization of time costs.

Hence, to overcome the challenge of optimizing time latency for data science applications, I was deeply involved in a research project to design a high-performance ML framework to accelerate model inference. For high-level optimization, I designed several operator fusion methods to streamline the computational graph with the support of Relay Intermediate Representation. Additionally, to resolve issues in the laborious maintainability of rule-based graph-level optimization, I developed a scalable and automatic compiler with graph partitioning and dynamic programming algorithms to reduce compiling complexity. This work led me to publish a research paper "GLite: A Fast and Efficient Automatic Graph-Level Optimizer for Large-Scale DNNs" at the 59th Design Automation Conference as the lead author and oral presenter. At the low level, I developed a high-performance operator library by adopting Auto-Scheduling and Polyhedral strategies to realize code generation. Integrating with other memory optimizations and distributed schedules, our system attained an inference speedup ranging from 1.5x to 5x compared with that of PyTorch and TensorFlow.

Through my graduate research experiences, I curated a thorough understanding of the mechanisms underlying data science systems and frameworks such as how data science algorithm code could be efficiently deployed, compiled, optimized, lowered, and executed. Equipped with that in-depth knowledge, I discovered my interest in learning the implementation details of data science methods to extract and optimize computational features instead of adopting generic optimization methods which are likely to be sub-optimal. My professional ambition is to be a data scientist and to contribute to reducing the cost of industrial-grade data science applications, thereby increasing the cost-effectiveness and availability of data science technologies.

Therefore, I wish to be admitted to the Master of Science Program in Data Science at the Rice University, where I may connect with the industry engineering challenges and systematic courses in data science. In terms of practice, the program provides students with opportunities to attend key capstone projects where I could adopt data science technologies and research with like-minded professors and students to achieve real objectives. This program is an ideal platform, uniquely allowing me to expand my academic comprehension, facilitate my further practice and research in data science, and realize my professional ambitions. Demonstrating my passion in this program as I have done in my previous work, I am confident that my experiences have prepared me well for this program. I am so thrilled to have had this opportunity to apply to your prestigious program and am grateful for your favorable consideration of my application.