Statement of Purpose

During my undergraduate summer vacations, I had completed a deep learning course and was busy experimenting with some algorithms when I heard my grandmother complaining about a small dark spot which had appeared on her forearm recently. I took a series of images of that spot from different angles, and fed them into Google's Inception V3 vision model, which I had retrained for skin pattern recognition. To my surprise, it identified the lesion as malignant. When I took my grandmother to the dermatologist, he said it was really unlikely for it to be a malignant lesion, however a biopsy was ordered just to double check. The results were surprising as it was an early, subtle example of an evolving melanoma, so we caught it at a completely treatable stage. This experience, while significant, was one piece of a larger puzzle that drew me to data science. It highlighted the potential of AI in healthcare, contributing to my growing fascination with the field and the potential to shift healthcare from a reactive to a proactive approach. The current healthcare system often focuses on treating existing conditions, but AI offers the exciting possibility of preventing them through early diagnosis. While treatment has undeniably improved life expectancy, the next frontier lies in enhancing quality of life and lifespan through proactive, preventative measures.

As a decision analytics associate at ZS, a prominent firm in healthcare consulting, I designed dynamic and interactive reports, KPIs, and automated dashboards tailored for the Japanese healthcare market, empowering clients to make informed and strategic business decisions based on sales force activity and patient data. My work ranged right from analysing market research data for the launch of a new drug to predicting erosion in sales for a patent expired drug. I also analysed patients' journey and treatment pathways to understand the evolving trends of prescribed drugs using tools like Rstudio for licensed electronic medical records and claims data. One of my significant contributions involved a high priority task where I leveraged my data analytics skills to help negotiate a $2.9 million contract for my client. By analysing the market trends, sales force activity along with patient behaviour I was able to make a compelling case that was used to guide the negotiation. This was a rewarding task in my professional journey, one whose impact was acknowledged even at the highest levels of the client team in Tokyo. Connecting the dots, the early potential I witnessed with my grandmother’s diagnosis, combined with the practical application and impact I achieved at ZS, solidified my conviction that data science could be instrumental in transforming healthcare.

Through CUHK’s Master’s program in Advanced Studies in Statistics and Data Science, I hope to further explore how to enhance and integrate artificial intelligence systems with healthcare for clinical diagnosis which are also aligned with human values. The course on Advanced *Statistical Inference* will help me build fast real-time analytics dashboards that accounts for sales force activity data along with insights on patient behaviour from electronic health records. In the same vein, electives such as *Optimization in data science* would allow me to choose predictive models for preventative healthcare, like using ECG data from modern wearables for early detection of hypertrophic cardiomyopathy (HCM). By leveraging machine learning, I could create algorithms to identify subtle ECG anomalies, enabling early diagnosis

and intervention to improve outcomes and reduce healthcare costs through timely, data-driven care.

The program's research workshop will enable me to work with real world industry problems and collaborate with Prof. Xiaodan Fan on his extensive research in pattern recognition and computational biology. This will present an excellent chance for me to learn about complexities of building better diagnostic systems for disease prediction using genetic data. Having worked in client facing projects in ZS, I understand how collaboration can play a key role in implementing a new idea. Thus, I am certain that CUHK's masters in Advanced Studies in Statistics and Data Science program will prepare me to succeed in a team setting that balances many data science roles, while equipping me to better deliver results to stakeholders.

Throughout my university studies, I have built a strong foundation in mathematics, signal processing, and Python, which complimented my growing curiosity in data science and machine learning. At Samsung R&D, I undertook a research internship, tackling challenges in the speech processing domain. My project on data augmentation using adversarial synthesis was published in an IEEE conference and cited by researchers globally. I also worked on predicting 30-day patient readmission in Japan using claims data, preparing the dataset from scratch and identifying key factors using Shapley values with an XGBoost classifier. Outside of work, I am an active Kaggle contributor, ranking in the top 3% in its data science community and honing my skills in data analysis, wrangling, and modeling.

The immense potential for the practical implications of my research, inspires me to pursue a Masters in Advanced Studies in Statistics and Data Science at CUHK. I believe that I can effectively contribute to and benefit from CUHK's vibrant and competitive student community known for being number one when it comes to interdisciplinary research and innovation. The program's industry-focused projects and research opportunities will equip me to become a competitive professional, advancing my goal of working at leading research institutes and tech companies like Tencent, IBM Watson Health, and Blua Health, where I can pioneer AI-driven healthcare solutions. These dynamic environments will offer unparalleled learning and innovation opportunities. Ultimately, I aim to take on leadership roles, driving impactful projects that improve lives. Through this application, I put forth my word to contribute and produce exceptional work at CUHK. **Data science will revolutionize healthcare and I yearn to play a significant role in this revolution.**