Statement of Purpose—Apoorva Kulkarni

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I became fascinated with the possibilities of machine learning because of Pedro Domingos' book "The Master Algorithm." The notion that such a master algorithm could potentially revolutionize industries, solve complex problems, and impact every facet of our lives was thought-provoking, encouraging me to explore its intricacies through advanced education. A master's program in CS will allow me to explore Machine Learning—particularly data-driven algorithms and recent innovations like Large Language models (LLM).

My undergraduate curriculum included courses that equipped me with computer science fundamentals. I further honed my HTML, CSS, JavaScript, Node, React, PostgreSQL, Web3, and DApps skills through online resources. My coursework introduced me to the potential of Machine Learning, motivating me to explore algorithms, data structures, and artificial intelligence through projects. I created a movie recommendation system using Flask and collaborative filtering techniques, and developed a spam mail classifier using Naive Bayes and Support Vector Machines (SVM), emphasizing feature optimization for accurate identification. In addition, I designed predictive home price models using regression algorithms, focusing on feature selection and dataset integration to improve price forecasting accuracy.

Pursuing my interest in ML, I enrolled in several online courses specializing in data science and ML. Exploring various AI tools and the latest research motivated me to compile a research paper exploring innovative applications of ML. I published the research paper in an international peer-reviewed journal investigating the application of AI to digital image processing, focusing on optical character recognition (OCR). It explores the advantages of utilizing AI for OCR and documents notable characteristics of OCR software. The proposed model for OCR is built using Hidden Markov Models (HMM). The recognition stage of the model involves using HMM to recognize the extracted features of the characters.

I wanted to augment my knowledge and expertise in pattern recognition and data analysis, which prompted me to work on another project for demand forecasting. The project presented a step-by-step process for accurately predicting the hourly bike counts essential for bike-sharing operators to optimize their resources and provide better customer service. The work measured how weather, time of day, and location influenced the demand for bike-sharing services and was published in an international peer-reviewed journal. Through this project, I was exposed to machine learning algorithms and statistical analysis to develop a predictive model. Owing to my interest in large language models, I'm also working on a project using the latest Python framework, Langchain, to design an efficient document summarizer and a survey paper exploring different methods of summarizing a document.

My ability to interpret and analyze data improved when I interned with Northern Trust Corporation, a Chicago-based Fintech company. I worked with cutting-edge technologies such as Microsoft Azure and Grafana during this internship. I helped analyze meetings between high net-worth clients of the company and the directors to measure effectiveness statistics. I deciphered and mapped meeting timelines using sophisticated graphs to support the analytics team in making effective decisions.

I actively sought involvement in student communities, events, and activities to enhance my technical expertise and personal growth. I am currently a member of a diverse six-person team participating in the Smart India Hackathon. For the Ministry of Social Justice and Empowerment- Government of India, we are developing a solution in which a web-based platform will assist individuals with disabilities in job coaching, resulting in equal opportunities for all.

My collaborative and leadership skills were cultivated by my involvement in the PICT IEEE Club and CSI Club, where I organized technical and non-technical events. Blood donation drives and tree plantings through NSS also fostered a strong sense of social responsibility in me. Joining the planning committee for the college festival and handling social media for the Greenpeace Foundation improved my managerial and communication skills. In addition, my knowledge of grassroots labor and cultural diversity has been enhanced by my involvement in RSS initiatives among tribal tribes residing near Nashik. These varied experiences have strengthened my leadership, adaptability, and holistic understanding—all crucial for succeeding in the rigorous academic and intercultural setting of a master's program in the United States.

Besides gaining corporate experience, observing Northern Trust's senior leaders profoundly impacted me. Their commitment to continuous learning and strategic technology implementation motivated me to enhance my tech skills and embrace new technologies. Thus, I am keen to pursue higher education. After completing my Masters, I aspire to join the tech industry, focusing on machine learning and impactful projects harnessing AI to address real-world problems. With industrial experience, I envision taking on greater responsibility and leadership roles. Over the next few years, I aim to lead significant initiatives, collaborate with industry leaders, and leverage technology to create positive societal change.

The academic atmosphere at the Carnegie Mellon University promises to nurture my growth as a computer scientist, and I wish to enroll in the Master’s in computer science program. Collaborating with experienced faculty like Andrej Risteski and Yiming Yang excites me, offering a platform to expand my knowledge and contribute significantly to ongoing research in ML. Furthermore, the state-of-the-art infrastructure at CMU’s Machine Learning Department will boost my academic and career aspirations.

In conclusion, I'm eager to engage in research projects, attend seminars, and immerse myself in the vibrant student community, which will undoubtedly play a pivotal role in shaping my future.

Thank you for considering my application.