Statement of Purpose

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To Columbia University,
Dear Professor,

I have always had a fetish for Computer Science from the time I was introduced to coding in my high school. Ever since then I have kept myself up to date on new trends in this field. My bachelor's education in Electrical and Computer Engineering provided me resources to build strong foundation in diverse subjects which include but not limited to mathematics, computer architecture & theory, algorithms & data structures, machine learning, cryptography & network security, analog/digital electronics, control theory and mechatronics. Later I went to pursue my dual master's in electrical engineering and computer science in collaboration between Indian and Swedish universities and it was in Sweden where I was introduced to research and the three important questions "what is", "why" and "the importance" of research, whose answers changed my perspective towards my career goals.

As part of my master's course work, I performed multiple research projects starting from a Systematic Literature Review in "Fraud detection in online payments using machine learning techniques", this research provided in depth knowledge about various supervised and unsupervised ML techniques and their pros and cons, it also helped me on how to analyze and validate the obtained results. In short, it gave me a complete picture of how research is done on a professional level. The positive experience from this research opened doors for me to take up research assistant role for the summer of 2019 in Blekinge Institute of Technology, Karlskrona, Sweden where I was involved in two research projects, one where I had performed statistical and machine learning analysis for studying the characteristics of the communication network of a bus and also for analyzing the possibility of any system error and the second one being my favorite which is custom path planning for turtle bot robot in a specific lab environment using A* and Dijkstra's algorithm, the take away from this role was collaboration with professional researchers, exploring diverse domains and also understanding the importance of resources for performing research work. Apart from this I have also performed research work in "Trusted computing in Containers" which involves understanding of various steps and key components that are involved in building trust within different hardware and software components of a system and the possibility of implementing the same in container technology. Next comes my master thesis where 6 to 8 months of sheer dedication was put by me in researching on the topic of "Design and Implementation of Key Exchange Mechanisms for Software Artifacts using Blockchain Technology" in collaboration with both the industry as well as academia. In short, my thesis included finding out the possibility of decentralizing the authentication functionality of Public Key Infrastructure and designing a framework which is compatible in an Artificial Intelligence marketplace. A different view about research was perceived by me from the experiences gained during the master thesis, be it learning completely new technologies namely blockchain, distributed systems, cryptography, cloud technologies etc. or the experience of

collaborating with industry and following the industry standards and trends, managing the unforeseen situations due to Covid lockdowns mainly the unavailability of visiting the university campus and accessing the resources. Proper planning and interaction with the supervisor helped me manage it. The most important lesson learned by me during my thesis was to have patience, persistence, adaptability and most importantly inspiration to complete any research work and I am not only proud of completing my thesis on time, but I am also happy that my thesis till date has received 1400 plus hits and 600 plus downloads which is the highest in my class. After my masters, I briefly worked for 7 months as a software developer in Ericsson, Gothenburg, Sweden. It was during this time I didn't find any excitement in my work as nothing new was done in the industry, rather the same old development of functionalities based on the customer input. Even though it was hard, I took the decision to quit my job and travel across Europe to rethink what I wanted to do in my career. Travelling helped me a lot by not only allowing me to explore different cultures and traditions but also helped me get introduced to new people. I made sure I interacted with different researchers across Europe who gave insights on how things work in graduate research and tons of other questions I had on pursuing a PhD. After a lot of thought I understood my role and purpose, which is research and build technology that enhances human life and I see PhD as the only way to fulfill this. I intend to apply for graduate studies in Computer Science with a focus on Artificial Intelligence and its applications. I choose this field as it aligns to my previous education, research as well as my future goals of implementing an intelligent system that replicates humans which can solve complex problems in a cost-effective manner with the help of software and PhD would be the first step in achieving it. Though I am flexible enough and open to ideas for the topic of my graduate studies I would like to conduct my research in communication/coordination, perception or design of system architecture for AI systems. Few of the topics I am currently educating myself or self-researching are "distributed coordination of multi modal robots in complex environment", for this topic I am mainly focusing on the architecture of communication among the robots and prioritization of tasks using machine learning by considering various parameters such as robots' current position, environmental conditions as well as the goal needed to be achieved. Next, I am also interested in "Prediction of human emotions using brain computer interface", in this topic I look forward to research on processing signals from the electrodes strapped on human head in predicting the emotions such as anger, happiness, etc. by statistically mapping raw signal data to different color codes and later try to replicate the model on to the system and predict it under various conditions as I feel this may be the early stage for transferring human consciousness on to a chip. I am also interested in researching on building a software architecture for satellite systems to process and predict the imagery in the satellite compute systems itself rather than sending the raw data back to earth which would cost a lot of time and money. I am also open to topics that align with my goal.

Meanwhile I also founded an Artificial intelligence consulting firm in India once I returned from Europe. The firm successfully deployed a computer vision application for a medical diagnosis start-up where we had to use OCR/ICR along with natural language processing to understand and predict the issues, treatments and medications handwritten by doctors. Later I had a great offer from another company where it assured me of mass hiring my employees and giving them a great salary package which I couldn't offer them, which I happily agreed to, and I had to eventually close my firm.

In a significant professional development, I now work as a MLOps engineer at a company called One Convergence, I am currently involved in building "Pluto," an AI system that enhances user workflows, like agents for Large Language Models (LLMs). However, Pluto's scope extends beyond a limited number of agents, providing integration for complex tasks and harnessing the power of Gen AI at its core.

I also embrace cultural diversity and bring unique talents to the table. I am an avid guitarist and tabla player, and I possess a profound knowledge of ancient Indian scientific scriptures, such as Sutra, Sulbas, and Vedas, which encompass age-old scientific wisdom. This cultural richness not only enhances inclusiveness but also offers a different perspective that can contribute to a comprehensive research environment.

I take this opportunity to apply for graduate education at Columbia University, keeping in mind my long-term goals. Working in a graduate position would provide me with an excellent opportunity to collaborate with world class researchers, it would also help me get associated with leading industrial organizations. After speaking to current and graduated PhD students from Columbia, I was fully impressed by the diversity, support and inspiration it provides for an individual to grow in his/her career. I understand the dedication, patience and inspiration required to have a great research career and I believe I have groomed myself technically as well as for having the right attitude and mindset for such a career. If you feel I am the right person whom you’re looking for please do connect to me as I will be more than happy to introduce myself and explain in detail my skill set, talents, and vision.

Thanks in advance!

Yours Sincerely