Personal History Statement

When I reminisce about my childhood, the first thing that comes to my mind is the terrible colds I used to catch every now and then. At a very early stage of my life, I was fighting asthma. The best schools in my city were a bit far away from my home. My parents were concerned that the smoke and dust on the way to those schools could make my situation worse. Hence, I was admitted to a less competitive school in my neighbourhood. In school, I used to outperform my classmates by a significant margin. However, my parents saved me from indulging in complacency. They always encouraged me to work harder, saying "Your competition is only with you, none else." This has been the most profound lesson of my life that I continue to remind myself every day. With each sunrise, I still try to be a better version of myself.

Much later in life, I got admitted to BUET for undergraduate studies, the most prestigious engineering university in Bangladesh. Being the top-ranked university, BUET selects the most brilliant students of the country (around 1% admission rate) through a very competitive admission test in each year. Among these admitted students, only the topmost students get the opportunity to study in the Department of Computer Science and Engineering (CSE). I have been fortunate to be the part of this department that regularly produces the country's top academics. Notably, I graduated *summa cum laude* from the CSE department, which I believe has been possible through determination, perseverance, and a lot of hard work. After graduation, I joined CSE, BUET as a lecturer and since then I have been working there full-time. As part of my job, I have conducted several courses including Artificial Intelligence and Machine Learning. Currently, I also conduct a training course on practical Machine Learning for around 20 graduates from different universities of Bangladesh. This brief teaching experience has made me realize that to be able to serve academia in a more meaningful way, a deeper knowledge and practical experience are needed. And what can be a better way to prepare for this other than involving myself in the high-quality research of a Ph.D. program in a quest to create new knowledge.

My interest in machine learning techniques started when I was a second year student. I was learning Java by writing small software and games. While implementing a color to grayscale conversion feature for an image editor, one thing puzzled my mind: How can I turn a grayscale picture back into a color one? After a few days of head scratching and internet surfing, I was puzzled to know about some machine learning techniques, which can solve these types of problems just by seeing examples. However, as I was yet to learn so many things before I could truly understand and implement such techniques, I continued to focus on other subjects. But my inclination towards machine learning and more generally towards artificial intelligence (AI) only increased with time.

I got my first opportunity to work with machine learning and related techniques in my junior year. I along with a group of researchers in CSE, BUET analyzed 40 years of historical weather data from different regions of Bangladesh to identify the trends in temperature and rainfall. We used a wide range of techniques, including clustering such as K-means, non-parametric trend tests such as Mann-Kendall and Sen's slope estimator, etc. We found a

number of interesting insights, such as, over the years the maximum temperature of our country has significantly increased during June to November. In contrast, there have been no significant changes in rainfall. The results also indicate that in terms of temperature the eastern part of the country has faced more climatic changes than its western part. The findings of the study were published as a book chapter by Springer.

Motivated by the outcome of this project, I focused on working with more fundamental machine learning and AI techniques. I pursued my undergraduate and Master's thesis on Evolutionary Algorithms—an exciting paradigm of algorithms which solve computation problems by mimicking evolution. I also explored other topics of machine learning and its application in various domains through my course-works, projects, and research collaborations. After completing my M.Sc., I have also studied deep learning techniques and become familiar with libraries such as Sci-kit Learn, WEKA, Tensor Flow, and Keras.

In addition to academic activities, while an undergraduate student, I co-founded Engineering Students Association of Bangladesh (ESAB) and served as its Information and Communication Secretary for two years. While serving ESAB, I have experienced a rare leadership journey. This experience gave me an enormous scope to work with the best minds coming from universities all over the country. Also, Bangladesh is currently undergoing a massive digitalization in many sectors and CSE, BUET is playing an important part in that process. As a faculty of CSE, BUET I have also contributed towards several of such projects. These activities have also made me realize that the transferable skills gained by the research work at Ph.D. level can enable me to contribute more towards my nation.

On a personal note, my motherland Bangladesh is the eighth happiest country in the world according to Happy Planet Index 2016. It is a home to 160 million people, including more than 2 million indigenous people. Our country has a rich culture of literature, dance, drama, music, and arts. Being brought up in this country, a unique sense of culture has been instilled in my personality. Since my childhood, I have been making good friends from different religions and origins with an open mind and a respect for differing opinions.

Finally, I think all the experience gained in different stages of my life has directed me towards this point when I believe my next step should be obtaining a higher degree to pursue my research, academic, and socio-economic goals. I strongly believe a Ph.D. will enable me to contribute more towards academia and help me to play a greater role in the development of my nation. I believe, I have grown a basic foundation to perform original research and I think the EECS department at UC Berkeley is one of those places where I can reach my full potential. Also, coming from a country with a rich culture of literature, music, and arts, I believe I will uniquely contribute towards the diversity of UC Berkeley.