Kazi Noshin kazi.noshin.111@gmail.com

# Personal Statement

My primary research focus lies in human-computer interaction, artificial intelligence, machine learning, and deep learning. My long-term vision is to work as an active researcher and faculty member, allowing me to contribute my creative works to the betterment of humanity. I aspire to become a part of the development of human civilization. So I would like to engage myself in technological development to create a better tech-based future. I think research is the best option to fulfill my dream.

In my undergraduate years, I got the opportunity to gather knowledge about discrete mathematics, data structures and algorithms, compilers, operating systems, artificial intelligence, graph theory, machine learning, deep learning, bioinformatics, etc. In my Junior year, I worked on a mini-game project titled "Lines-of-Action (LOA)" for which I designed an AI agent using adversarial search with alpha-beta pruning. This project piqued my interest in AI and with further digging, I got fascinated with ML. The potential of modern ML and the vast array of foreseeable applications amazed me. Although I was mainly introduced to the applied sides of AI and ML, I would like to learn more about the theory in these fields. The insights I achieved from these explorations have increased my research interest in human-computer interaction using artificial intelligence, machine learning, and deep learning techniques, particularly those concerned with human health and behavior. Therefore, I am interested in pursuing my Ph.D. in the Department of Computer Science at the University of Virginia, which provides an excellent opportunity for research in these areas.

I had my first significant research experience during my undergraduate thesis, supervised by Dr. Mohammad Saifur Rahman. The project aims at providing an online platform for identifying undiagnosed individuals living with Parkinson's Disease (PD) in Bangladesh which is minorly explored in the context of this country and needed to shed more light. We modified an existing web-based application so that people from Bangladesh can easily use it in Bengali. We collected audio and video data from PD patients using our interface to create a novel dataset from the Bangladeshi community. We analyzed the features extracted from the videos of facial mimicry expressions to diagnose PD using machine learning-based models such as the random forest, XGBoost, and others. The reason for choosing this project as my thesis was that one of my acquaintances was diagnosed with Parkinson's disease, and I learned how he had to face many difficulties due to this disease. During data collection, observing the struggles of people with PD in their day-to-day tasks made me more intrigued to design human-centered applications.

After getting my first hands-on experience in human-computer interaction under the guidance of Dr. Mohammad Saifur Rahman, I was even more inspired to explore the area because of its capability to solve problems relating to human beings in society using cutting-edge technologies. Currently, I am working on a project under the same supervisor in collaboration with Dr. Abu Dayem Ullah, based on cancer, specifically cancers of pancreas and liver. One

of my friends died of cancer, so I was particularly interested in working with this. The project focuses on identifying the association of various clinical or molecular factors with cancer survival. We are using the publicly available "The Cancer Genome Atlas" (TCGA) datasets from the GDC portal and analyzing the data by taking advantage of machine learning techniques. The ultimate goal of the project is to develop a gene mutation-based scoring system for categorizing patients according to their survival potential.

Additionally, I am involved in another research project in which a team of people from CSE, EEE, and Civil Engineering, is working together. I work as a research assistant to use my CS skills in this project, under the supervision of professor Dr. Mohammed Eunus Ali. The objective of the project is to improve earthquake early warning systems (EEWS) by predicting earthquake intensity in different regions using a relatively small amount of earthquake receiver station records with the help of graph attention networks. In this project, we are using our collected data from Bangladesh Meteorological Department and STanford EArthquake Dataset (STEAD). Through this project, I've learned about a new dimension of the research arena. I could pick up several skills, for instance, how to work in a research team, how to interact with others in a multidisciplinary environment, how to reach a consensus quickly about any particular issue, how to share workload, and more.

Apart from this, I am currently employed as a lecturer in the Department of CSE at the University of Asia Pacific. I used to explain the course contents to my classmates every now and then during my undergraduate years. Through these exposures, I realized that I enjoy teaching and can make topics understandable to the audience. As a lecturer, I am doing all related academic work. All these experiences paved the way for fulfilling my desire to be a successful faculty member in the future.

The University of Virginia offers a wide range of academic and research opportunities in human-computer interaction. I am particularly interested in the works of Dr. Tom Fletcher. His studies on machine learning combined with image analysis are very fascinating and align with my interests. I am also intrigued by Dr. Aidong Zhang's work on developing machine learning approaches for biomedical applications. I would also be open and happy to work with others who have a similar interest. Despite the tough competition for admission to Ph.D. programs at universities, I believe my experience in research and the skills I developed as a lecturer, have equipped me to make a significant contribution to the University of Virginia. I am confident that I will be able to obtain expertise in my areas of interest with the help of this university's outstanding faculties and researchers if I am given the chance to be admitted into the Ph.D. program. I hope to enhance my knowledge over time and make some difference, even if it is tiny, toward improving the world.