

Statement of Purpose

New software and technologies always fascinate me as these are some ways one can depict their thoughts, ideas and creativity to the world. As a computer science major at undergraduate level, I developed sound knowledge on software engineering and development. However, I believe, for having a deep insight into this domain my existing knowledge is not sufficient. Pursuing a Master's in computer science precisely in software engineering, code recommender system, API misuse detection, mining software repository research, information retrieval on source code, software testing, research in UI/UX designing or other relevant field with a focus on building more efficient and effective software with lesser or I can say no bugs will be a stepping stone towards fulfilling my long cherished dream.

When I was a child, feature phones was the latest trend in Bangladesh. I used to play the 2D games as well as check different applications in cell phone. During my Secondary and Higher Secondary education, Android smartphones was creating a great hype in Bangladesh. I used to wonder about the functionality of the first generation smart phone. The games and software installed in android phones were also more lucrative and efficient than the featured phones. I used to spend most of my leisure time in checking different features in the software's and games and wondered if I could make such software. Finally, I got the opportunity to fulfill my dream. After my higher secondary examination, through a rigorous admission test, I got admitted into Bangladesh University of Engineering and Technology (BUET). Being among top 1% of this competitive examination, I got into the Department of Computer Science and Engineering (CSE) at BUET.

During my undergrad life I have done a lot of software project in different academic courses. I had often assisted many of my friends in their projects. My interest in software engineering study always inspire me to do such things to know more about software development. Towards the road, the real strikethrough of software engineering experience I got when I was appointed as an intern in BigGO limited during my senior year. During the first period of internship, they asked me to learn Nodejs and Reactjs framework and develop a website using these two frameworks. Then, for the first time I got some industrial experience and learned the proper architecture (front-end and back-end) of building a large-scaled system. From my childhood, I was quick on learning new stuff efficiently and effectively. Therefore within three months, I had gained a good level of knowledge and experience of these two frameworks. The project manager was satisfied with my performance and appointed me as a full stack developer in a senior engineer position which is unlikely for a fresh graduate. My first project was to make a project management software. In this project, the project manager gave me the opportunity to directly interact with the client, understand and analyze their requirement and get the features out of it. As a result, apart from the developmental task, I was introduced to the human factors responsible for a professional project. He also gave me the freedom to work but always supervised me with a proper way to design and build the project. During this project, I understood the difference between an academic project and a professional project. The client wanted to make a generic project management software where every individual can make their own project template and create projects using these templates. After some struggle, I had completed the project in time successfully. This project taught me how to handle clients and work in an industrial environment. I think this real-time experience is very important for every software engineer.

Then came the hardest time of my life. My mother was sick and affected by various diseases. As I am the only child in my family and lost my father at an early age, I had to leave the job and return to Chittagong to look after my mother. I joined as faculty member in Southern University Bangladesh. It was my first step towards academia. I started to research in different software projects. Home tutors are common phenomenon in every student's life in developing countries like Bangladesh. However, there is no common and free platform to connect the tutors with the guardians and the students. Therefore, I started to work on this topic under the supervision of Dr. A. B. M. Alim Al Islam, Professor, BUET. I designed and developed an android application for tuition media named "TuitionHub" using google flutter framework. The app is currently available in the [Google Play store](#). The tutors can find tuitions based on their necessity at the same time guardians and students will also find suitable tutors.

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There is also research motivation behind this android application. It was my first research in Human Computer Interaction Field. During my short tenure at industry, I closely engaged with clients and I realized the best technology alone cannot ensure the best product without understanding the explicit and implicit requirements from the client to the best of their satisfaction. In this “TuitionHub” software we are analyzing the behavior of the tutor and guardians. Based on the analysis we are suggesting tuitions to the tutors and the guardian so that they can get suitable tuition with ease. We are trying to analyze the current education situation in Bangladesh based on the tuitions data. We can differentiate the more educated and less educated regions based on this data. We can also analyze the individual data of the tutors and guardians/students. Overall we can analyze the individual personality of the tutors, students and guardians regarding tuitions through this app which can be utilized as a scalable educational data mining software in our context.

After building a prototype of the app Dr. A. B. M. Alim Al Islam told me to study UI/UX design to make an attractive and user-friendly application. I started to study UI/UX designing and understand the psychology of the user of the application. The study of UI/UX design helps me design a beautiful and easy to use the android app.

Besides this I am also connected with other different research and humanitarian activities. In 2019 Dengue outbreak was become one of the most dangerous diseases in our country. In dengue, the patients’ RBC count decreases very rapidly and they often need blood. Though there are many blood donors around us, we cannot get them when we need. Therefore, I developed a blood donation app that bridges the donors and blood receivers with data of 2000 blood donors. It is now being used in many hospitals and blood donation centers in Chittagong to find blood. On another project, I designed and developed the website for [SciencePathsala](#). It is an online education platform in Bangladesh where students can give practice for their board exams. They can also see their mistakes and find solutions of their mistakes in this system.

Recently I have submitted a journal manuscript named "Smart Door Unlock System with Android App" in the International Journal of Advanced Science and Technology. In this research, we implemented a low-cost and affordable IoT device connected to the house door and operated by an android application. The door can be unlocked by face recognition of the owner and also by answering some security questions. Our objective of the research was to design a home security system with enhanced security and affordable cost. I am also doing work on health-care research named “An android application detect pneumonia using fuzzy logic”. In this research we have implemented an android application that will detect pneumonia using fuzzy logic. Our system gives a great accuracy level in detecting pneumonia comparing to the original medical test. I am supervising two students in their final year software project “[HomePharma](#): An online medicine ordering system”. It’s an online medicine ordering system where we try to connect the clients with the pharmacy owner to get the emergency medicine immediately.

Given my deep research interest in Software Engineering, Human-Computer Interaction and System Research as well as my working experience in a number of diverse software projects, the next step for me is to pursue the next highest academic accolade, i.e., Master’s from a reputed rigorous program that can shape me into a complete independent researcher. I believe that the research opportunities and resources present at University of Alberta will allow me to fulfill this dream by providing the facilities to learn from world-class professors and work with qualified fellow colleagues. To be more specific, I am highly motivated in collaborating Professor Sarah Nadi’s work on software engineering. Her work on API Misuse Detection (MUbench and MUDetect project), Code Recommender System fascinate me a lot. I am also interested in working with Professor Abram Hindle’s intersection of software engineering and computer music, Mining Software Repository Research, Information retrieval on source code. Professor Eleni Stroulia’s work on technical and socioeconomic concerns around building software systems for the purpose of service delivery in SSR group also presents interesting research opportunities. Therefore, I am certain that the University of Alberta is the right place for me to begin the expedition of lifetime learning and contribution.

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