Statement of Purpose

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I wondered what if machines could understand. In final years of my college days, I did some research on Semantic Web and my thesis was on eliciting senses from web documents. This was not enough – I want to learn more and contribute with fruitful implementations; may be machines should really start to understand and use their conscience to serve humanity.

Pursuit of knowledge is a long enduring endeavor, which grew from contribution of polymaths to modern day of specialists. Such growth in scholarship requires organized preservation. This enormous task can be performed by utilizing artificial agents with capabilities of processing natural languages and mapping semantics in the very manner human generalizes concepts and incorporates precise descriptions.

My primary research interest is on knowledge systems and I want to study *artificial intelligence* and *machine learning* in fields of cognition, linguistics, semantics, reasoning, knowledge inference and representation along with additional depth courses. I envision machines will be able to understand text and taxonomies. Moreover, underlying RDF of any web document can be elicited for semantic entailment. This will help machines to reason, gather knowledge and infer senses, which in terms will enhance a core ontology or knowledge graph.

My childhood dream of conscious machines started to become lucid as I started my undergraduate education at *Khulna University of Engineering & Technology*, and studied computer science. Starting with fundamentals of computing and then gradual progression with theories, systems and application fueled my venture of incorporating intelligence to machines. My first effort was in sophomore project *'Intelligent Home',* under supervision of Dr. Hashem, where we designed a centrally controlled local system of devices and sensors, which actuated smartly upon perceptions. This project was also exhibited in prestigious national SoftExpo. In junior year, under supervision of R. Shams we investigated on automated *traffic-jam detection* system. We used image subtraction and blob detection along with time-lapse captures of road to estimate traffic flow, count and congestion.

With a vision to ply intelligence in internet, along with two fellows under supervision of R. Shams, our senior year research was on enabling machines to understand web documents. Our thesis proposed a framework, *'RDF by Structured Reference to Semantics'* (RS2), to elicit senses from unruly html documents and produce RDF tuples. In the framework, plaintext extracted from web documents is parsed to yield subject-object-predicate of each sentence. Then a lookup in the ontology generates RDF graph. Our prototype with minute ontology about *English Premier League* demonstrated successful semantic entailment of related texts. Like my aforementioned academic research, this one also achieved highest grade and was highly appreciated.

Besides academics, I have been doing independent software projects – some of which are on Github. Lately, I have been doing a project to build semantically linked multilingual lexicographic corpora. In aspiration of developing algorithmic skills, I was involved in contest programming and secured eleventh place at *ACM ICPC Dhaka 2007*. I have organized and instructed in several workshops on problem solving and programming. I also served as the *General Secretary* of *IEEE Student Branch* and held other representative roles in campus. These extra-curricular involvements bolstered my organizational competencies and enhanced my skill to think subjectively from different viewpoints.

I enjoy the thrill of searching for something, discovering and then implementing them. The joy of doing so is as amusing as indulging oneself in poetry and being creative with paintings. I have a habit of doing graphic artworks and writing technical blogs. I often receive good audience and appreciation for these. I devour the same, or often more, satisfaction when I do well as an aspiring computer professional. With progression of my undergraduate engineering program, alongside my research and implementation ventures, I realized that a proper blend of formal tuition, interdisciplinary collaboration and exposer to industry with professional experience could bring in successful research combined with fruitful applications.

After graduating, I joined then newly established research base of *Samsung* at Dhaka for being acquainted to industry's broad gamut. There, I learned about full-stack of systems, involved in modular design of complex solutions and worked with several technologies. I had the opportunity to explore different fields. I worked in system level, developed device drivers and embedded applications, explored image processing and codecs. Later, I joined the platform team. Upon successful completion of post-silicon chip verification in the Samsung headquarters our team started to research on enhanced SoC verification system and been investigating the possibility of a platform that can facilitate verification in FPGA and post-silicon stages with minimal recoding. In doing so, I designed a host–target interaction protocol, chalked architecture for the platform and been developing a dynamic GUI for verification control from host computer.

In two and half years' brief but effective professional experience as software engineer, and in my visit to Samsung headquarters at South Korea, I interacted with world-class researchers from different backgrounds, sporting diverse avenue of mediation, which enabled me to ponder and thus enhance my work approach, programming skill, inquisition, teamwork and management. I learned how research goes in industrial environment facing challenges of deadlines and intense competition. I also realized to improve my personal esteem and to become a successful contributor, I need to undergo academic tour exploring additional depth and breadth of computer science.

MS in Computer Science program at *Stony Brook University* is an ideal course to nurture my faculties, develop my skills and enhance my scholarship. Department of Computer Science's erudite faculty, well-equipped research facility and vast spectrum of projects stimulate my desire to be a part of this school. I was first introduced to Dr. Kifer's work (particularly RIF & RuleML) while doing my thesis. His prolific work in field of artificial intelligence, specially the Semantic Web and knowledge manipulation intrigues me. His projects SILK, HALO and FLORA-2 are quite interesting; I think I can learn from and contribute to them. Besides, Dr. Fodor's contribution to SILK language and research on knowledge acquisition, representation and management fascinates me. His fruitful works on SPARQL and on natural language processing demonstrates about research strength at Stony Brook. Dr. Choi's approaches of computational linguistics, especially her projects regarding semantics are amazing. Her investigation on composing natural language descriptions from images seems interesting to me. Her insight can enhance my knowledge to empower my expedition to enable machines to understand. Nevertheless, research and teaching of Dr. Warren, Dr. Ortiz, Dr. Wasilewska and other well-read faculties encompassing wide arena of computer science, their stellar expeditions and nifty endeavors make Stony Brook a center of excellence.

Stony Brook really speaks strong and diverse language of computer science. Its successful alumni and faculty and long history of their well-recognized contribution assures me that its community can guide me to find and walk in right path to learn, search and apply – thus fulfill my desire of becoming a successful computer professional.

After completion of my graduate study, I would like to venture in implement my earned knowledge in building intelligent systems. I might participate by being a part of any company with such vision or more likely would establish such one. There, I would like to work hands on and collaborate with talented coworkers. I might also get involved in training and managing researchers/engineers. Alongside, I would love to share my knowledge by publishing results of my research in professional life, attending conferences and as part time faculty member if get chance to do so. I would also like to carry on learning and discovering after graduate study.

I always want to acquire and generate knowledge and extend output of my research with fruitful implementations and associated publications. In the attainment of singularity, my venturing contribution would be in implementing and building knowledge systems. I anticipate Stony Brook's broad portfolio of projects and climate of cross-discipline collaboration will quench my thirst of knowledge and foster me to carry on my endeavor.

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