Statement of Purpose

of Sakshi (MS CS applicant for Fall 2022)

Social media today has become an integral part of everyone's life, connecting people worldwide, exposing them to the unknown, and enabling them to share thoughts and stories from their personal life with the border community. However, in recent times, people often get exposed to threats and objectionable content online, which leaves a lasting impact on their minds. Being a victim of this, on certain occasions, I empathize with people who just wanted a friendly conversation but faced tremendous hate. Recent studies even show that Wikipedia has been losing many of its experts and contributors owing to the hate and trolls they receive. This highly threatens the internet of tomorrow. How can we make the internet a cleaner place? How can we stop people from spreading such hate? That is when I decided to build solutions to seek answers to these questions, using my computer science skills to fight hate speech online, and that is exactly why I want to join X. The NLP lab and faculties there will help me acquire the proper knowledge to develop NLP systems that can help me implement scientific results into applications where the products make a difference in human lives.

During my school days, I was fascinated with computer games. Later, in high school, when I was introduced to computer fundamentals and programming subjects, it caught most of my attention. Later, as a student of Computer science engineering, my interest in the chosen branch was absolute. My undergraduate studies have been a journey of following this and understanding the subject as a whole in order to empower myself to carry out independent research in the field. I have always been dedicated to learning the various aspects of computers and exploring different technologies, as is evident from my consistent academic record.

In my sophomore year, apart from the courses I was keen on finding ways to automate everyday tedious tasks. I figured out that apart from semester and major exams, weekly quizzes on all subjects were the norm in college. Preparing unique sets of questions frequently for a large student group is an arduous task. To address the difficulty, I designed a web app that would pick questions from a database and generate unique sets of questions given the number of unique sets required for a particular subject. The app was of great help to faculty members; the college and students benefited greatly. This was an affirmative experience of how with apt technology large volumes of data can be tapped into profitably. The challenge of finding solutions to a given problem that are both effective and efficient drove me to think analytically and push the boundaries of my knowledge. I felt the need to learn more beyond the courses and the confines of mere bookish knowledge and joined the competitive technical club in college, SIT De-Coders. Intent on enhanced productivity I actively hosted hackathons, deriving multiple benefits from interactions with enthusiastic programmers, the nature of problems presented, innovative thinking, and experimental approaches. I was mainly responsible for mentoring juniors on the side of ideation for hackathons and teaching advanced algorithms and data structure concepts.

Later, ***Foundations of Data Science*** introduced me to data analysis, data manipulation with statistics, and machine learning algorithms. This was an important stage of my undergraduate journey. My innate passion for computer science was further accentuated with topics in machine learning and artificial intelligence algorithms and their applications. After completing several courses in college and MOOCs by Andrew Ng, I was completely enamored by the field of Artificial Intelligence. I collaborated with few of my peers to implement my first noteworthy project in AI at Smart India Hackathon, one of the biggest national hackathons,and got the opportunity to lead the team. The idea was to implement 'Road Symbol Detection Software' for vehicles. Road symbols occasionally go unnoticed by drivers, leading to penalties or accidents. We worked with Convolutional neural networks and Raspberry Pi to classify extracted frames in real time. We won the KPIT Innovation Award for the effort. This exercise taught me the importance of perseverance and hard work, and when I finally arrived at a very good result, the feeling of accomplishment was absolutely sublime. This was my first exposure to integrating AI into a standalone application. After this, I was confident to step towards exploring more in machine learning and artificial intelligence, as I became particularly experienced with toolkits like Keras and PyTorch, allowing me to process data, build up pipelines from ground up, and train deep neural networks effectively.. Simultaneously, I traveled deeper into the advanced principles of Artificial intelligence. Online courses, books and research papers were my source of knowledge and in a year, I

was able to build a strong theoretical foundation. Being exposed to fake news often, as a part of my bachelor's thesis I worked towards implementing an AI powered tool to detect Fake News on Social Media, leveraging the power of NLP.

Working on my undergraduate thesis gave me the fundamentals to take on challenges in natural language processing, as I became particularly experienced with various and acquired an in-depth understanding of the subject. Inspired from the likes of quantitative firms, I started to work on a research project with one of my papers at the intersection of stock markets an AI. The key idea was to predict stock movements in a quantitative manner by considering auxiliary factors like volume, volatility, etc. Our work was accepted at the ICTCS 2022 held in Udaipur, India. I presented my results at the conference and interacted with faculty, students and industry partners from different parts of the world which gave me a different perspective of research. Finally, the joy which comes from discovering something new and useful is what motivated me to take my research endeavors ahead.

After my undergraduation, I was fortunate to get an opportunity to collaborate with researchers from MIDAS Labs, IIIT Delhi and Speech Lab, IIT Madras to explore the field of AI powered content moderation. Motivated from my immense desire to make the internet a cleaner place, collaboratively we figured out that despite of the fact that content moderation using text had progressed immensely in the past decade, there was no work in the modality of speech. Speech was also an important modality with increasing tendency of humans to communicate through spoken speech in various settings. Thus, at ICASSP 2022, we proposed a new Spoken Language Processing task of detecting toxicity from spoken speech. Starting from funding the entire annotation, to exploring numerous online datasets and making small baselines, it was a great learning opportunity, and nevertheless an important contribution to the SLP community.

Subsequently, I joined Cisco Systems as a Software Consulting Engineer. Research has been the focus of my stint at Cisco too. I lead an initiative to devise a closed loop network remediation solution using unsupervised anomaly detection as a tool for one of Cisco's Enterprise customers and the world's first 5G deployment. It included a mix of modern SOTA AI and hand-written rules for detecting anomalies in real-time systems at scale while maintaining interpretability and ease of root-cause-identification The novelty of our solution led us to patent the system which is currently under US Patenting. A preliminary defensive publication has already been published.

Although I have enjoyed being part of one of the biggest tech-giants in the industry, I realized that I can fulfil my desire to obtain comprehensive knowledge and pursue innovative research only through graduate studies. All about college.

Research is all about stretching our comfort zones to innovate using a combination of theory and practice. A graduate opportunity at 'X college' will definitely help me strengthen my technical knowledge, and through this knowledge I can implement scientific results into applications where the products make differences in human lives. I look forward to joining X for an exciting and fulfilling academic journey.