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I am fascinated by how data can effectively facilitate researchers in improving various aspects of the world. Specifically, when this data is used to enhance networks' efficiency and security and privacy, it is nothing less than a miracle humans need to tackle ever-growing and complex networks. I love to mine the internet and identify patterns/information that can make **the networks efficient, secure, and reliable.** During my undergraduate (BS Computer Science), I did two major projects involving large scale data for improving security (in my first project) and enhancing web efficiency (in my second project). The first project has already been published at **ACM Sigcomm CCR July '20**, and the second is ready for submission at **OSDI'21**. I have also taken various graduate-level courses to expand my research horizon. These courses include Network Security, Internet Measurements, Distributed Systems, and some Machine Learning courses. With these advanced courses and my research experience, I am ready to start the journey of a doctorate **to make networks efficient and secure by harnessing the power of data**.

In my junior year, I started my research journey with a first research project under Dr. Mobin Javed (Ph.D. UC Berkeley). I worked on a reproducibility study of a USENIX'18 paper, **A**cquisitional **R**ule-based **E**ngine (ARE) for Discovering Internet-of-Thing Devices, which introduced an NLP technique for identifying vendor, product, and type of IoT devices. I re-implemented this tool and reported my results in a research paper at ACM Sigcomm CCR. In this project, I was responsible for re-implementing the ARE tool, managing the entire data pipeline, and reporting any ambiguities found in the original ARE paper's re-implementation details. The reproduced ARE performed inadequately on the real-world dataset and failed in achieving the accuracy reported in the ARE paper. The results showed how technical ambiguities in the research papers and the lack of original data/resources could hinder a faithful re-implementation. **IMC Reproducibility Track'19** accepted a poster of my work before the paper's acceptance at **Sigcomm CCR**. During this project, I learned about handling large amounts of data and got first-hand experience with different Network Analysis tools, e.g., NMAP, ZGrab, ZTag, Censys, and BigQuery. This project prepared me for further research work, and I was also fortunate enough to secure a Summer Research Project grant for this project. Securing the funding instilled valuable skills in me, including but not limited to writing grant proposals and convincing other people about my research work.

After completing my first research project, I started my undergraduate thesis with Dr. Fareed Zaffar (Ph.D. Duke) and **collaborated with the ComNets lab of NYU Abu Dhabi** and worked with Dr. Yasir Zaki from there. I developed *JSLite*, a tool for transforming web pages into light-weight pages so that users in developing countries with low-end devices can get a better web experience. In the process, I developed an ML model, trained over 117k JS scripts that categorized JavaScript into critical and non-critical scripts using a specially crafted feature set. This model was then used by my tool, *JSLite*, to block non-critical scripts, thus saving network-bandwidth and compute of users' devices. An evaluation with popular web-pages on both 4G and 3G connectivity showed that my tool reduced Mean **P**age **L**oad **T**ime (PLT) by more than 40% while retaining above 90% functional and structural similarity with the original

pages. The evaluation also showed that my tool performed better than the existing solutions by a significant margin; it reduced PLT 30% more than the maximum PLT facilitated by other tools. I also conducted a user-study of the tool, highlighting its advantages and showing its usability for people with low connectivity and low-end devices. This paper was previously rejected from NSDI; however, an improved and significantly better version is ready for submission at OSDI'21, and I am hopeful that I will be presenting it at the OSDI stage very soon. As I was the only student in this project while others were all faculty members, I learned to manage a project from end-to-end and be responsible for every little detail, a lesson that will be most valuable in my Ph.D.

Furthermore, I have been a **teaching assistant** for five terms and four different courses during my undergraduate. As a TA, my duties included designing course components, grading assignments, and delivering tutorials to students. The part I liked the most was to help students understand difficult concepts, and I am always ready to do it more. Therefore, as I will be starting my research career, I plan to also serve in academia to suit my interests. Furthermore, I would like to mention that I have an invitation for a **research visit** by **NYU Abu Dhabi**, which I plan to go for early next year (2021). This visit would further prepare me to hit the ground running when I start my doctorate.

My research and teaching experience has helped me in various ways ranging from sticking to a problem for finding a solution to laying out a solution in a manner understandable by my audience. The results do matter; however, I enjoy the research process more. The realization that my skills are being used for devising an unprecedented solution is a pinnacle that satisfies me and makes the work seem more significant than a typical job. I am aware of the Ph.D. process, and I, a first-generation college student, would not have stepped into it if it was not for my urge to achieve something great.

My search for a university with a growing and thriving research group of my interest areas has drawn my attention to Stony Brook. I am impressed by its prolific faculty and believe that I would prove an asset with my skills and hard-working attitude. Specifically, I am targeting Dr. Nick Nikiforakis, Dr. Michalis Polychronakis, Dr. Amir Rahmati and Dr. Radu Sion, as I have the right skills and interests for working with them. I am excited about the opportunities I will get at this university. I will make the most out of my experience there hence developing into a scientist who will serve the field with meaningful contributions.