Statement of Purpose

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I was first introduced to the concept of 'IoT' at a science fair organized by the Indian Space Research Organization. The idea of using the Internet to control and measure things intrigued me but the subject was never my passion. It was only during my coursework in under-graduation that I was amazed by the ability of a little silicon wafer to store infinitesimal amounts of data, captivated by ever-increasing speed of microprocessors and stupefied by the limitless possibilities of Artificial Intelligence and embedded systems. My idea of transformative engineering aligns with the pioneering work of Linus Torvalds, the founder of Linux systems. To bring about a fundamental change, rebuilding the entire code from scratch is the call of a true engineer. Like my father, a mechanical engineer himself, I wish to give wings to my imagination and knowledge, creating something of significance out of pure love for the subject. It is in pursuance of this vision that I now apply for a Masters Program at your prestigious University.

The journey to fulfill this aspiration began with my Bachelor of Technology (Electronics and Communication) program at National Institute of Technology, Calicut. One of the premier Engineering Institutes in India, NIT provided a platform to delve deep into academics and work on exciting projects. Gaining a sound foundation of engineering, I imbibed insights into a wide range of courses like Data structures & Algorithms, Microcontrollers, Microprocessors, Modeling and testing of digital systems, Computer Architecture and Embedded systems. I attempted to explore low-level implementation of brain computer interface as the team leader of the 'Electromyography based Robotic Arm' project. The inspiration were the words of our professor, Dr.____ who told us that even if we were able to model 2% of the human brain, we could unlock huge secrets. Using electromyography we designed a basic filtering circuit, which fed EMG signals into our microcontroller to breathe life into the robotic arm with two degrees of freedom replicating arm and wrist motion. The unparalleled thrill and sense of achievement on controlling the arm still brings joy and pride , whenever I think of it. Another noteworthy project was the Touch Screen Module which used two cameras to develop a high precision and low cost solution to modify projected screen of variable sizes using OpenCV libraries, Visual Studio and Emgu CV. I was able to learn implementation of algorithms like object and color detection, location triangulation, and convex hull method. Not only did we secure excellent grades in the innovative project, we also published a IEEE conference paper based on the same, going on to win the second place in the NIT project competition (2018 IEEE Recent Advances in Intelligent Computational Systems (RAICS). Numerous other projects like a Microcontroller based Smart Waste Basket project, Wi-Fi Automation IoT and Design and implementation of a 7:4 hamming code encoder and decoder circuit using MSP430. These projects were instrumental honing my engineering skills simultaneously instilling values of discipline, time-management and teamwork.

Sample SOP for Ms in Computer Science & Engineering

Graduating with a high 8.3 GPA, I joined Target Corporation as a Data Engineer. Working with the inventory planning and control team has been an experience inlaid with curiosity and learning on the job. Initially working in Gscll node operations, I managed Distribution center data from various data sources, working on technology modernization efforts like Mainframe & Data Stage migration into open source toolsapche, hadoop and apache. Optimizing and testing algorithms for demand forecasting and inventory management, I am handling huge datasets at a scale of terabytes per day. Working on real-time data has made me understand the limitless possibilities that algorithms like merge, sort, divide etc. offer to achieve unimaginable scales in processing. My greatest learning has been identifying problems, working as a team to develop solutions, testing and deploying optimizations at large scales. I have learned that mutual interdependence of both hardware and software of embedded systems is essential for efficient use of hardware.

Maturing professionally through my industry exposure, I realize that there is much to learn in this exciting domain. I now wish to broaden my horizons through a graduate degree in Computer Science and Engineering. Embedded systems beckon the researcher in me, and I believe that a Masters degree will enable me to drive innovation and script savvy technological advancements in this realm. My immediate goal is to gain advanced knowledge and expertise in the tools used to design and develop these systems, subsequently honing my skills in technological giants like _____. A start-up is on long term vision, where I wish to work on embedded systems to perhaps bring about fundamental, disruptive changes in this arena.

Decided on an MS, I have zeroed in on Penn State College of Engineering. With a pedagogy immersed in tradition and visionary education, it offers avant-garde courses in Computer Science focused on thought leadership, innovation and research. The immersive curriculum and experiential learning through software and hardware projects will deepen my erudition in Computer Architecture, Microprocessors and Embedded systems. I am excited at the prospect of working in the renowned Microsystems Design Lab, and exploring Embedded systems and computing theories. Browsing the college research section, I was able to resonate with the Computer Architecture researches at Penn State. I was particularly drawn to a 2014 IEEE paper 'Data driven adaptation for QoS aware embedded vision systems ' done under the supervision of professor Dr. John Sampson. The substantive research into optimization by reusing the previous results to reduce the processing of redundancy is inspirational, and I am excited at the prospect of similar research into normal computation methods, implemented on a software level to provide high throughput data pipelines.

I also bring with me experiences of first-hand research and experience in the industry, a zest for learning and a zeal for extra-mural activities. Serving as the Joint Secretary, IEEE NIT Calicut Student Branch and Senior Executive, Hospitality Committee, Ragam'15 and Tathva'15, I actively organized and participated in

various technical and cultural events and workshops at college. Enriching myself with the various student organizations like the Association for Computing machinery and the Engineers without Borders, intellectual debates with peers and professors and all the incredible opportunities at Pen State promise an exceptional educational experience.

Hoping that the MS in Computer Science & Engineering program will accelerate my progression, I aspire to push the boundaries of technological innovation. A keen desire to make a substantial contribution in the computing world, and not just remain a figure on the college fact sheet, gives me the confidence to take up the challenges offered by this pioneering program.