

# Statement of Purpose

I've always been fascinated by research, especially work that benefits common people or the environment. The idea that my efforts may better someone's life or help create a greener planet motivates me. So after a successful career in IT, I intend to pursue my MS in Computer Science at [REDACTED] in order to build my research skills and work towards my interests in Computer Visualization, Data Mining, and Software Engineering.

After completing my bachelor's degree in Electrical Engineering, I was interested in joining the Information Technology industry. So I pursued my dream by enrolling in a six-month Post Graduate Diploma course in Advanced Computing. At the end of the course I got a job in Software Automation Testing with Verismo Networks. After working in Perl for 1 year at Verismo, I joined Siemens Information Systems Limited. There I worked in Automation Testing using Microsoft .Net Technologies. Working with Siemens was both challenging and rewarding, as we did not use any commercially available tool for testing but rather created, designed and developed our own automation scripts, frameworks, APIs to communicate with the hardware, and developed various automated test tools to check system performance, integrity, stability, etc. After 4 years in Siemens, I joined Schneider Electric where I was given the leadership of introducing automation testing into our project. I worked with several teams to understand the project requirements and built automation testing framework using MSUIA and developed testing tools using MS SilverLight and .Net C#.

This strong professional experience has given me a better understanding of the immense potential of technology to materialize innovative ideas --- ideas which not only help solve our toughest problems but also enrich our everyday lives --- by objective research and even humble developments. To create innovative technologies and bring research ideas to life, I will need appropriate problem solving approach and a competitive environment that will help sharpen my acumen in research. A Master's degree with thesis will help me acquire these skills. In my 6 years working in the IT industry, I have developed specific interests in the fields of Computer Visualization, Data Mining and Software Engineering. [REDACTED] is one of the renowned universities in [REDACTED] and houses research teams that work on the areas of my interest. Given a chance, I would like to continue this journey in your department.

Developing automation tools for 2D and 3D Imaging Applications of Siemens ultrasound machine, I gained a fair idea of the domain of Ultrasound in Healthcare. I substantiated my knowledge by studying more about specialized areas like Visualization and how it transforms complex data into graphics representations that enhance the perception and meaning of data. 3D Visualization, one of the latest advances in the field of medical science, plays a vital role in diagnosis and has the potential to greatly reduce invasive interventions into the body, increasing physician performance in arresting or curing a disease. However in many countries, like in India/Bangladesh, these advanced facilities are still unavailable to most physicians. Also, in many cases, the visualization of the 3D anatomy is not very easy even with state-of-the-art techniques.

Broadening our research areas in the field of medical science might enable us to build more affordable medical equipment. For instance MIT developed an inexpensive smart phone device 'Catra' that can detect cataract. In a country like India where public healthcare services are dismal and even basic level healthcare is beyond the reach of most citizens, we have to devise innovative ways in similar lines to make better healthcare reachable to all. This is an area where emerging research can have a significant positive effect on people's lives.

I want to specialize in the field of Computer Graphics and Visualization to exploit the significant potential of 3D visualization. Not only will this open more options for minimally invasive or non-

invasive surgeries, it may also vastly simplify post-operative care and expenses. At [REDACTED], I am especially excited by work being carried out in the 'Computer Graphics, Computer Vision and User Interfaces' research area. I want to develop my skills and knowledge in this field by working in the project group 'Visualization Research Group' under Prof. Sebastian Bauer and use this knowledge to further my chances of a career in a research institute like Siemens Corporate Technology, a research division of Siemens. By working with this research group, I will learn how vast quantities of complex data can be represented in a visual and legible format to respective users. I may also get a chance to learn about the latest technology '4D Visualization' and invent ways to use it in medical domain in a cost effective manner.

In my undergraduate project, I worked on Forecasting Power Consumption and Energy Needs for the State Electricity Board based on historical energy usage using Neural Networks. I analyzed huge piles of records to understand the usage behavior based on season, time of the day, location, etc. Although the project was very rudimentary, I quickly realized how helpful, economical and efficient energy usage would be, if this was implemented. Luckily again in Schneider Electric, I worked on energy monitoring application which had similar approach. There I could see the practical benefits. This experience triggered my interest in Data Mining. This is a field that helps develop intuitive systems that forecast future problems and channel solutions based on current data.

Rapidly developing economies like the BRIC countries are among the largest markets for automobiles which is leading to heavy traffic issues, fossil fuel wastage and alarming pollution levels. All these can be mitigated if we encourage Data Mining as a research area in the companies working with public service departments. If we look through various databases available to analyze association between population increase/emigration and rate of increase in the number of vehicles, rush hour syndrome, current and upcoming major business areas, etc. we can find a connection among all these which will enable us find solutions to our traffic woes like building intelligent traffic control systems or innovative routes that can ease traffic congestion, reduce fuel usage and cut down emission. Corporate initiatives like IBM's Smarter Cities are using data mining principles to help give authorities the tools to analyze current problems or anticipate future ones from available data and find solutions pro-actively. \*I want to study Data Mining to work with such research companies and address some of the challenges most developing countries are facing today. [REDACTED]'s 'MADAI : Models and Data Analysis Initiative' research group is conducting cutting-edge studies in data mining and would give me exceptional opportunities to develop my skills. I am especially interested in the fact that MADAI emphasizes areas that are sometimes in domains outside of computer science. Similarly, I want to use my Data Mining knowledge in solving some real-time problems that cross disciplinary boundaries. I would be excited to work under Prof. Edward Griffin, because my objective of tackling real world problems is in accordance to his research interests.

Not every emerging technology is a breakthrough but some truly do have the potential to change our social landscape, and to build such effective technologies we need effective testing tools that will help create a dependable product. This drives me towards Software Engineering. Testing -- a subdivision of Software Engineering, especially Automation Testing, is one of the most underrated parts of the Software Development Life Cycle. A major area of the IT industry is unable to identify the importance of strong testing skills, resulting in a low skilled team where testing is executed within a limited boundary of a few pass/fail scenarios. In my years working in IT, I realized automation testing requires far more expertise; it's just like any development project requiring proper planning, design and commensurate skills. \*I also realized how important it is to embrace the latest technologies in automation scripts as the latest software developed are far more enhanced to be truly tested with age old testing methodologies.\*Since I've worked in this domain for so long, I know if I specialize in the field of Software Engineering, I can introduce Software Testing and Methodologies as a research area

in corporate level and help promote Automation Testing as a crucial part of software development. Working with Dr. Lars Anderson in 'Analysis of Computer Systems Group' under Software Engineering research area at [REDACTED] would help me understand latest software engineering practices and how it can be implemented to expedite software testing and overall product development.

While my primary areas of interests are Computer Visualization, Data Mining and Software Engineering, I look forward to gaining a broad foundation in Computer Science during my MS, and I am eager to learn about other research opportunities. My brother who is pursuing PhD in IISc, Bangalore also strongly recommended your university on the basis of faculty interests and the research work currently in progress. I am confident that earning my MS (with thesis) at [REDACTED] will help me hone my research skills and prepare me to contribute as a researcher who helps bring innovative ideas to reality.

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