Statement of Purpose

Introduction

My long and enjoyable interaction with computer science goes back one decade when I first learned to program. My initial motivation in studying computer science was its formal, rigorous and mathematical nature, but around five years ago, when I met Dr. Vijay Gokhle, my context got defined, and since then, I am working with undaunted relentless passion. He is a doctor of a human body, but also internationally respected technical fellow, and he keeps motivating me.

The concept of applying mathematics in the real world has fascinated me since childhood and therefore I chose to pursue B.Sc. Computer Science. After three years, passing a very competitive national exam, I got admitted to the Interdisciplinary School of Scientific Computing for the Masters in Scientific Computing program. I was naturally attracted to the world of computer vision and graphics. I have been working in the Computer Vision area for the last three years. My main research interests are related to affective computing, especially spatio-temporal analysis of images. My motivation for pursuing research related to computer vision stems from seeking to find solutions to practical problems, and my intuitive feeling that I have the potential to change the way people interact with visual data. I aspire to develop intelligent algorithms that perform visual perception tasks such as activity recognition, scene understanding, fusion, etc.

Research Experience

As a full time researcher at Persistent Systems – LABS, taking the first step towards my goals, I started with researching the problem of Activity Recognition based on Kinect. I have devised a novel way of representing the activities mathematically, and recognition on top of this representation yields accuracy of 86% on standard datasets. This method has roots in human body kinematics and particle motion from Computer Graphics. This research proved to be very important for me. Persistent LABS being a product company, and most of the work is focused on applications and monetizing the solutions, I had to single-handedly own the problem, convince the authorities that it was indeed a significant finding. During the process, I learned multiple skills such as constructively criticizing the work, using the precise words and understanding what is important in a context of a problem at hand. Initially, while facing the hurdles, I spent many sleepless nights till I could form a mathematically accurate model. Having a firm grasp on the maths an computer science fundamentals helped me a lot. Finally, when it was proven that the system actually solves a problem, pushes a boundary of human knowledge further by a small margin, the joy I experienced was beyond anything else that I had ever felt. This algorithm is used at present to demonstrate our group's ability and achievement at Persistent LABS and Persistent Systems are exploring ways to file a US patent on this method.

Later, when I read about how a researcher should be, I was surprised that unknowingly and naturally, I already possessed many qualities of being a good researcher. I have mastered many machine learning techniques in preparation for my future research work.

In another project, while working on remote sensing, I successfully invented a new method, which detects power lines from an HD camera of UAV in real time using a Kalman filter. This will be used as is in an “IndiaSmartCities” project. Through original research, I also have these two inventions, one basic

research and the other one being applied, in my name which I expect to be published in prestigious journals in 2016. I also have a strong understanding of 3D graphics. I have worked on GPU device drivers and written my own game engine for Android using OpenGL ES 2.0. Additionally, during my masters degree, I gained valuable experience in operating system development.

Teaching and Leadership

Teaching comes naturally to me; my mother has been a teacher for twenty two years. I have worked as Teaching Assistant in the subject Scientific Visualization – Computer Graphics. During my masters, I taught mathematics to senior high school students. They found it very motivating and appreciated the fact that I always enjoyed explaining how the real world is full of mathematics.
I have also led a group of three people at Persistent Systems, to develop Next Generation Data Visualization Techniques, a product which uses OpenGL to represent multidimensional information in an interactive way. Two of the members were more than three years senior to me, and for this achievement, I was awarded intra-company Young Leader of The Year award. Throughout the history, I became the youngest fellow from the LABS division to win this award.

Conclusion

For me, problem solving is an experience unmatched by anything else. It would give me immense pleasure to be able to contribute to this subject. My experience reflects few open problems which motivated me, and which I will continue to work on. In addition, after interacting with the members of your group will give me an invaluable opportunity to broaden my horizons and work in many exciting areas of research. Having decided that I will engage in a career in research, I am aware of the kind of dedication, resilience and resolve I will have to show. I feel that I am adequately prepared for that, both in having the technical qualifications and the right mindset for doctoral level research.