

Statement of Purpose

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“Computers can be easily programmed to perform things that humans find difficult”, this statement was my assumption for a long time. In my senior year as an undergraduate in computer engineering major, I found out that trivial functions, such as speaking, listening, perception and understanding, are actually the most challenging problems for computers. Being convinced with the importance of having these tasks performed by computers, I built my interest in Artificial Intelligence (AI) and Computer Vision fields.

This interest encouraged me to look for a research problem that combines both fields; AI and computer vision, in my graduation project. Therefore, I chose my project to be “Face recognition and Identification”. We investigated various face recognition and skin detection methods. Subsequently, we gathered a new skin color dataset which we used to create a skin color model. This model was used to segment image into either skin or background areas. We mapped the face image into Eigen space this is followed by using a classification method to finally identify a person. This project showed me what it meant to work in research and handle the frustration of wrong or unexplained result. On the other hand, the thrill and the continuous motivation to gain more information, ideas help investigating more creative problem solving and thinking techniques. In short, I knew then that I want to continue to work in the scientific research and particularly in the AI field.

Although my dream was to become a scientific researcher, I believed that I need more practical experience before involvement in another academic research. Thus, I worked for four years as a Software Engineer in EngNet Company. During my work I gathered some valuable research skills as I was engaged in various discussions and negotiations with clients and with my own team members. The experience taught me how to resolve conflicts between different opinions and compromise to reach a final decision that will be acceptable by all parties. I was quickly promoted to Team Leader for a software team. I planned, coordinated, and supervised my team to achieve the company goals. I continually needed to evaluate, the organizations and operations of my team to guide them to better engineering practices that will help enhance and maximize the team and in turn the company performance. Learning new skills on how to supervise and evaluate operations of software projects led me to search on how to implement software practices that will enhance the company performance and products.

These experiences along with my research oriented graduation project emphasized that my dream work is working as researcher in an academic institute. Since 2007, I have been affiliated with the ‘Signal and Image Processing’ research group in the Electronic Research Institute (ERI). The position offered a research environment which I believe is essential for conducting any constructive research. My work in ERI focused on investigating and evaluating the use of Swarm Intelligence in field of Image processing. I also worked on integrating this work with my Master’s thesis in Sketch Recognition and Understanding. I worked on evaluating the efficiency of different Particle Swarm Optimization (PSO) algorithms on segmenting users hand drawn sketch. Engaging in research discussions and projects opened my mind to other fields of research other than my own, which was very helpful to provide me with a breath of information that I would definitely help me as a researcher in the long term.

I believe that any academic or scientific researcher must acquire some tutoring skills and experience. Thus, prior to my work in EngNet Company, I worked as Teaching Assistant in the October University for Modern Science and Art (MSA), Egypt. Additionally, I have been working as a Teaching and Research assistant in the American University in Cairo (AUC), since Sep., 2008. My responsibilities include preparing tutorials and course materials as well as correcting assignment and projects. I have been assisting in presenting and advising for various courses ranging from Software Engineering and AI to Logic Design and Embedded Systems. Even though my main goal is to become a researcher, teaching is in itself an enriching experience which improved my skills in both professional and personal aspects.

Besides working as a teaching assistant in AUC, I also work as a research assistant along with Dr. Sherif Abdelazeem. Our research in AUC focuses on Arabic Digit Recognition specifically analyzing and measuring the efficiency of different features and classification algorithms. The research focuses on investigating and experimenting new domain specific features to improve the accuracy and speed of current Arabic and English Digit Recognition systems. We are currently extending the research to the recognition of Cursive Arabic handwritten words.

Machine learning is my main field of research interest as mentioned before, mainly the use of machine learning algorithms in image processing in general and specifically in application which aim on improving Human Computer Interaction (HCI). This field has a wide range of problems like handwriting, sketch and gesture recognition. In the last few years, the attention for these applications increased due to the importance of creating easier, faster and reliable HCI which led to introducing of new

interfaces like Table-Tops and tangible interfaces. Furthermore, I am also interested in the usage of artificial intelligence in software engineering; particularly ideas like generating code based on previous similar requirements or using natural language to represent reusable requirements that can be automatically transformed into running programs. My interest in this area is mainly because of my previous experience as a software engineer where I investigated ideas and procedures to improve and speed the development process

In conclusion, pursuing a PhD degree will help me achieve my goal as a researcher. My choice of studying abroad is based not only on the research experience that I will gain in studying in another university but also on the experiences I am sure I will gain by living in a diverse community. The University of Calgary is ranked as one of the top universities in Canada which will provide me with the high caliber qualities that I need to widen my vision. I am sure that both my previous and currently growing teaching and research experiences provide me with the necessary background in Computer Science to pursue further studies. I know that research requires persistence, hard work, and self motivation and management skills. I am proud that my professors and supervisors see me as a responsible, reliable and self motivated person. I hope that my experience will enable me to contribute to the on-going research at the University of Calgary.