Teaching Statement

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I have already about seven years of teaching experience, both as a teaching assistant and lecturer in Automatic Control Engineering and Microcontroller at Credit Hours Program "Electrical and Energy Engineering, EEE", Electrical Power and Machines Engineering Department, Faculty of Engineering, Cairo University and also in the capacity of lecturer in Mechatronics Engineering and Robotics at Mechatronics Engineering Section, Mechanical Engineering Department, Egyptian Academy for Engineering and Advanced Technology "Affiliated to Ministry of Military Production". My teaching experience has spanned a variety of courses, universities and student levels and I feel that I am very competent, at this stage to handle any course at a faculty level.

As an Assistant Lecturer and Control Engineering Labs Supervisor I helped conduct problem sessions or recitations and graded homework assignments and exams for classes while as an instructor I have designed and taught the entire course. In addition, I have also had the opportunity to work with students more closely by serving as their co-advisor for the senior undergraduate graduation project course at Credit Hours Program "Electrical and Energy Engineering, EEE" and the Two Terms System at Electrical Power and Machines Engineering Department, Faculty of Engineering, Cairo University. I was also the supervisor of graduation project at Egyptian Academy for Engineering and Advanced Technology.

I have helped in establishing and assembling some systems and devices at Faculty of Engineering, Cairo University such as Mitsubishi Robot, FESTO System and Schneider Robot. This has been one of my most memorable experience. I also leaded a group of M.Sc. research students in Robotics field under the supervision of my advisor.

Through this time I have come to greatly value the significance of hands-on experience in teaching. For this reason, several of my advanced undergraduate classes have required a final project where the students get to apply the theoretical concepts that they have studied over the term and in the process also learn invaluable lessons through collaboration, presentation, critiques and often through failure.

Teaching has opened a new facet of knowledge that I did not know existed. I have come to realize that teaching is an essential part of learning for myself. I have benefited as much, if not more, through this experience, than my students. I have found excitement and self-fulfillment through teaching. Furthermore, I have also truly and deeply understood several things only after I have taught them.

My teaching philosophy essentially boils down to allowing students to use their own skills and faculties to understand the subject at hand; to be able to see the world uniquely through their own eyes. Then they are bound to appreciate what they have learned. I am also for a holistic understanding of a subject. Any topic needs to be seen from several different perspectives for complete comprehension.

For the future, I look forward to teaching a variety of courses at the undergraduate and graduate levels, to interacting with all students and challenging them and myself with novel ways of thinking about new and old concepts.

Current Research

Nowadays, I am enrolled in designing bionic hand project at Egyptian Academy for Engineering and Advanced Technology. This research project aims to design and implement a 3d printed hand model for prosthetic applications using recently acquired skills in mechatronics and bio-mechatronics engineering technology to lower the price of a bionic hand. The mechanical parts that make up the hand will be designed using 3D CAD software and it will be created on a 3D-printer. Using 3D-printing, the hand can easily be scaled to any size much more cheaply than using traditional methods. The project also lowers cost by designing and creating its own EMG circuit. This is the most important part of the whole system because it gives the user control over the hand. Without it, the hand is just for looks. The EMG circuit measures voltage across an arm muscle. When the muscle contracts, the circuit sends signals into a microcontroller that operates the 3D-printed hand with the help of a few servos. At the end, deep learning will be used to make more movements.

I am also enrolled in Covid-19 Detection project using x-ray images at Egyptian Space Agency. This project is developed to provide accurate diagnostics for binary classification (COVID vs. No-Findings) based on-CNN basically. Due to the success of deep learning algorithms in analyzing medical images, Convolutional Neural Networks (CNNs) have gained much attention for disease classification. Our project can be employed to assist radiologists in validating their initial screening, and can also be employed via cloud to immediately screen patients. In addition, features learned by pre-trained CNN models on large-scale datasets are much useful in image classification tasks. We analytically determine the optimal CNN model for the purpose.