Teaching Statement

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As a "teacher", I consider the act of teaching a learning experience not only for the students but also for myself. The key ingredient for a class to be interesting for me was, if the instructor was able to provide keen insights into the topic which are not evident from simply reading textbooks. Moreover, looking at a problem from a theoretical and applied perspective is also important as it leads to a more comprehensive understanding of the issues involved. I would like to provide such insights to my students, especially in today’s world where access to information is cheap. Moreover, I would like to provide different ways of looking at the problem that is not just from a computer science perspective, but also from the perspective of other fields such as statistics, social sciences and economics. My experience with lecturing has taught me that involving students in discussions by asking them questions, maintaining eye contact and timely humor to freshen their minds are all essential for a successful discourse. I plan to incorporate the lessons learned from these experiences into my teaching with the hope of creating a stimulating environment in my classes.

I was a teaching assistant for the course Applications of Discrete Structures during Fall 2007. The syllabus covered basic concepts in set theory, predicate calculus, counting, proof techniques and some other discrete math topics. My duties included conducting discussion sessions, grading and holding office hours. The discussion sessions consisted of two batches of around 40 students each and I used to lecture for 2 hrs. every week. I primarily motivated the subject as an exercise in thinking clearly which can be helpful even in other walks of life. I used to ask them a lot of questions so as to make the class interactive. The questions sometimes included fun puzzles, which kept them interested and at the same time made them think. In short, it was an extremely fun and rewarding experience for me and I would love to teach sometime again. In addition to teaching, I have given multiple talks to different types of audiences – conference talks to experts, big picture talks to CIOs and high level executives of major corporations, presentations to domain experts in other fields – which were well received. I hope to leverage these experiences, when conducting classes.

Considering my research experience, teaching experience and course work I would be particularly glad to teach both graduate and undergraduate courses in Data science, Machine Learning, Data Mining, Algorithms, Discrete Mathematics, Data Structures and Optimization. Advanced classes on these and related topics would also be of interest to me. In addition, I would like to design the following new courses:

- **(Research) Problem Abstraction:** Based on my experience in an industrial research lab, I feel that being able to define relevant and novel research problems from practical applications is a skill that is extremely important to have/acquire. I believe this is a skill that needs to be developed to be successful in industrial research and even to some extent in doing innovative and useful academic research, but hasn’t received nearly as much attention as skills that need to be learned for solving known problems. This doesn’t imply that you create a problem that isn’t there, but rather be able to clearly think and formalize a more generally applicable research problem from one or more related real life applications. Being exposed to problems in diverse domains in industry and having conducted research in that manner I strongly feel that I have a lot to offer my students related to this. In such a course there is no incorrect answer, just more useful ways of defining things. I think this would really bring out the creativity of the students.

- **One Application Many Problems:** This course will consist of me presenting to the students some real world problems that need to be solved. Usually any single real world problem or application requires making sufficient progress in multiple research directions. This is a complementary perspective, where rather than going deep into a specific research problem which may be partly relevant to many applications, we are trying to solve an application which may be composed of multiple research problems. I believe that this will not only give students an appreciation for how hard it is to actually solve a particular application but also expose them to multiple research problems that have practical impact. They can then choose the research problems they want to tackle in their dissertation work in a much more informed manner.

One of the objectives of this new course work is to make students aware of my line of thinking. It would also expose them to the kind of research that I am involved in and encourage further collaboration with those that are interested. I hope that I will be able to have the same kind of positive impact on my students that my teachers have had on me.