Teaching Statement
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1 Overview

Teaching forms the central component of an academic career. I love solving problems and what I love about teaching is its striking similarity with the art of problem solving. While solving a new problem, we are often interested in the right perspective that simplifies and connects the problem to some known domain which we are comfortable in handling. Similarly, given the comfort zone of students, effective teaching requires finding the right perspective for the concept at hand that connects it with the existing understanding of the class. Both teaching and problem solving require patience before seeing some progress. Diversity of students adds another dimension to teaching. In order to make the subject understandable to a diverse set of students, it is important for a teacher to think (or rethink) about the ideas from different angles, which often opens up new perspectives for further research. Teaching a subject is a very effective way of mastering it. Teaching and research strengthen each other and the combination is something which is unique to academia.

For the teacher, it is very important to stimulate interest in the subject by creating enough curiosity that constantly keeps the students engaged. The hope is that after long enough engagement students will themselves discover their taste in the field. For this to happen, I believe that the curriculum and the teaching process should progress gradually in a connected fashion like a story revealing the bigger picture step by step in a natural flow. I think the best way to keep students engaged is to make them aware of their own creativity for the topic. It is important to design right questions with the right amount of hardness. Too easy questions will not make students appreciate their creativity while too hard questions might make them lose hope. Diversity in the levels of students should always be kept in mind and it should be ensured that the curriculum has something to offer for everyone. The future of any field is directly linked to the success of the students practicing it. It is therefore necessary to ensure that the students also learn the appropriate skills that will be required for their future success in the field. Balancing all these aspects is an art which can only be mastered through practice, patience and continuous efforts.

2 Prior Experience

I have always found teaching a very enjoyable and satisfying experience. During high schools days I used to enjoy giving lectures and short tutorials in the classroom, and I was always ready to actively volunteer for such opportunities. My first formal mentor experience was as a trainer for five junior scientists as a part of one month research orientation. The aim of the program was to teach the incoming candidates different machine learning and data analysis techniques, used by the team, along with object oriented programming in JAVA. The program consisted of 2-3 hours of lectures everyday followed by day long group assignments. It was indeed a challenging task to design lectures and assignments that kept stimulating the interest and at the same time ensured that the students made the required progress and understood the key concepts thoroughly. To make the assignments more rewarding, I designed problems having real value, so that the students feel
a sense of contribution along with the learning process. As a result, the candidates designed a JAVA code profiler which was later used by many people in the research team to locate running time bottlenecks of their own codes. The rewarding experience and the positive feedback that I received after the training program boosted my confidence towards teaching.

After coming to Cornell as a grad student, I got more opportunities to practice teaching. I participated in a two week long teaching orientation program organized by the Cornell Center for Teaching Excellence to better understand the academic setting and improve my teaching abilities. During my PhD program, I served as a teaching assistant for two senior graduate level classes 1) Foundations of Artificial Intelligence (AI) and 2) Introduction to Natural Language Processing (NLP). I was also a head teaching assistant for “Practicum in AI”, a project-based course. In these courses, I was responsible for designing assignments, advising and steering course projects, giving tutorials and class lectures along with holding office hours. These responsibilities gave me plenty of chances to interact with students and monitor their progress closely. I was able to appreciate the diversity and the advantages of multiple perspectives while teaching. I was also responsible for mentoring many groups for semester long projects involving various topics from AI and NLP. I was holding weekly meeting with the groups and advising them on literature reading, asking the right questions, performing experiments, etc. It was amazing to observe how different students evolve and finally come up with something concrete, useful and presentable. I have always found interacting with students a very rewarding experience.

3 Teaching Interest

For an effective teaching it is important to have a deep understanding of the topic. I hold bachelors and masters in Mathematics and Computing from my undergraduate institution and a master in Computer Science from Cornell with a minor in Applied Mathematics. I have done extensive and rigorous coursework in mathematics, computer science and statistics. I have a strong foundational background in theoretical computer science along with a solid first hand experience with a variety of applications. My education and experience have made me appreciate both the theoretical as well as the applied perspectives. I therefore feel confident and prepared for teaching courses having both theoretical and applied perspectives.

At the undergraduate level, I can teach courses such as Machine Learning, Mathematical Foundations for Big Data, Foundations of Web Mining, Algorithms and Data Structures, Probability and Statistics, Discrete Mathematics, Introduction to Artificial Intelligence, Introduction to Machine Learning for Massive Datasets, etc. These courses will build basic foundations of the underlying ideas and principles along with hands on experience in using them for solving practical problems.

I will be happy to teach advanced and specialized courses at the graduate level such as Advanced Algorithms, Advanced Machine Learning, Scaling up Machine Learning, Hashing and Randomized Algorithms for Big Data, Mining Massive Datasets, Graphs and Social Networks Mining, Advanced Probabilistic Models, Sketching and Streaming Algorithms, etc. I envision most of these courses as interdisciplinary project-based courses aimed at exposing students to the recent research directions in the corresponding fields. The project component will be a direct application of the modern tools and techniques, introduced in the class, on real high impact problems which is of direct interest to industries. Depending on the interest, these courses can be made more professional or theoretical.