Teaching Statment

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1 Teaching Philosophy

My overarching teaching goal is to foster an inclusive environment where students not only acquire technical knowledge but also develop critical thinking abilities. I want all my students to think about why they are learning a particular concept, how these concepts can help them in real life. Over the past six years, I have served as a teaching assistant for a variety of courses, ranging from small-scale classes (25-50 students) to larger lecture halls (200 students). Additionally, I served as the lead research mentor and TA for the Early Research Scholars Program (ERSP) at UC San Diego, during which I mentored 150 students from underrepresented minorities on diverse computer science research fields. These experiences and student interactions have refined my teaching practices that I deem critical for optimal student learning: **promoting critical thinking, active involvement in student learning, combining theory with practical applications**

1.1 Promoting Critical Thinking

I believe the primary goal of teaching should be to inspire students to learn. I have always structured my lessons with this principle at the forefront. Every concept I teach is a story for students to follow and learn more. To promote critical thinking in my class, I use an instructional strategy centered on the 'why', 'what', and 'how'. I initiate the lesson by explaining the rationale and real-life applications of the concept, followed by introducing the prerequisites and essential terminology. I then delve into the intricate details, elaborating more on how these components combine together to address the presented problem. I have used this strategy throughout my teaching experience and found that it helps even more when explaining advanced computer science concepts. For instance, when I conducted a workshop on machine learning and tensorflow for undergraduate students as part of ERSP, I started with a real world problem of email spam classification that the students were familiar with. I encouraged the students to think and come up with various methods to solve the problem. By slowly traversing through cons and pros of each of those solutions interactively, I gradually introduced the necessity and utility of machine learning. Feedback from students emphasized the efficacy of this approach; in their evaluations, they reported the usefulness of the workshop and how much it helped with their research progress.

2 Active involvement in student learning

A crucial aspect of my teaching methodology that I give importance to is to be actively involved in the students' learning process. From my experience, I have observed that certain groups, especially first-generation students and underrepresented minorities often encounter unique challenges during their learning process. In my teaching, I incorporate strategies like logging and reflection, enabling students to express their difficulties and achievements throughout their learning journey. By continuously monitoring these logs, I can identify the concerns and challenges of students and proactively provide tailored resources to help them. I reach out to students in trouble and discuss with them in-person to help them in anyway possible. During my teaching experience, many students have reached out to me for technical guidance and also to discuss other issues hindering their progress either through logging or directly reaching out. Occasionally, students might

go through troubles that are non-academic, such as mental health issues. I provide an accommodating environment where they can share their troubles with me and also point them to the appropriate resources such as CAPS to help them. This empathetic approach has created a welcoming environment for the students and has promoted learning.

3 Combining theory with practice

Theoretical lectures can sometimes be challenging to grasp. When conveying complex theoretical concepts, I consistently complement the lecture with practical activities that demonstrates the application of theory in real world. This not only helps the students in understanding the concepts more clearly but also equips them with a practical understanding of the use cases behind such theoretical concepts. When I was mentoring a group of undergraduate students in ML, I has the opportunity to explain the back prop algorithm to the students. This is a complex topic to grasp as it involves lot of calculus and mathematical understanding. with the help of visual tools and aids, the students learned to slowly change the values of model's weights and see how back prop affected the end performance of the model. Using such visual tools enable students to put theory into practice and promotes a deeper understanding of the topic.

Research has also shown that students think better when they think together. Working in small teams and having discussions with other peers also enables students to articulate their thoughts more freely. I frequently employ the 'think-pair-share' technique in my teaching. I pose a problem, let students contemplate various solutions, and then encourage them to share and discuss the merits and drawbacks of each approach with their peers.

3.1 Teaching experience

Throughout my Masters and PhD at UC San Diego, I have taught a wide variety of topics such as machine learning, statistics and also mentored students on many concepts across computer networks, computer hardware and algorithms. Table 1 summarizes my overall teaching experience.

Course Name	Number of students
CSE 291I: Machine Learning for 3D Data	50
PSYC 60: Introduction to Statistics	200
CSE 193: Introduction to Research (ERSP)	49 + 49 + 48 =146
CSE 258: Web Mining and Recommender Systems	229
CSE 231: Advanced Compiler Design	118
CSE 194: Race, Gender and Computing	44
CSE 158: Web Mining and Recommender Systems	229

Table 1: Summary of my teaching experience at UC San Diego

3.2 Teaching Interests

Given my experience in machine learning, I am well-equipped to handle courses related to AI and deep learning. Majority of the machine learning courses focus more on the theoretical concepts and popular algorithms. I would like to design my own course on how these algorithms are used in production as a product to cause societal impact. The course would provide insights into the complete production system pipeline, emphasizing the trade-offs to consider when implementing any learning paradigm in a product.