

Teaching Statement

Shi Feng

Machine learning is becoming an indispensable tool for future workforce. Teaching machine learning is an exciting and crucial part in ensuring that the long-term outcome of artificial intelligence is beneficial to humans. I believe that training for technical excellence is as important as informing students the social impact of technology and helping them navigate the complex issues shaped by future technology. I intend to develop and teach machine learning and natural language processing courses in a highly interdisciplinary way, drawing inspirations from philosophy, social science, and psychology. In this document, I will briefly discuss my philosophy on topic selection and teaching style.

Topic selection and course project design

With increasingly available online resource, students have more and more opportunities to learn about machine learning techniques from high quality materials at their own pace. So we as educators must ask: what unique insight can our course offer? I believe a good course—even one on technical topics like machine learning and natural language processing—should tell a story, a story about how the technology came to be, what key ideas help shape it, and where it is headed in the future. Compared to traditional ML courses that start from a mathematical background, the gradually build up a stack of techniques which eventually leads to modern neural networks, I think a more effective approach is to start from a high level discussion about ML's impact, identify and formulate concrete problems, then introduce the background knowledge in such context. This allows technical knowledge to be taught in a coherent story. And instead of learning about more traditional methods like support vector machines and wondering how they are to modern models, the student will understand the underlying idea and how it contributed to the evolution of ML methodology.

My course will draw inspiration from psychology, social science, and psychology. But I also recognize that depth is equally important as breadth. I believe the best way to gain deep understanding in a subject is through hands-on experience, especially for a discipline where engineering is a big part. This motivated the course project for the graduate level natural language processing at University of Maryland (CMSC723) which I co-designed with another PhD student. The project has an ambitious goal: to build a machine learning system that can compete with humans on a trivia game called Quizbowl. This a relatively large scale project, but we break it down into self-contained components that each takes one to two weeks to complete. The students learned about many techniques in the process, such as language model pretraining, uncertainty estimate, reinforcement learning, and human-in-the-loop evaluation. More importantly, the coherent theme helps the students understand how each of these components contribute to the system.

Teaching style: Engagement is key

I believe that engagement is crucial in teaching. Besides designing course material that inspires curiosity, I have a few strategies to build engagement both in and out of the classroom. The first strategy is to encourage the students to be active participants of a conversation rather than passive listeners of a lecture. The first method I will use is to ensure face time with individual students and small groups of students. The fear of speaking in public can be compounded by the fear of being judged by the teacher. And the way to alleviate that concern is to build a good relationship with students where they feel comfortable talking to me individually. I believe that a small amount of time invested in this can go a long way. For larger classrooms, having meetings with groups of student would also help since the peer pressure is partially alleviated. The second method I will use is to set up structured discussions where each student takes on a designated role, such as in a debate or a Role-Playing Paper-Reading Seminar. This way the students won't feel like they are the only person talking in the whole classroom, but one of many people who are having a conversation.

Also important to engagement is to ensure that each lecture progress smoothly in terms of difficulty and depth. The idea is similar to the zone of proximal development: engagement drops both when the material is too easy and too hard. Structure each lecture such that it tells a coherent story. Start from things that are easy to understand.

Finally, I believe that it's important to respect student's diverse needs and recognize that fundamentally, they have to study at their own pace. I will use whatever technology available to help them do that, e.g., with prerecorded lectures in a flipped classroom format (which I participated in for graduate level NLP as well as a tutorial at NAACL 2022), online forums such as Piazza, Slack, and Discord. Their feedback can help the course evolve the course over time.