

Teaching Statement

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Teaching is an important, enjoyable, and beneficial academic duty. While it demands an enormous amount of effort, teaching gives me immense satisfaction and joy by passing on my knowledge to students to learn about new concepts. Furthermore, in the process of mentoring others on their research projects, it rewards me with a deeper understanding of the problems and new research ideas.

Teaching Experience and Philosophy. Starting from my senior undergraduate year, I have served as Teaching Assistants for five courses at both undergraduate and graduate levels. In particular, I have experiences teaching *Introduction to Programming*, *Artificial Intelligence*, *Natural Language Processing* at the University of Michigan and Yale University, and assisting with a *Natural Language Processing Massive Open Online Course* on Coursera. As a teaching assistant, I proposed, designed, and graded assignments and exams, and held weekly office hours and tutorial lectures to explain assignment requirements and answer questions. Based on the student feedback, my teaching evaluation are 4.4/5.0 for Natural Language Processing in Spring 2018 and 4.8/5.0 for Artificial Intelligence in Fall 2017.

As for my teaching strategies, first, my central goal of teaching is to equip the student with the ability to absorb new concepts and acquire new techniques by themselves, not only to deliver the course material itself. This is particularly important for computer science students because computer science is one of the most fast-changing fields. When I gave a tutorial on deep learning in my class, I taught the students about the programming logic behind the most popular programming frameworks for deep learning and compare their pros and cons with older programming libraries. Instead of focusing on syntax details and pointing directly to their bugs, I showed them how to leverage the online documentation to solve implementation issues. While the programming framework is rapidly developing, the fundamental understanding of programming logic and the ability to leverage existing resources by themselves will allow them to adapt to the future change. I found this strategy very effective. One student felt overwhelmed in the first two homework assignments, but later on, she did amazingly well on her own in the last two assignments. I am proud of them because not only did they thrive in this course but they also finally ended up developing stronger programming skills and became self-learners in Computer Science.

Furthermore, as computer science is inherently cross-disciplinary, it is crucial to help students draw connections between different subjects to master knowledge. In particular, Natural Language Processing (NLP) is a subject lying between Computer Science, Artificial Intelligence, and Linguistics. My NLP class at the University of Michigan is cross-listed in three different departments including EECS, Linguistics, and the School of Information. Therefore, students with different educational backgrounds study Natural Language Processing in the same classroom. While the majority of the class is from computer science, there are a few linguistics students taking NLP because of their interests in empirical methods of computational linguistics. While they are experts in the linguistic aspects of the class, it is important for me to help them understand the algorithms that computers use to process language and successfully implement a program. For example, for the first assignment of implementing a part-of-speech tagger, I reserved time for personal tutoring to explain the statistical principles of language models and the workflow of the Viterbi algorithm. It turns out that all of the students, including those from linguistics, did very well in this assignment.

Finally, I also believe it is effective to leverage educational diversity as an opportunity for students to learn from each other. During my office hours, I often created small panel discussions with students to review materials for upcoming exams. When a student was confused about a question,

another student possibly already had a good answer. In this way, I encouraged students to share their confusions and solutions together, and I found this was particularly beneficial for both "teachers" and "learners". I also maintained a Piazza site where students could post questions as well as responses. This created an online discussion forum with very active participation. Throughout the semester, students contributed quite a lot: 173 out of 431 responses were from the students themselves.

Mentoring Experience and Philosophy. As someone benefiting greatly from my dedicated mentors, I look forward to starting my own group and training others to become independent researchers. Through my graduate study, I have found it truly rewarding to mentor other students by encouraging them to start research based on their interests, supporting them to strengthen their research skills, and creating opportunities for them to make their own contributions.

Starting from my second year, I have supervised five undergraduate students at Yale University with their independent research study and thesis. Their projects span various topics including text summarization, cross-lingual information retrieval, and semantic parsing, all of which make significant contributions to my publications. One of my best mentoring experiences was with a sophomore student on Graph-based Neural Multi-Document Summarization. Based on his courses and interests, I started by identifying an idea of using neural networks for multi-document summarization and providing relevant benchmark datasets and implementations of baseline systems. I then encouraged him to explore using semantic graphs to represent documents and graph convolutional neural networks to solve the problem. Following this line, the student made significant contributions which finally led to his first first-author top tier conference publication at CoNLL 2017.

Teaching Plan. Given my past experience in teaching and research covering a wide range of areas, I am qualified to teach undergraduate courses in Artificial Intelligence, Machine Learning, and Introductory Programming. In particular, I would like to offer undergraduate and graduate courses directly related to my research projects in Natural Language Processing. I will organize my courses to cover linguistic theory, real-world applications, and cutting-edge research progress in Natural Language Processing for students in different majors. In addition, given my teaching experience on Coursera, I would be excited to explore the opportunity to Massive Open Online Courses (MOOCs) in Natural Language Processing and related topics. Natural Language Processing has been increasingly popular and applied in many fields such as Clinical Informatics, Financial Technology, and Data Science. MOOCs provide an accessible and effective platform for everyone to start learning and applying Natural Language Processing techniques. I will structure the MOOCs for students of various computer science backgrounds and design a scalable and automatic mechanism to grade programming assignments and provide feedback.