1 Teaching Experience and Philosophy

At the University of Illinois at Urbana-Champaign, I have been a teaching assistant with Prof. ChengXiang Zhai on CS 510: CS 410: Text Information Systems (undergraduate), Advanced Information Retrieval, CS 598: Special Topics in Information Retrieval. These courses covered a wide range of sizes (from a mid-sized class with 45 students, to a large class with 200 students), angles (focusing on research vs. focusing on engineering and practice), and levels (graduate and undergraduate).

Managing big class. Through working on these three courses of similar topics, I became very familiar with teaching these topics. At the same time, based on the different focuses of the three courses, I learned about how the same topic could be adapted for different teaching needs. In CS 410 (undergraduate class), there were 200 students, and I learned about how to manage a large class, including designing assignments and answering questions. Because this class focused on training students to advance their engineering skills for building text information systems, e.g., a search engine, we designed the assignments so that each assignment was one step for building a search engine, and at the end of the semester each student had implemented a search engine from scratch. Due to the size of the class, we received a lot of questions on Piazza (1,000 questions for the whole semester, i.e., 9 questions a day). To make sure students' questions were answered on time, the TAs took turns to answer all new questions on each day of the week. In addition, we engaged the students to help with each other and in the end, 99% questions were answered and the students managed to help with answering 265 of them.

Innovative teaching methods. I am enthusiastic about innovative teaching methods. CS 510 was a more research-driven course, where the goal was to help students get hands-on experience in research, teaching them how to find a research problem, and eventually generating a research paper. We mentored 90 students on their final course projects. Because the class was big, we developed a novel 4-step process for scalable mentoring. Half way through the semester, we asked each student to pick a conference paper from a top conference in the area, and write a summarization essay. Through the process of finding papers, students got some initial idea of this area and what they were more interested in. Then we asked students to find their teammates based on the similarity of the papers they selected. Next, each team submitted a project proposal, and created a research page based on the proposal. Based on the topics in their proposals, we grouped all the teams into 7 big research groups, e.g., sentiment analysis, question answering, representation learning, and software track. We asked each team to peer review the research pages from other teams in the same group. After being peer-reviewed, they finalized their projects and submitted reports. I found such peer commenting methods had significant influence on their project reports. From learning others' ideas, they were able to reflect how to improve on their own projects. For example, some students commented, "*... I did not realize SQuAD could be used in this way!...*" (learning new ideas from other teams), "*... I think it could be interesting to analyze the trends between years of this dataset*" (suggesting new ideas to other teams) and "*... you answered a bunch of questions but seemed they lack some sort of coherent theme*" (pinpointing the problem in other team's project). There are also a few shortcomings in this 4-step model, e.g., students still had difficulty finding teammates, students were prone to following shallow trends. I plan to further improve this model in future.

Adaptive teaching methods. I applied adaptive teaching to mentor students projects in CS510. (1) *Adaptive mentoring on research skills*. Some of my students had more experience on research than other students. For more experienced students, my job was more like a peer reviewer who raised critical questions to help them justify the soundness of their work; while for less experienced students, my job was more focused on helping them learn to define a research problem and have a research mindset. I tried not to help solve their problems by myself but rather pushed them into thinking about what are the important things to consider for solving a

research problem. Among different students, I tried to prioritize mentoring students who were less experienced. In particular, I found one team made very little progress in a month, so I spent more time on this team by monitoring their progress every now and then. In the end, they found their project and made good progress. (2) *Adaptive mentoring on research interests.* At the beginning of the semester, I provided two candidate projects for students to choose, and then at one point 5 groups selected the same project and it became challenging for them to justify the novelty of their projects. Then I helped the students find their own projects based on each student's own research interests. For example, some students were more interested in exploring the data, while others showed stronger interest in building tools. For the former students, I encouraged them to analyze the data for discovering insights, while for the latter students, I encouraged them to build a tool by considering who they wanted to help and what are the biggest pains that need to be addressed with tools.

I believe that *patience, empathy, and communication* are the keys to teaching. Junior students could easily change their opinions based on my comments, and they sometimes got intimidated for speaking up their opinions. In such cases, I would try to imagine myself back when I was a student for the same course and reflect whether my questions/answers were helpful for bringing up their own opinions. I also always encouraged my students to think independently and defend themselves, even when their opinions were in conflict with my own opinion, e.g., I always maintained an open rubric as long as students can explain their answers.

2 Student Mentoring

I have mentored 2 master students (Yue Leng and Shengliang Dai), and a few undergraduate students. I have provided counseling helps to numerous Ph.D. student from other backgrounds (software engineering, programming languages, security, social sciences) with my expertise in text mining, natural language processing, and theory. I helped a Ph.D. student in information sciences by providing an algorithmic solution and they turned that work into a publication in WWW 2015. I also helped a Ph.D. student working on education to design a graph algorithm for her work in education concept graphs. Later she turned that work into a publication in EDM 2018.

3 Research Seminar Organization

I organized the research seminar in our research group at the University of Illinois at Urbana-Champaign. The goal of the seminar was to help everyone in our research group learn about each other's work and educate junior students. During the semester, many junior students got the chance to speak and receive advice. I also invited two students from outside of our research group to present their interdisciplinary work related to the research theme of our research group. I was very satisfied when seeing a lot of discussions going on, and many junior students speaking up their opinions and making suggestions for the first time.

4 Teaching Interests

I am interested in teaching courses on software engineering, security, information retrieval, and data mining (at both undergraduate and graduate levels). I would also like to teach introductory level courses such as data structures and algorithms.