TEACHING STATEMENT | DONGYAO CHEN

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My PhD education and research have focused on Internet-of-Things (IoT) sensing and artificial intelligence (AI). Therefore, I am prepared to teach undergraduate and graduate-level courses in data science, wireless communication/networking, algorithms, programming/development on ubiquitous devices, and interactive application design. In this statement, I summarize my teaching experiences and outline my teaching goal and approach.

TEACHING EXPERIENCE

As a lecturer, I have learned to interact effectively with students by preparing illustrative lecture slides/notes and clearly explaining course content. I delivered guest lectures on ubiquitous sensing and applied machine learning in an undergraduate course (CSCI3511, Hardware-Software Interface) at the University of Colorado, Denver and a graduate course (EECS571, Principles of Real-Time Embedded Systems) at the University of Michigan, Ann Arbor. In CSCI3511, I detailed the dynamic time warping (DTW) algorithm for students by exploring the algorithm's time complexity and threshold settings. I emphasized several research challenges related to this topic in EECS571 to foster an open discussion with students. One group in the class proposed a solution for a presented research challenge (i.e., involving parallel computing when processing ubiquitous sensor data), which led to the group's final project. More information on my talks are available at https://web.eecs.umich.edu/~chendy/.

In addition to giving classroom lectures, I mentored four undergraduate students (one freshman, two sophomores, and one junior) at the University of Michigan, Ann Arbor during a 4-month summer project in 2019. As the mentor for an original research project, I facilitated weekly team meetings, designed a reading list, distributed task assignments based on students' preferences and expertise, and guided students' system development process. The project resulted in a research paper submitted to a top-tier conference. During the team retreat after the paper submission, one student provided the following feedback:

> *I have gained a lot of confidence, especially in tackling technical challenges, after the summer project. I learned to search for solutions at my own pace and evaluate my idea in a scientific way. I think it is an extremely valuable experience for helping undergraduate students.*

TEACHING GOAL AND APPROACH

My main teaching goal is to promote *active learning*. Based on my educational experiences, I am a firm proponent of this form of learning; I believe that engaging students in the learning process is essential for motivating them, helping them overcome learning curves, and encouraging critical thinking regarding existing solutions. To achieve this objective, I will apply different teaching approaches in lecture-based and project-based courses.

Lecture-based courses (lower-level undergraduate courses). I plan to encourage classroom involvement in various ways. Specifically, I will use open-ended questions (e.g., "How would you lower the time complexity when analyzing time-series data?") to motivate students to brainstorm quick solutions. In my experience, by comparing a proposed solution with classic ones (i.e., lecture content), students can obtain a deeper understanding of the problem and refine their critical thinking. To enhance students' appreciation of course material, I plan to contextualize solutions through examples, such as by demonstrating a system's efficacy based on real-world data and live demonstration. I will also arrange group discussions to give students opportunities to share what they have learned and obtain peer feedback. To develop students' self-exploration skills, course progress will be assessed more heavily through homework and/or small course projects than the midterm and final exams.

Project-based courses (upper-level undergraduate and graduate courses). In project-based courses, I will guide students to explore real-world problems and seek solutions in a scientific way by reviewing relevant papers, highlighting practical problems, and presenting their findings. In paper-reading sessions, I will distribute tasks to students based on their preferences (first come, first served). Then, students will present their takeaways and critiques of the paper to the class. This approach will provide students sufficient time to dive into a paper while enabling the entire class to learn about it. For instance, I will encourage (e.g., by assigning extra credit) students to re-implement the core functionality of their chosen paper and demonstrate this implementation. To identify meaningful project topics, I will guide students in conducting a close inspection and/or measurement (e.g., data collection) of a real-world system. Finally, students will peer review one another's technical report associated with their final project to assess the novelty of the topic, quality of implementation, and clarity of the report. Students will thus become better prepared to present their work to the public and provide constructive feedback to the community.

To kick off my teaching, I plan to offer a graduate-level course on Advanced Mobility Technologies. This class will introduce several cutting-edge mobility technologies and research challenges in the quickly evolving mobility ecosystem. In addition to technical contents, I will showcase for students how research outcomes can be applied to mobility products (e.g., in auto insurance, ride-sharing, and self-driving car businesses) to influence millions of lives. As the outcome, students will learn to *prototype* their sensing systems and evaluate its performance using real-world experiments.