Teaching Statement

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Teaching Philosophy I was fortunate to meet some exceptionally talented teachers when I was a student. Their passion for teaching impressed many students, and I learned a lot from them inside and outside the classrooms. Their teaching styles have significantly influenced how I taught in South Korea. The most important thing I learned from my teachers is how to deal with students with various levels of knowledge and abilities. A good teacher should make complicated ideas easier for students to understand and turn obscure topics into interesting ones. More importantly, a good teacher should look for the best way to convey knowledge to students at different levels and backgrounds.

I believe in learning by doing and dismiss exams as effective tools to force students to learn. I like to give students challenging homework, but at the same time, I make sure that students can finish the homework if they follow the instructions closely. In senior-level classes such as AI and machine learning, I gear students toward thinking about using AI techniques to address real-world problems creatively. Since most senior students will enter the job market soon, I hope students can be proud of the course projects they did in my courses during their job interviews.

In graduate courses, students should learn how to do research. I like to ask students to submit a mini-research paper at the end of a graduate course, by which students can learn how to write literature surveys, identify research topics, conduct experiments, present experimental results, etc. Knowing that some graduate students will not do AI or robotics research eventually, I encouraged students to relate the course projects to their research in their labs.

Teaching Experience I have taught many undergraduate and graduate courses at UNIST. The websites of some of my courses can be found on my homepage at `https://chiuau.github.io`. I would be most excited to teach undergraduate courses on algorithms and data structures, artificial intelligence, computer organization and architecture, principles of programming languages, and robotics. Moreover, I can teach other undergradaute courses in computer science as well. I also enjoy developing graduate-level courses on new research topics in AI and robotics.

I put a lot of emphasis on programming in my courses, as I think it is important for computer science students to acquire good programming skills such that they can impress their employers in the future. At UNIST, I was an instructor for several programming courses on C, C++, and Python. I taught TensorFlow, Keras, and ROS in some of my senior-level courses. I have co-taught some courses with

other professors, and our collaboration worked seamlessly. Occasionally, I gave lectures in companies and exhibitions. Last but not least, I was an instructor in the American Red Cross, offering training sessions for volunteers.

At UNIST and UT Austin, I was fortunate to mentor several exceptionally talented students. I supervised three Ph.D. students and eight M.Sc. students. Among them, one Ph.D. student and six M.Sc. students have graduated. The list of my students and their positions after graduation can be found on my homepage. My lab always attracts many undergraduate interns to work on their interdisciplinary projects under my guidance. Moreover, I maintain a good relationship with international students at UNIST and have recruited many of them into my lab. My lab is one of the popular destinations for high school students and graduate applicants during lab tours since students like to see our robot demos.

Extracurricular activities are important parts of academic life. I took part in many competitions when I was a student, and I would definitely recommend students to devote their spare time to take on some challenges. At UNIST, I have been coaching students to take part in international competitions such as autonomous drone racing competitions. Although my students did not win, their drone was one of the few that can complete the entire course in the competition in 2018.

Technology for Teaching When I started my teaching career in South Korea, Massive Open Online Courses (MOOCs) began to take off. Higher education institutes around the world tried to follow this trend, and my university is no exception. Apart from encouraging professors to record their lectures and put the videos online, my university promoted a new way of teaching called *flipped learning*, which aims to increase student engagement by completing the reading assignments at home and working on problem-solving in the classroom. I have implemented flipped learning in some courses. According to my experience, flipped learning works better in programming courses than theory courses.

During the pandemic, my university turned to online teaching exclusively and offered courses to teach professors how to give online lectures effectively. I also purchased a set of expensive equipment for online teaching at home. I replaced online exams with course projects, but students preferred exams to course projects. However, it is difficult to prevent cheating in online exams. I can see the benefits and drawbacks of both online and offline teaching, and therefore, a mixture of online and offline teaching can be beneficial even after the pandemic.

UNIST adopts *Blackboard*, a web-based learning management system, for content management in all courses. I am familiar with Blackboard since I have used it in my classes. Since the user interface of Blackboard is not appealing to students, I also wrote course homepages for some courses I often teach. The URLs to the course webpages can be found on my homepage.

I found it exciting to develop better tools for teaching. For example, in my data structure class, I wrote software that can grade students' programs automatically and give students scores with feedback instantly. Students were given more than one chance to correct mistakes in their programs according to the feedback before the final submission. My students liked this program a lot, and there were fewer arguments between students and TAs after using this program.

The advances in technology have a significant impact on higher education. Some famous professors at top universities offer highly popular online courses for free. On the other hand, students can easily find a lot of helpful information for self-study from YouTube and learning platforms such as Coursera, edX, and Udemy. Inevitably, we have to embrace AI technology such as ChatGPT and GitHub Copilot for teaching, though students can misuse these technologies. As a teacher, I need to keep pace with these technologies all the time.

In fact, I have been thinking about how AI can offer a better learning experience to students. For example, it would be great if a chatbot could gauge how much a student knows and then generate content to teach the student what he does not know. In the future, I would like to develop better AI technology and teaching robots for all sorts of learning tasks.

Teaching Goals One of my teaching goals is to make my classes relevant to students' future endeavors in technology. There are still plenty of opportunities in computer science, and I will encourage students to explore them. One of the happiest moments in my life is to witness my students' success after graduation. It would be my great honor to play a part in their achievements.