YUE WANG TEACHING STATEMENT

Teaching has been one of my main motivations to apply for a position in a university since I started my current role as a PhD student. My interactions with students prepare me to pass on knowledge I learn as a researcher and practitioner to a broader audience. These experiences, in return, inspire me to understand the scope and impact of my field beyond research.

Teaching Philosophy

My goal for teaching is to inspire students' initiative and creativity. Learning is not a static process of listening to lectures, memorizing proofs, and taking exams. Instead, learning is a way to digest knowledge, communicate ideas to others, and abstract and solve real-world problems. I will strive to give students every opportunity to pick up the desire to learn and teach themselves. Below, I summarize how my past experiences have shaped my teaching philosophy.

- **Learn by practice.** The best way to learn is to practice repeatedly. As an instructor, I will give students chances to apply what they learn from classes to real-world questions. At MIT, I TA-ed *6.869 Advances in Computer Vision*, where I was responsible for grading assignments, hosting office hours, and designing the course project. I shaped the final project to give students opportunities to work on an open-ended research idea and submit the project report to top AI conferences. One PhD student from Harvard physics department shaped her final project as part of her dissertation, followed by a publication [1] on The Astronomical Journal. In addition, my experience mentoring undergraduate research made me believe that working on real problems is the quickest way to learn. In the future, I will strive to increase the *practice* part in each assignment and each course project.

- **Encourage students' motivations.** One lesson I picked up when serving as a K12 tutor during my undergraduate study is that the internal motivation typically determines how well students perform on a subject. To motivate students, I will carefully formulate materials as openly as possible by letting students define problems and figure out solutions. In addition, I plan to increase healthy competition in my classes, e.g., by holding a 3D shape classification challenge in a 3D computer vision class.

- **Benefit undergraduate/graduate TAs.** Teaching is a great opportunity for undergraduate and graduate students to internalize their knowledge and deliver it to others. My TA experiences helped me understand how to communicate my ideas to the students. I want to return the favor by working closely with TAs to prepare for their goals. I would like to give TAs more flexibility on office hours, recitations, and etc.

Teaching Plan

Drawing from my past research and teaching experiences, I come equipped to teach an advanced 3D vision class targeted to advanced undergraduate and early graduate students. This class can cover a breadth of techniques, from fundamental 3D vision algorithms to recent 3D deep learning techniques. This class will focus on implementation of existing 3D methods on synthetic data and/or small data, and the evaluation will be based on assignments and a final project (or a 3D vision challenge).

To appeal to more advanced graduate students, I desire to teach a seminar related to 3D visual computing. This class will target students with adequate background who want to pursue research in 3D visual computing. Weekly paper presentations and a final open project will be the major components. Also, I will encourage students to submit their final deliverables to top AI conferences.

Finally, my background in computer science qualifies me to teach fundamental computing classes such as data structures, algorithms, and object oriented programming. In addition to the typical format of a computer science class, I endeavor to incorporate enjoyable components into lectures and assignments. I would like to encourage students to conduct a study of connecting a computer science algorithm to a real problem.

My ultimate goal in teaching is to demystify AI and to pass on what I know about 3D deep learning and vision to the general public. By fueling the future researchers and engineers, we can speed up the development of 3D deep learning and robotics perception.

References

[1] Jun E Yin, Daniel J Eisenstein, Douglas P Finkbeiner, Christopher W Stubbs, and Yue Wang. Active Optical Control with Machine Learning: A Proof of Concept for the Vera C. Rubin Observatory. *The Astronomical Journal*, 2021.