Teaching Statement

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Demand for computer science classes is rising faster than department hiring and faculty need to be ready to handle larger classes while still providing a world-class education. I'm fully committed to educating every student who is interested in learning about computer science.

As a graduate student I've taught two classes: Computer Vision, and Introduction to Deep Learning. I developed these classes from scratch, both lectures and homework assignments. With both classes I tried to build a comprehensive, self-contained, and closely integrated set of teaching material. Apart from these classes I have experience as a guest lecturer, TA, and mentor to undergraduates and high-school students.

Computer Vision

In the spring of 2018 I developed and taught a revamped computer vision course at the University of Washington. CSE 455 offered 3rd and 4th year undergraduates the chance to learn low, mid, and high-level computer vision techniques and implement them by building out a comprehensive image processing library.

Student reviews, while not a perfect metric of class success or value, at least offer one perspective on the course. **Students rated CSE 455 among the best courses in the last year.**

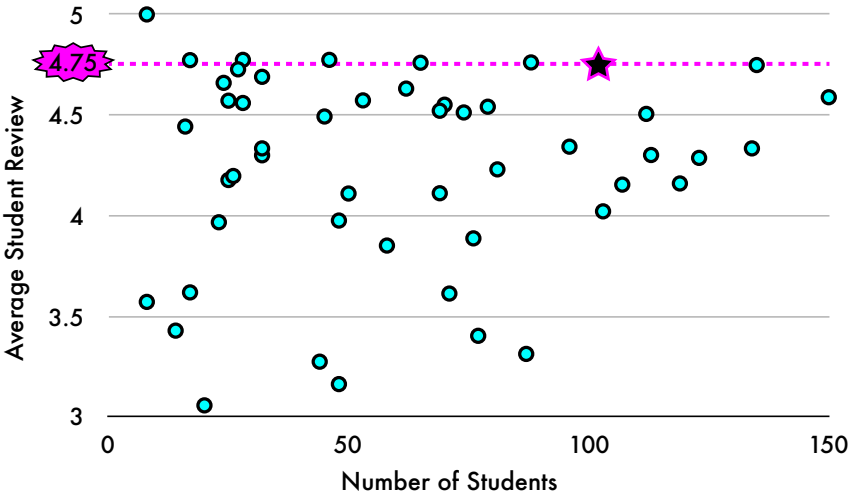

Figure 1: Course reviews for all 400-level computer science courses at the University of Washington. Computer Vision is on the Pareto frontier for class quality and size. Six classes were higher reviewed by students; no larger class had better reviews.

Developing CSE 455 from scratch gave me a deep understanding of the course material and allowed me to build a tightly integrated curriculum. The lectures build up concepts and intuition while the programming assignments reinforce the techniques and hard skills necessary for mastering computer vision. A robust testing framework allowed students to get real-time feedback on their implementations.

Introduction to Deep Learning

This fall of 2018 I developed and taught a new introduction to deep learning class for 97 undergraduates and graduate students, CSE 490G1/599G1. Introduction to Deep Learning surveyed topics around neural networks: implementation, optimization, and applications. We covered convolutional networks, vision, audio processing, recurrent networks, language, question answering, reinforcement learning, game playing, and a variety of real-world applications.

Each homework was split into two parts. The first part was implementing a low-level component of a neural network framework: fully connected layers, convolutional layers, maxpooling, batch normalization, etc. Over the quarter students built up a neural network framework from scratch, gaining a deep understanding of the core components, algorithms, and design decisions necessary for the task. They tested their frameworks on datasets like MNIST and CIFAR to see the impact of different network structures and components.

The second part was using a standard framework (PyTorch) to tackle larger tasks like training a classifier on ImageNet or implementing A3C on OpenAI's `gym` environment. This gave students experience with the standard tools, methods, and datasets deep learning engineers and researchers rely on.

Additional Experience

Aside from teaching 455 and 490g1/599g1 I have experience as a TA, guest lecturer, and mentor. I've TA'd for undergraduate machine learning and taught 3 weeks of it as well. I served as a volunteer mentor for the graduate programming languages course holding office hours for students and creating a widely used tactic index for Coq (it still gets 3,800 views per month). I've also served as a volunteer undergraduate mentor in individual and small group settings for a variety of classes at UW.

For two years I was a mentor for high school teams competing in the Paul Allen Computing Challenge, a programming and data analysis competition that encouraged innovative problem solving. For example, one year I helped high school students learn basic techniques in database querying and natural language processing to analyze tweets severe weather events. This type of outreach is important for developing the next generation of computer scientists and getting students from diverse backgrounds and experiences interested in computing and research.

Summary

I know how to teach, I'm pretty good at it, I like it, and I'm committed to teaching a broad base of students from a variety of backgrounds. I'll continue to offer the best education I can to the most students I can reach. I'd be excited to teach a number of classes at the undergraduate or graduate level including: **machine learning, computer vision, deep learning, and natural language processing.**