Teaching Report: Fall 2021

For the fall 2021 semester my primary focus has been teaching and creating material for ITCS 4156 Intro to Machine Learning. Additionally, I have continued my research when time has allowed although the creation of course material for ITCS 4156 has occupied the majority of my time this semester.

Teaching ITCS 4156: Intro to Machine Learning

As mentioned, my primary focuses this semester has been teaching and creating course material for ITCS 4156. As I taught a flipped classroom, I needed to create 12 modules from scratch to support such a learning environment. Each module consisted of notes, videos, a quiz, and a lab. The notes, videos, and quiz were assigned to the students to review before class which provided introduction and review of the current topic. In class, I further reviewed the notes and quiz before providing a brief overview of the lab. The goal of each labs was to allow students to practice implementing the theory they learned about in a guided environment. All labs were given via Jupyter Notebook files which provides students an exploratory coding environment. Furthermore, each lab had "TODO checks" which are automatic grading checks that help guide and ensure students that they were on the right path in real time. This allowed them to recieve automatic feedback about whether there implementation was achieving the desired output. Student's had the remaining in class time period to work on the lab and ask any questions. As this was usually not enough time for students to finish, many students wanted to take their time with the labs, an additional week was allowed for students to continue working on each lab.

Additionally, I had to rework 3 mini-projects which were handed down to me from Dr. Lee. These mini-projects aimed at giving students an opportunity to practice and review multiple concepts on their own. Each mini project covered groupings of different concepts such as regression algorithms, classification algorithms, and neural networks. Once again, the majority of the points student's received for each mini project were computed by an autograder. As student received multiple attempts to submit to the autograder, this allowed students to see how they were performing in real time. However, the final grades, just like the labs, were manually reviewed as well. For each mini-project, students had the opportunity to compete to see who could train the best performing algorithm. This helped motivate students to

go above and beyond the minimum requirements of the each mini-project as the top performing students would receive extra credit.

Based on feedback provided by students at the end of the semester the course seemed to be a success. Many students conveyed their gratitude for flipped style classroom that actually allowed for guided and self-learning. However, much like most machine learning courses, many students struggled with the seer number of concepts that were covered. As machine learning requires knowledge of many different disciplines, such as programming (Python specifically), calculus, optimization theory, statistics, and linear algebra, this can be overwhelming for students who don't have the proper background. Luckily, many students were thankful for the written notes and labs as they can go back to and review concepts as needed, even when the course is over.