Executive Summary

How to Teach a Class to Grade Itself Using Game Theory

This research project focuses on the development of a novel and efficient peer grading system for online courses by Coursera or EDx. In such courses, the amount of students can be enormous. To grade the number of assignments produced, multiple choice tests and automated grading systems have been employed, but these run into limitations when grading open-ended responses such as essays. The underlying complexity of peer grading arises from the nature of human behavior. Our approach to this problem utilizes game theory and mechanism design — a first of its kind to our knowledge. Our research proposes three mechanisms, each with more realism than the previous. To compare mechanisms, we defined a benchmark based on the accuracy of grades and workload of student and professor. Using this benchmark, the final mechanism we created surpasses both traditional peer grading and automated grading methods. Our work facilitates and standardizes future work for peer grading and mechanism development, ultimately improving the quality of online education.