Thesis Project Portfolio

Innovation in Gaming Technology: A Course Proposal Using Machine Learning to Improve Gaming Infrastructure

(Technical Report)

Gauging Public Opinion: Polling to Machine Learning

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

This portfolio consists of two main parts: A technical paper proposing a new class for the department of Computer Science and an analysis of the change in the use of technology through time. The sociotechnical paper focuses on the technologies that have been involved in collecting public opinion over time. Given the importance of accurately representing peoples' opinions, it is necessary to constantly improve the methods which determine the general public's opinion. This paper argues that, given contemporary technical developments, machine learning is a disruptive technology and, as such, will be used to more accurately gather and report public opinion. Framing the paper in terms of disruptive technology allows it to analyze public opinion gathering technologies throughout the ages and how it has advanced over time. Using that context, it can show how machine learning is the next development of public opinion disruptive technology. This topic is important because the gathering of public opinion is a big part of society in many different contexts, from political to consumerism, and as such we should utilize all technology to gather and interpret relevant information most effectively. Machine learning is the next natural step in developing information gathering, given it is a breakthrough technology in computer science and can be usefully applied to this area, as has been shown through trial use.

The technical paper proposes a new course offering, Reactive Game Agents, which would combine elements from the existing classes CS4710 Artificial Intelligence and CS4774 Machine Learning to teach how game developers can employ the power of machine learning. The proposed course would teach students how to make intelligent game agents and would put students on the cutting edge of game technology. This technical paper is important because it is pivotal for students to constantly be on the cutting edge of computer science technology given the technical advantage they will have when entering the market as new recruits. With this

proposed course, the University of Virginia would also become a competitive choice for students who wish to pursue game development as a career path, so it is a desirable choice for UVA as well.

The topics of each of the papers are similar in that they both cover the recently developing technology of machine learning. Machine learning is a subfield of artificial intelligence that is concerned with the development of algorithms that allow computers to learn from data and improve their performance at tasks. In recent years, machine learning has been applied to a wide range of domains, including natural language processing, image recognition, and video games. Machine learning is important because it helps us automate decision-making and can help us build models that make predictions or recommendations. This is a key development that can be applied in both domains of the papers: public opinion and teaching students about video game development. After researching for both papers, I have been surprised to learn about just how multifaceted machine learning is as a programming technique. The applications are vast and cover several domains, and it was interesting to discover more about machine learning within the context of the game industry and public opinion.