

Thesis Project Portfolio

Intelligent Decision-Making: Reinforcement Learning Applications in the Defense Environment

(Technical Report)

Artificial Intelligence and the Death of Human Superiority

(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

While interning at Heron Systems, I began thinking about the far-reaching implications of artificial intelligence replacing skilled human labor and the potential death of human superiority. Low-skilled routine jobs have been getting automated for a long time, but with the advent of machine learning models that achieve superhuman skill levels on complex tasks, the reality of all types of jobs being automated looms. My internship (technical project) was on creating models and the infrastructure needed to train models, and my STS project analyzes the potential ramifications of AI on geopolitics and labor markets.

My STS project looks at the attributes and ramifications of artificial intelligence and automation. The paper analyzes the topic using Langdon Winner's technopolitical framework to extract the inherent political qualities of artificial intelligence and look at them within the context of the current effects and uses of artificial intelligence. The conclusion is that artificial intelligence has inherent authoritarian politics and invisibility that allows it to influence behavior and foster dependence, and using artificial intelligence for automation has the potential to bring about another industrial revolution. The effects of this already exist through job loss and rising income inequality. The US and China's close trade relationship creates an artificial intelligence arms race between the two countries because of the economic benefits of automated labor and manufacturing.

My technical project is my experience interning for Heron Systems. Heron Systems is a government defense contractor focused on machine learning, working on problems such as AI dogfighting. My work with Heron primarily involved improving Heron's open-source reinforcement learning library, Adept. The work also included designing, implementing, and training reinforcement learning models using Adept. Changes I made to the data-preprocessing

pipeline of Adept increased training speed by 400%. All Heron projects using Adept switched over to my improved version allowing for faster model development and lower costs.

My technical project sparked my interest in the impacts of artificial intelligence and its uses. The experience further informed the particular ramifications I would investigate and analyze in my STS project. The STS project has since helped answer some of the questions that arose for me during my technical project. The combination of my experience working at Heron Systems and in turn writing my STS paper has given me a lot of knowledge on the subject and in the end helped me make my job decision for after college.