Thesis Project Portfolio

Cinder Pipeline Improvements: Automation of Droplet Administrative Overhead

(Technical Report)

The Potential Effects of Artificial Intelligence in Healthcare within the United States

(STS Research Paper)

An Undergraduate Thesis

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

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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

Information and communications technology (ICT), including but not limited to the internet, personal computers, smartphones, and the functionalities they come with has changed the world. ICT allows many traditionally manual processes to become assisted or even fully automated by these technologies, and provides valuable advancement such as global connection, accessible information, and improved quality of work. But ICT can also cause societal harm such as loss of individual privacy, decreased employment, decline in mental and physical health, cultural homogenization, and other ethical issues. This undergraduate thesis addresses both the technical capabilities of ICT as well as the complex social implications that arise from the use of these technologies.

The technical report illustrates the productive capabilities of ICT to expedite work by automating menial tasks and reducing the load of labor. At Amazon, the EC2 Nitro Firmware Team (NFT) spends around 130 hours of weekly manual work on obtaining droplet loans and generating host config files to run the Cinder Qualification Testing Pipeline. The technical project creates a system that automates this administrative overhead. The system utilizes a droplet capacity management service (re:Stack) to obtain droplet loans, and a python script plus an internal API (AskEC2 Coral) to generate the host config files. The system cuts down on the hours of labor spent weekly on testing, which allows the team to focus more time on creating and maintaining features.

The STS research paper addresses the complex social implications of ICT regarding artificial intelligence (AI) usage in healthcare. The paper explores the potential effects of integrating AI in healthcare within the United States through an Actor-Network Theory framework. The paper identifies the actors of the network, the interactions that enable and

contribute to social and technical effects, and the differences in the actors' desired outcomes that create conflict. The paper ends with a discussion of actionable steps for integrating AI in healthcare that can maximize beneficial outcomes for patients and physicians and minimize risk and concerns.