Thesis Project Portfolio

Capstone Final Report: Radiance

(Technical Report)

The Effects of Automation on Employment and Governemnt Policy in 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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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Executive Summary

As time passes, newer, more advanced technologies take the world by storm. Whether it's an intricate assembly line or a more efficient gaming system, the distinction between humans and machines grows fuzzier as our mechanical partners weave themselves deeper into our everyday lives. Each new generation enjoys the comforts brought about by every new wave of technological advancement, but while the idea of innovation has not changed, its effects on their human counterparts certainly have. Instead of imagining a paradise full of lasers, flying cars, and virtual reality, many people now live in fear of their mechanical competition in the face of rising costs of living and forced unemployment. The machines that were once considered a commodity now stand as many workers' greatest nightmare, an unrelenting, unstoppable juggernaut of cheap, efficient labor poised to strike at the heart of human economic prosperity. While labor markets and the forces that guide them are affected by far more sources than just innovation, this portfolio delves deep into the impact of historical and modern technological advancement on the employability and job prospects of workers in the United States of America.

To gain a better understanding of how innovation impacts the labor market in the United States, I developed an automated spotlight security system that functioned as a sentinel for monitoring and recording a designated area. To achieve this, I worked alongside a group of peers to design and implement the hardware and software for a secure, weather-resistant thermal camera mounted on two rotating motors that adjusted the vision cone of the lens along with a line-wired light source that illuminated any heat signature that intruded upon the monitored area. Once sufficient data was collected, it became very apparent that an automated spotlight security system far exceeded the performance of human test subjects due to eliminating sources of human error such as the need for food, water, sleep, entertainment, and motivation. In addition, the

thermal vision and tracking software allowed our system to automatically illuminate and record the identity of any intruders in the area far quicker and more accurately than humans. Ultimately, my peers and I concluded that technological advancement and innovation definitively pose a serious threat to the job security of humans in the field of guarding and monitoring, which could be extrapolated to other similar fields of employment.

To illustrate the broad scale of the issues posed by technological innovation, I began by asking how automation truly affects employment in the United States and if government policies are necessary to respond to an approaching automation-dominated future. As I researched the historical unemployment rates of the United States and cross referenced them with major historical events associated with progression in the fields of technological advancement, I claimed that industries such as manufacturing that once employed hundreds of thousands of Americans are being consumed by mechanical competition in the forms of more efficient production methods that require fewer human resources. In addition, new fields of employment that newly unemployed workers flock to like healthcare and computer science all require much higher standards of education than manufacturing, which leaves millions of Americans with scant opportunities in the face of an automation-dominated workforce. Ultimately, I came to the conclusion that government policy in the form of major economic reforms such as Universal Basic Income are necessary if we as a society wish to remain financially stable due to employment and wages being insufficient when compared to rising costs of living.

Over the course of this school year, I've grown very fond of the mechanical and theoretical aspects of my capstone. The concept of facing unemployment due to rising levels of automation and technological innovation has burdened me for quite a while, but I'm now content with the written and practical knowledge I've accrued over the past few months. In particular,

the physical evidence of watching the automated spotlight security system my partners and I created solidified the unique possibilities that my generation in particular must face when entering an automation-dominated job market. In future, I hope anyone continuing my work will acknowledge the data collected during my time researching the effects of innovation on employment and expand the timeline into the future to determine if my predictions hold true or if some groundbreaking political or technological event occurs that throws my projections wildly off course.