Thesis Project Portfolio

Scenery Robot: Robotic Path Planning for Theater Scenery Movement

(Technical Report)

Hero or Villain: A Sociotechnical Analysis of Automation in the United States

(STS Research Paper)

An Undergraduate Thesis

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

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

Giovanni Joseph Cianciaruso

Summer, 2023

Department of Computer Science

Table of Contents

Sociotechnical Synthesis

The technical project in this portfolio covers an experience I had conducting research for the University of Virginia drama department, working on a robot project that seeks to create a robot to automate the movement of scenery in the theater arts, allowing directors to greatly improve the quality of set design and operation. With my technical project, other University of Virginia students and I integrated the scenery robot into the theater arts while thoroughly considering the perspectives of the stakeholders most closely involved with managing productions. Heavy input was taken from the Technical Director of the Drama department along with stage managers at UVA and results were also taken to the United States Institute for Theater Technology (USITT) to involve more individuals with expertise in the field.

The advancement associated with this project does not come without potential detriment: those who are doing the jobs in setting up and managing scenery may have their skills become obsolete. It might seem obvious in this case that having a robot move a few pieces of a set is not jeopardizing the careers of members of the stage crew. Yet, replacing or diminishing a person's job — however trivial it may seem — does raise the question, how do we toe the line between making technological progress and decreasing human quality of life? Thus, in my STS research project, I have consider the adverse effects of both automation and innovation under capitalism as they pertain to employment by observing and analyzing the history of labor movements, technological advancement, and their effect on each other in the United States.

Specifically, my research project entails leveraging Sheila Jasanoff's theory of co-production along with Karl Marx's work in Grundrisse and Das Kapital to draw conclusions on major technological events since the beginning of the 20th century. From Henry Ford's introduction of the assembly line until the present time with the continued development and increasing

pervasiveness of artificial intelligence, each of these major events have had a profound impact on labor in the US. As such, the impact of these innovations are directly mapped to protests and class struggles such as the ongoing Writer's Guild of America (WGA) strike that is occurring in the summer of 2023. Through this investigation, I have articulated specific recommendations for both the federal legislature and for working class people consistent with co-production and the critiques of capitalism I introduce.