

Thesis Project Portfolio

Project Romulus

(Technical Report)

Box Controllers and Legality within Super Smash Bros. Competitions

(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

Tryn Dunne

Spring, 2024

Department of Electrical and Computer Engineering

Table of Contents

Sociotechnical Synthesis

Project Romulus

Box Controllers and Legality within Super Smash Bros. Competitions

Prospectus

Sociotechnical Synthesis

My technical project and STS research paper are connected by both technologies changing their respective fields, pressuring the rules to change or be redefined through the lens of technology as infrastructure. My technical project involved creating a portable, automatic aiming system that would recognize targets and move an airsoft gun to aim at it. My STS research, while it also involves a tool for a human to use, focuses on a new type of controller and how it affects the competitive video game Super Smash Bros. Melee. Both projects involve changing how humans' interface with technology, but the technical project is much more drastic in effect.

My technical capstone involved the culmination of many different systems to automate the process of aiming. This was originally pursued to help make airsoft more accessible to a wider audience. This system involves three primary systems: the target recognition, the distance estimator, and the robotic aimer. Target recognition was done using a custom image recognition model, the distance estimator was done using two cameras and stereovision, and the robotic aimer takes in coordinates and extends actuators to properly aim the gun. In conjunction with each other, this product is battery-powered and can be used to automate the aiming process, only requiring the wielder to pull the trigger. This product fundamentally changes the game of airsoft, breaking the infrastructure and rules of the game.

For the STS research paper, I focused on whether box controllers for Super Smash Bros. Melee should be legal in competition. This analysis used the framework of infrastructure established by Susan Leigh Star to determine the societal values imbued within controllers and if it breaks the common trends for how technology is adopted. Box controllers are a new type of controller that is more ergonomic but allows the user to make inputs that were previously

impossible, leading to its controversy. Through looking at the facts available, the main claim made in the paper is that box controllers followed the typical adoption of infrastructure and improved accessibility to those with arthritis or hand ailments, and that the controllers should be legal in tournament play.

Both my technical and STS research involved how new technologies effect pre-established societal systems and “rules”. The technical project is a much more radical change compared to the adoption of the box controller, but they both fundamentally required me to question why the current system exists. For airsoft, this involved delving into the psychology of competition and why people enjoy it. For box controllers, this involved understanding the societal significance behind the current controller and how it means more to the community than just an interface to the game. Both have helped drive home that no matter what system is being analyzed, there is always social weight that needs to be considered. New technology cannot be developed in a vacuum; it needs to be brought into a system in response to a need and with respect for the current societal values.