

## **Thesis Project Portfolio**

### **Developing a Multimodal Entertainment Tool with Intuitive Navigation, Hands-Free Control, and Avatar Features, to Increase User Interactivity**

(Technical Report)

### **The Ethics of Addictive App Design: Determining Accountability and Prevention Strategies for Dangerous App Designs**

(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

**Erin Hensien**

Spring, 2022

Department of Engineering Systems and Environment

## **Table of Contents**

Sociotechnical Synthesis

Developing a Multimodal Entertainment Tool with Intuitive Navigation, Hands-Free Control, and Avatar Features, to Increase User Interactivity

The Ethics of Addictive App Design: Determining Accountability and Prevention Strategies for Dangerous App Designs

Prospectus

## **Sociotechnical Synthesis**

Mobile application (app) design is a young but rapidly growing and competitive industry. App design work combines technological capability, user psychology, and traditional aesthetic components to create an effective product. This portfolio includes two research projects connected by the principles and process of mobile app design. The capstone technical work centers on applying the principles of app design (including aesthetic choices and user psychology) to create and test a novel streaming app feature. The STS research focuses on the psychological principles incorporated into app design as well as regulations placed on the industry to protect users from addictive design. Both projects explore the usage of design techniques to impact the way in which users engage with content on their mobile devices.

Digital entertainment has become the norm over the past decade, especially in recent years, due to the ease of at-home streaming. Individuals can now view movies and TV shows on demand and multiple entertainment companies are working on developing novel ways to keep their consumers engaged in a saturated industry. Effective user experience design ensures engagement and interest while also prioritizing ease of use. A wide variety of users are also able to access and use these online services easily, regardless of any disabilities or device limitations. Currently, on-demand streaming services provide mostly passive experiences for their users such as TV shows and movies where consumers perform no actions. In the capstone project, a new type of entertainment experience that utilizes multi-media and multi-modal interaction to engage a diverse audience is designed for an active 'edutainment' how-to experience that differs from what is currently available. Specific novel features introduced in this project include interactive recipe mapping, avatar engagement, and hands-free interaction with a mobile streaming app.

Smartphone overuse and addiction forms the focus of my STS research, since an estimated 2.71 billion people check their phones an average of 150 times per day. Tech companies and developers are heavily financially incentivized to maximize total user time spent on their respective apps, leading to the creation and utilization of dangerous addictive design techniques rooted in psychological principles. To create a safer digital world for future generations, the following research question will be addressed: What ethical points of accountability can be found in the new grey area of malicious app design to protect users? This question and the following analysis will be supported by the Technological Momentum framework to help understand the bigger picture of how smartphone app technology both influences and is influenced by societal and cultural standards. Rising smartphone addiction has led to an extreme influx of research performed in the addictive design field throughout the past 5-10 years. This quick influx has created a disjointed and unclear understanding of the contributing factors and consequences to smartphone app addiction. The lack of clarity has created a space in which tech companies are not held accountable for their actions and governing bodies do not have the necessary credible evidence to enact change. Results should provide an organized analysis of the harmful app production system and its impact on society to better inform both product users and governing bodies.

The simultaneous completion of both projects allows for a more in depth understanding of the mobile app design process. Ethical concerns of addictive design raised in the STS research provided insight to prevent malicious design tactics from being unintentionally applied to the technical work. Psychological principles researched for the STS portion and observed in case studies could be recognized in the initial design of the streaming service's app, allowing for remediation. In addition, creating the interactive mobile app feature allowed for personal

completion of the design process leading to greater insight into the decisions and responsibilities creators face. This combination allowed for a more empathetic and realistic approach to finding places of accountability for creators. With the combination of the theoretical research for the STS portion and the applied production of a mobile app feature for the capstone portion, this portfolio provides an in-depth examination of the app development process and clearly identifies realistic areas for improvement.