Thesis Project Portfolio

Influence by Design: Big Tech's Impact on Mental Health

(Technical Report)

Generative Adversarial Networks in Cybersecurity:
An Evolution of Malware Detection

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

The role of technology in society is pivotal and evergrowing. As technology becomes more advanced, we become more reliant on it. The relationship between human and technology has shifted with the development of powerful portable computers such as smartphones and laptops. Anyone with access to one of these devices and an internet connection has an endless stream of information available to them. They can choose to visit any website, download any software, and post any information they want. While this power yields countless positive benefits, it usually leaves the user vulnerable to developers of the technologies being used. Vulnerable in ways where the user can be exploited by ways of targeted ads from search engines and personalized recommended posts on social media apps. While these things could be beneficial for the user, the intent is to minipulate them into spending either more money on ads or more times on the apps. The extent of manipulation doesn't stop here. If users aren't careful about what websites they visit or software they download, they might download malicious files that could have detrimental effects. This relationship between technology and its users is a sensitive one with lots of room to improve.

The technical report addresses the area of improvement around malware detection. With open access to the internet, it can be easy for users to fall into traps where they download malicious software on their computer. The malware can be as innoncent as displaying ads on the device or as bad as holding the contents of the computer for ransom. Luckily, anti-malware software exists to combat this issue. But with the ever changing development of malware, it is difficult to detect novel computer viruses. The technical report details a recommendation of using generative adverasarial networks with the hopes of creating a model that can discriminate between benign and infected files at a high accuracy. The generative adversarial network is a

machine learning idea that would allow for the system to train on generated malicious files. Ideally, this would allow the system to be able to distinguish between a never before seen virus and a normal file. More work is still needed to create a practical prototype.

The STS paper explores an area of improvement that revolves around the power tech companies hold over the users. Apps like YouTube and TikTok are designed in to maximize the time a user spends on the app. They utilize carefully crafted algorithms to appeal to the user's interests. In turn, the mental health of users can be damaged by ways such as social media addiction and parascoial relationships. The STS paper analyzes this situation through the social construction of technology framework. The relevant social groups of tech companies, groups against unnecessary device use, and content creators each have differing perspectives that are explored. These perspectives setup a possible paths towards closure in which users are not as negatively affected from using these apps. These paths forward include government intervention and a demand for design changes from content creators.