

Thesis Project Portfolio

Automation and Self-Sufficiency through Scripting

(Technical Report)

Analysis of Design Considerations in Virtual Reality Social Spaces

(STS Research Paper)

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Bachelor of Science, School of Engineering

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Prospectus

Companies all over the world have been rapidly changing over the last few decades as computational technology continues to advance in both the hardware and software sectors. Enterprise-level adoption of new technology is necessary to stay competitive in tech-based markets, and understanding these technologies is a key factor in understanding how these companies manage their workflows. Knowing the workflow will, in turn, reveal the decisions made by companies when creating their products, allowing the consumer to better understand what they are buying. This is important as consumers interact with complex technological products on a daily basis, from phone games to virtual reality headsets, and gaining even a small amount of understanding of these products can be difficult for the average consumer. In order to avoid predatory practices, it is necessary for consumers to understand the design philosophies behind the products they buy. To that end, this research aims to aid in the understanding of enterprise-level adoptions of new technologies and how those technologies inform the products they make.

The first project in regards to this research was the creation and analysis of an automated script to improve the workflow of an accelerator facility. This facility found its system-info database to be out-of-date, with many of its systems being out-of-service, leading to problems with accelerator measurements, unresponsive SSH requests, and confusion about which systems required support. There were hundreds of systems spread across the campus, and there were no engineers with the free time to check them individually, so an automated solution was deemed the best choice in order to optimize the workflow. This solution was created in the form of a user-friendly Bash script utilizing several Secure Socket Shell connections across 200+ systems. The script would check the information gained from each SSH and cross-examine it with the information present in the database. This script presented several options to the user as to how and where data was collected to promote its usability and convenience. The project was successful and, with some minor tweaks, was integrated into the workflow of several system engineers on site as well as the database manager, creating a much more accurate and robust systems database in a fraction of the time of a manual solution. However, this script was only utilized by the Linux system management. Expanding the script to encapsulate the Windows system database could yield similarly positive results on system/database management workflows. This project helped reveal why so many companies are adopting automated solutions in the workplace and how those solutions might change the work being done.

The second project shifted the focus onto analysis products rather than workflows to analyze how new technologies are changing product creation and management. As virtual reality has grown from its conceptual infancy, more companies have begun taking notice of its potential, not only as a platform for entertainment but for education, work, and even social interactions as well. VR as a social platform is a relatively new idea, and the implementation between these platforms varies widely due to the differing design goals driving those implementations. This project analyzes the goals and executions of two such platforms, Meta's Horizon Worlds and VRChat, to assess how their respective goals and technologies have influenced their ongoing development. These platforms were chosen for their contrasting properties, such as the fact that Horizon Worlds is backed by Meta, a multi-billion-dollar corporation, while VRChat is a self-

published title from a small company wholly dedicated to the maintenance and updating of VRChat. This difference creates a dichotomy between each product. VRChat has very few resources to pull from, though this allows for more freedom in design considerations, while Meta has access to greater resources but is more restricted in what it can do with its platform. This assessment will take each implementation into account, contrasting the pros and cons of each and, especially in Meta's case, examine how the context of these platforms informs the opinions of the people using them as well as how their differing designs change how people interact with them.

These projects helped shed light on how modern software projects are developed and how those workflows can change the final product. It was a very enlightening experience, demystifying the products created and the process behind their creation. However, because the products chosen in the second project, VRChat and Horizon Worlds, are so new, it was difficult to discern what decisions were intentional design and which were simply a factor of time constraints. Nonetheless, this research was fruitful, and next steps could include greater research into enterprise workflows and perhaps research into some of the psychological aspects of social software, especially in regards to virtual reality.