Thesis Project Portfolio

Roblox Game Development: The Game Development Process in a Scarce Genre

(Technical Report)

Cyber Forensics: Cybercrime Investigation through Logs

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

Introduction

My STS research topic revolves around researching whether or not Cyber Forensics and log analysis can aid crime investigations and improve the security of society by allowing analysts to uncover suspicious behavior quickly to resolve and prevent crime. My technical Capstone research involved creating an anime racing game similar to *Mario Kart* for a lackluster Racing genre and a stale and repetitive Anime genre on Roblox using the Roblox Studio Engine that provided the building, scripting, animating, and other tools to do so. My technical Capstone research is loosely related to my STS research topic as it involved creating security measures against hackers and exploiters through implementing log checkers. These log checkers would check if the client's data matches the server's data, and if it didn't, it would classify the log as suspicious and prevent the game transaction from occurring, and in some cases even prevent the user from continuing their gameplay. Through this, I became curious in the usage of log analysis and Cyber Forensics in crime investigations and prevention.

Project Summaries

My STS research paper investigated how beneficial log analysis can be in cyber forensics and cyberattacks. Furthermore, whether these logs can aid with crime investigations and improve the security of society by allowing analysts to uncover suspicious behavior quickly to resolve and prevent crime. In this paper, I also presented the Cyber Forensics process, the protocol for conducting the process, the challenges that come with the process, and the solutions to those challenges. I analyzed several case studies with topics ranging from internal network activity logs from an employee to pharmaceutical drug transportation logs. I concluded that log analysis is useful in cyber forensics and can help prevent crime from escalating, but the crime has to

occur and be recognized as suspicious activity beforehand in order to do so. Log analysis and Cyber Forensics can aid with crime investigations and improve the security of society by enabling analysts to uncover suspicious behavior quickly and resolve crime investigations.

As stated previously, my technical Capstone research was to create a Roblox game that combined the Anime and Racing genres to create a *Mario Kart*-styled game. Roblox, a gaming platform where users develop games for other users to enjoy, not only lacks games in its Racing genre but many Anime-inspired games are repetitive and lack variety. To address the problem, I worked with a partner to develop a game inspired by Mario Kart using Roblox's Studio. Roblox Studio provides developers with built-in 3D modeling, sound, UI, animation editing, and plugin systems along with the programming language Lua to develop games. I used Trello, a project management web application, with an agile development process to document ideas and progress on various aspects of the game. The project was successful in the creation of a game that mixes the Racing and Anime genres for users to enjoy. However, the project still lacks a consistent player count due to limited advertising and poor visuals, meaning the game is not likely to be long-lasting. The next step is to create and implement better visuals and UI along with advertising for more public traffic, while also fixing bugs/glitches as they appear.

Conclusion

My STS research and technical Capstone project taught me the importance of building a good development team and the importance of analyzing logs. Through my technical Capstone project, I was reminded about the importance of a good team that consistently communicates about their progress and ideas. My Capstone involved working with one other person and without communication to discuss ideas and progress, it would have been more difficult than it

was as we could not meet physically and only communicate electronically. In both my STS and technical Capstone projects, I learned about the importance of logging transactions and analyzing those transactions when they occur before continuing a process to ensure the system is working as intended. In the game I made for my Capstone, we added automated log analyzers to ensure players weren't exploiting. If a log was found to be suspicious, such as attempting to access something that was off-limits, the transaction would be canceled and the player would be kicked/banned depending on the severity. My STS research extended this to other real-world applications and explored Cyber Forensics and log analysis. Through my STS research, I learned about the challenges and restrictions when conducting the Cyber Forensics and log analysis processes and how it helps improve the security of our society.

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