

Sequential Pattern Mining: Big Data Analysis in Mobile Gaming

(Technical Topic)

Ethics of Facebook: Analyzing the Social Network and Global Leader

(Thesis Topic)

A Thesis Submitted to the Faculty of the School of Engineering and Applied Science University
of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements of the Degree Bachelor of Science, School of
Engineering

Selwyn Hector

Spring 2020

On my honor as a University Student, I have neither given nor received unauthorized aid on this
assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Acknowledgments and Comments

As I developed my STS Thesis many were helpful in guiding the direction of my paper to ensure it was of the highest quality. I'd like to thank Lukas Curtis for helping me develop the initial idea and turn current events into an appropriate STS topic. I'd also like to thank Gorman for his teaching and feedback throughout both semesters. Gorman helped me to focus on ethical analysis so that my paper would turn out to be less critical and more reflective. Gorman had also gotten me to think of incorporating Actor-Network Theory in a way that was more complex and using Ethical Frameworks to analyze their habits and responsibility.

Table of Contents

Sociotechnical Synthesis	3
Capstone Summary	3
STS Summary	3
Sequential Pattern Mining: Big Data Analysis in Mobile Gaming	6
Introduction	6
Datasets	7
Analysis Process	7
Tools Used	12
Conclusion	13
References	14
Ethics of Facebook: Analyzing the Social Network and Global Leader	16
Introduction	16
The Growth and Culture	17
Modern Controversies	18
Cambridge Analytica	19
Fake News	20
Rohingya Genocide	21
Normalized Deviance in Software	22
Ethics Moral Reasoning	25
Conclusion	26
References	28
STS Prospectus	34

Sociotechnical Synthesis

Capstone Summary

My technical capstone is a data science project that attempts to make sense of a huge repository of activity data for players in a multiplayer mobile online game. The company that developed the mobile game was not able to analyze the data so my professors and I were then brought in to break down the data programmatically and develop models from it. My professors focused primarily on statistical analysis and I focused on data science programming. We used sequential pattern mining to look at users' activity from login to logout. This analysis can be used to find which sets of actions are the best at predicting future actions. We then tied that gaming activity to spending activity in order to determine what actions were most frequent and most profitable.

STS Summary

My STS research paper gives an ethical analysis of Facebook's business practices. I was particularly interested in Facebook because it is one of the most successful internet companies while also being one of the most infamous. It developed from my original prospectus which was similar but I wanted to explore not only highlight their culture but also determine what led them to their decision-making and how their decision-making, in turn, influenced society. I did this by studying three of their controversies since 2016 and looking for patterns across those incidences. I then applied various STS frameworks to further explore these controversies and determine how they can occur in successful companies. Ultimately, the thesis offers insights into the consequences that can result from the communications the internet provides.

Both my projects are related to practical software engineering. My capstone applies software to a business situation and extracts unique insights that can only be found through programming. My research paper then demonstrates that powerful technology also can have repercussions on users across the world and that these social repercussions are just as important as the engineering behind a product. The theme around doing them both together is that technology can lead to incredible new heights.