

Thesis Project Portfolio

Mobile Development: Feature to Promote Sales for a Movie Streaming Application

(Technical Report)

How Sociotechnical Factors Create Gender Biases within Google's Search Engine Algorithms

(STS Research Paper)

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Executive Summary

Software applications have become essential parts of people's daily routines due to the integration of technology in almost all aspects of life. When creating software, teams from multiple areas of expertise from designers to engineers utilize the software development life cycle (SDLC) which is a process-driven methodology for producing high-quality software. With this huge and growing industry, each person must be aware of how their decisions during the development process could impact the final software product as well as its users. Throughout the entire development process, individuals should be cognizant of how their decisions have the power to impact the application and its users. My STS and technical project aim to showcase the importance of the decision-making process throughout the software development lifecycle and how these decisions can impact its users. The technical portion delves into how the UI of a new application feature aimed to promote movie sales, impacts user behavior and emotions. This section will provide a clearer view of the application development process as well as how decisions made by non-technical roles have the power to directly influence user actions on an application. In my STS Research topic, I will specifically discuss the impact gender bias has on algorithms used by search engines and how these biases could be avoided through different potential methods. My research will focus primarily on gender bias in Google's search engine algorithm as it is by far the top-used search engine worldwide.

It is important for businesses to properly connect with consumers by catering to their target audience. There are studies that showcase the correlation between mobile app UI design features and consumer behavior. Different types of mobile design features trigger a certain emotional response from an application's target audience, which in turn determines the consumer's mobile app retention. To look further into the effect of new UI design features on

consumer interaction, I interned with a mobile development team at a California-based movie streaming company. The company had difficulty finding new and exciting ways to encourage users to continue purchasing movies through its business. Multiple teams from various areas of expertise i.e. (marketing, design, analytics, project management, product management, Android, iOS, etc.) worked to implement a new Sets feature for its mobile and web platforms that will promote the purchase of movies to complete a movie collection. The purpose of this feature is to appeal to a collector's mindset by using elements of UI design that will trigger an emotional response from the user whenever they complete a movie set. Although this feature has not yet been released it is expected to excite existing users of the app who may already have a purchase history. My technical project provides an understanding of how a mobile development team operates when implementing a new feature as well as how each person's role contributes to the making of the application. The project provides evidence of how software applications directly affect user behavior.

Today's search engines are a vital source of information that has a significant influence in shaping our understanding and beliefs around the world. Search engine algorithms are believed to be neutral, but many sociotechnical factors affect these algorithms along with their outcomes. Throughout history, marginalized groups have been negatively affected by discrimination in search engines due to its perpetuation of false stereotypes and lack of transparency. This paper will primarily focus on analyzing Google's utilization of search algorithms since Google owns 91.42% market share of the global search engine market (Chris 2022). This research aims to discuss *how sociotechnical factors create gender biases within Google's search engine algorithms*. Gender bias in Google's search engine has a significant impact on people's attitudes toward gender roles and gender equality. Their gender-biased results negatively women through

their presentation of high-paying job ads to men as well as its reinforcement and propagation of gender inequalities that directly affect people's beliefs and decision-making processes. To address this issue of gender inequality in Google's search results, studies found that a large contributor is its use of biased datasets as well as how Google's algorithm operates. My research presents a study on how to mitigate bias in algorithms by collecting diverse data sets, monitoring algorithms for bias, and involving diverse stakeholders in the design and testing of algorithmic systems. This can be used as a potential framework for a solution to the issue of Google's gender-biased search engine results.

Overall my STS and technical projects came out how I wanted them to. I do wish my technical project was more meaningful in terms of addressing a meaningful issue that could be fully addressed. Due to the circumstances of my technical project being based on a short internship I participated in over the summer, the results of my technical portion were inconclusive since I no longer have access to more details of the feature I worked on with my team. In terms of my research paper, I am satisfied that I decided to focus on gender bias in Google's search results since it is a very relevant issue. I hope my research can bring more awareness to this problem as well as offer a potential solution that could benefit people worldwide. Through my research, I found there are many factors that influence gender bias in Google's search results and it became difficult properly address each piece of evidence in an organized way. There were also limitations in the information I wanted to find regarding Google's search algorithm since it is not something that is easily accessible to the public. Much of the evidence found regarding the actual algorithm was gathered through black-box testing. I found that I began to heavily focus on certain pieces of evidence over others which I plan to fix. If people were to pick up where I left off in my research I would suggest looking deeper into the

actual algorithmic function and economic factors that influence Google's gender-biased search results.