

## **Playlist: A New Social Music Sharing Application**

### **Exploring User-Platform and User-Media relations within Social Media Applications**

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By

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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.

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## Introduction

Throughout the past two decades, social media has grown from an unknown presence to the status quo. Most information travels through some network of social media each providing only a slightly different medium. Facebook, Instagram, Twitter, Snapchat, etc. while starting out in different aspects of media have all expanded to provide essentially the same capabilities of sharing video, pictures, or text. It is estimated that 71% of Americans get news content from a social platform and an estimated 4.48 billion people actively use social media throughout the world. With such a vast outreach and what has now become many people's primary source of information, one must explore the interactions existing within this spread of information.

With the COVID-19 Pandemic, many professional institutions turned towards social platforms as a means of communication. Utilizing tools such as Discord, Zoom, Microsoft Teams, etc. some of which may fall under the same network structure as social media. For my capstone, I am creating a web application, named Playlist. Playlist will be a music streaming application with social media elements. People will be able to create an account with a single song they wish to promote or associate with their account. The users will then be able to follow other users combining all the followed users' songs into a music playlist. Users will then be able to listen and interact with their playlists. As I complete my capstone project, I want to design the app in the same manner as other successful social media applications while utilizing the information I learned from experiencing school and working during the pandemic. I want to understand the underlying structure of the different agents involved in these applications and how I can better use them to foster a sense of community through online interaction. However, I want to focus on how current music streaming applications heavily utilize machine learning which leaves gaps in developers understanding its users.

Social media continues to expand, it is important to explore the relationship between humans and technical components involved. Exploring this relationship will help us understand the structure of a popular modern-day interaction and the different roles in a growing online media presence. Through researching these interactions one can answer, how are social media applications designed to leverage user relation networks?

## **Technical Topic**

Social media numbers are surging with an estimate of over nine of ten people with internet access actively using social media and a recent annualized growth of 13.1% (Baremetrics 2021). With having such a large global outreach, social media companies are constantly designing, innovating, and improving features on their applications. Companies which found their origins in streaming are now adding media elements with Spotify, SoundCloud, and Deezer having Facebook and Google integrations. Playlist is a new music application which has the same foundations as other streaming platforms, a platform which can stream songs produced by various artists. Playlist is novel through incorporating a follower feature and single published song. Other music streaming platforms have full albums or multiple songs associated with an artist. However, Playlist will limit each account to one song per account. Additionally, accounts do not have to be artists to be users on Playlist. Users can follow friends, family, celebrities, etc. and promote songs which are created by someone else. The goal of Playlist is to be the guideline for music streaming services in their expansion, providing similar functionality in building a scalable music sharing application while adding value in showing how utilizing new technologies may limit the developers' ability to understand their users.. In order to do so, the team will consult with a mentor for technical advice in order to complete the essential

functionality. Nada Basit is the team's mentor. Professor Basit has expertise in Databases and is a Computer Science professor at the University of Virginia. Her expertise will be useful for the team in connecting the backend technology with the user interface. The team will attempt to focus on user feedback as a centerpoint for design elements by utilizing agile. The team will send out feedback during the evaluation stage of the agile development cycle. Based on feedback, the team will go back to the design stage and progress towards evaluation again. Repeating the process as necessary.

While many companies may have started out as a small web or mobile application, the growth of the technology sector has made the measurement of success very abstract. The typical company measurement for success is profit. However in large technology companies there are multiple categories for determining positive signals including time to market, recruiting, technology development, outreach, etc. Many of these complexities are not part of the capstone project, thus Playlist should have a simpler model for measuring success.

Growing companies will use the DAU metric, or daily active users. DAU measures the interaction between users and the application based on a custom definition of active. This value is especially important to early stage applications as it measures the "daily traffic of an app or website and gives a good sense of how many people are checking out the product and, hopefully, valuing what it does for them" (Datareportal 2021). The measure of success should potentially be split into two categories; the functionality and the growth rate of the daily active users. In order to be a guideline the application must have similar functionality for the applications of interest. These vary from project to project but the minimum requirements for Playlist are; the app will be built using HTML/CSS, the app will have users, and the app will create a playlist based on the users followed. The determination for being considered active on Playlist will be the number of

changes to their account song and the number of clicks on the Explore page. This metric incorporates elements of human behavior into analysis and allows the team to identify potential problems within machine learning results.

Research will focus around topics of large scale measures of success and promotion. Music platforms want to continue their growth into new mediums. Understanding large scale measures of success will allow the team to align the development goals of Playlist to other global music streaming services. Music platforms and artists may benefit from emphasizing the music of various cultures to expand their outreach of different messages and communities. One example of this outreach could be the recent Black Lives Matter movement. The goal of analysis of the promotional techniques used and available to artists is to identify factors associated with community building and outreach which are missing within machine learning.

Success will be determined by the team's mentor and capstone advisor, Nada Basit. The team will present the metrics of success to the professor towards the end of the project. During the final presentation, professor Basit will use these metrics to evaluate Playlist.

## **STS Topic**

### *Punctualisation Frameworks for Music Streaming Services*

As streaming services continue to expand, the network of interactions within applications becomes more complex. Competition has driven an ever growing amount of features between applications resulting in higher complexity. In order to simplify, ANT provides a theoretical concept known as punctualisation. In a Spotify case study, punctualisation is the abstraction of a network or group of networks as one actor. Punctualisation is an analytical point one can make when studying a topic. One would punctualise a network in which UX or backend functionalities

are grouped to prevent complications with complexity. Punctualisation allows a focus onto a “complex area of a network resulting in analytical thinking” for specific roles within the network (Leijonhufvud 2018). In terms of user experience, punctualisation can hide the complexity regarding user decisions until the system fails. The system is “black boxed” and makes judgements based on the interactions of the user. For Spotify, the system would be black boxed unless the recommendations made to the user do not align with their preferences or the user did not have any recommendations. By utilizing this Spotify case study, one can understand the costs and benefits of punctualisation within music streaming.

Typically in computer science applications, analysis is quantitative. Employing information such as user growth, profit, clicks per page, to determine weak points within the application. User interface and general design is limited by these metrics. Many UX professionals “gravitate towards qualitative methodologies, which are widely perceived as being easier and cheaper than quantitative research” (Moran 2018). One can also turn to semiotics to analyze its user experience affordances as the design bears the imprints' ' of the ‘social’ (Kress 2010). In the case of Spotify, multimodal analysis is used to determine these affordances. Understanding the analysis methods used by UX professionals allows developers to measure the success of various design decisions. UX professionals use results from these analyses to understand user interaction surrounding immeasurables. For example, one method used is principle benchmarking. Principle benchmarking “evaluates the website or product against principles – and myths – and uses them as a metric to identify how to improve the design” (Dance 2016). Alignment of company principles to a technology requires a certain level of human interpretation. Through researching UX quantitative and qualitative evaluation

techniques, one can understand how computer science applications which utilize machine learning's punctualisation of a network may fail in understanding its users.

### *ANT and User Interactions*

The technology and media sector is strongly focused on user experience and interaction. Framework analyses centered around observations aim to understand users, and how the application utilizes this information to improve user experience. Machine learning has become common within all applications which uses a programmatic methodology to leverage user and platform interactions. Machine learning stores individual accounts' patterns of interactions, based on those interactions a model is trained to predict what other features on the application may follow an account's interactions. Machine learning does not force interactions between users and elements of the platform but is rather a method for collecting information about how various groups and users interact. Spotify utilizes machine learning by storing information about skipped songs, listening history, and platform social interactions to give song recommendations and improve user interface. Machine learning allows applications to develop a constructive relationship between its users and the platform. Through understanding the patterns of interactions for each user implemented in machine learning, companies are leveraging user groups to improve their application. Previously, companies would treat the user base as one entity. Machine learning has allowed companies to see the value of separating users into groups and interactions. By incorporating machine learning as common practice, social media applications are utilizing user interactions within a network for design decisions.

Machine learning is a fast growing technology which utilizes a network of users, content, and the platform itself to understand the complex relationships surrounding the components of the application. While most social media platforms have similar services, they may have strong

differences for ideal user platform interaction. Exploring the various machine learning algorithms for social media platform interaction will allow better understanding of the focus of the design as “algorithms are not only constituted by rational procedures, but also involve institutions, people in a multitude of roles, and various intersecting contexts” (Storms 2019). Furthermore, exploring the differences will also give insight into the contrasts of company approach for involving the users in the design/development process.

Prior to machine learning, computer scientists developed methodologies to understand user needs and how to build upon those expectations. As machine learning continues to grow, many qualitative methods are not being used as the goal of machine learning is to be self functioning by utilizing quantitative metrics. Machine learning is a mostly automated tool that then goes in between the developers and the user, essentially "punctualizing" the complex process of "knowing users". By punctualising the network, machine learning may fail to implement successful design decisions measured by qualitative methods such as principle benchmarking.

## **Next Steps**

To follow up on this research the capstone project next steps include building the application and utilizing information learned about ANT, machine learning, and application design. In order to be a guideline for future development, Playlist must show it has the same core functionality as these applications. The team will meet with the technical advisor over the next several weeks to ensure these functionalities are present or accounted for. The team will develop HTML pages for user interface then send feedback forms and collect user usage statistics to make design updates. The team will leverage the user platform interactions data from user

feedback to update the design. Incorporating design changes can be abstract in benefit, so design changes will be backed up by metrics of DAU and Explore page interactions.

As an independent capstone, this project has a small scale which cannot compare to the media giants of modern day. However, the goal is not to become a scalable application but to understand the interactions of different agents within a social media application and how those interactions can be leveraged in design.

Once the development is complete, the team will send out the beta to users and create feedback forms. The forms will be sent out continuously throughout the beta experience and will be used as evidence to make design decisions. The team will also follow up on more research and case studies regarding application design and ANT.

Below is a tentative timeline for the project completion throughout the semester. The technical requirements and timeline for the project are fairly set. In terms of the STS portion of the project, the team needs to further research DAU and page interactions to properly set thresholds for success. Questions which need to be researched and discussed include: What values for DAU and clicks per page are realistic given the scale of the project? What kind of statistical assumptions need to be made in order to consider the feedback evidence as valid? What would the team consider as substantial data?

#### Timeline

- October 1st - Go over proposal with Professor Basit
- October 8th - Make adjustments to proposal and start working on UI
- October 15th - Continue working on UI and make adjustments as necessary
- October 22nd - Work on UI / Start on User creation.
- October 29th - Finish UI and start working on User creation/storage
- November 5th - Continue working on Users
- November 12th - Research adding streaming option/additional features
- November 19th - Implement additional features or create future plan of implementation
- November 26th - Thanksgiving Break
- December 3rd - Final Adjustments/Improvements

- December 10th - Final Demo Presentation

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