# Report on:

# MUSIC RECOMMENDATION SYSTEM BASED ON TWITTER ANALYSIS

-Sriharsha Kaluva

## Abstract

The particularities of musical data and its multiple modalities make original contributions possible in many core topics such as context-aware and mobile recommendations. The current revolution in the music industry represents major opportunities and challenges for recommendation systems in general. Recommendation systems are now central to music streaming platforms, which are rapidly increasing in listenership various comparable frameworks that are already available in the market. A person's mood changes more frequently compared to personality hence forming the base for the proposed application. The proposed system uses this way of analyzing the personality for the system to learn how the user might be feeling. This shall be different from the existing systems in a way that the system would be doing an analysis on music tracks having the lyrics and in English language that are obtained from third party source and on the user's tweet data requiring mandatory integration of the user's twitter account to the proposed application.

## Author Keywords

Twitter; recommendations; subscriptions; sentiment analysis; polarity; depression; mood analysis; music; lifestyle; Spotify.

## Introduction

The system was developed by following a sequential design approach which included requirement gathering, needs assessment, design and implementation phases. My initial approach started with an intention to develop a product in health and wellness domain focus being on mental health rather than physical. My research process started with exploring the mental wellness domain and it being very broad, I narrowed down to a specific aspect of analyzing social media posts and their relevance to a person's emotional state.

To identify the core challenges encountered by people dealing with depression or anxiety or similar emotions, I conducted an online survey and personal interviews. These methods helped me to choose target population as well. The most common activity among the survey responders and the interviewees turned out to be listening to music when no matter how their emotional state is. I

now had a definite shape for the problem I aim to solve which is – to relate social media analysis to music listening experience which led to the birth of this system. The design phase conceptualized the idea of the system, with design phase involving pitching the idea, sketches and storyboards. After first iterative prototype, I got valuable feedback from users and improvised my system. In this paper, I will present brief overview of how I implemented the design. This paper concludes with presenting next step key points.

## Goals*

The proposed system focuses on bringing the music listening experience closer to the user than ever. Hence, detailed needs assessment laid out few design goals as listed below -

1. **Hassle free**

   Users would like to use applications which are hassle free which is the ground rule of any product. This has again been indicated by the users in the survey hence remains my top priority.

2. **Mood Enhancing**

   The domain that I've chosen to work on deals with emotions influence them in positive and negative both ways. In the light of the research that I've done, it can be safely concluded that specific music has specific impact on mood and people take interest and feel good after listening to music. Hence, the need for an application that is different from the existing products like the Aura app was clearly seen from the survey.

3. **Minimal-moderate experience Apps**

   Users wanted a handy decision-making system in User basic needs. It requires minimal mobile experience for Context of use and Functional requirements.

*Mentioned here are related to the long-term goals & are discussed in Future Work section.

## Methodology

Mental health plays a vital role in what a person does from day-to-day. On the contrary, mental health issue is a real thing and requires a lot of addressing by self and by peers. To identify core challenges within this domain, I conducted online surveys. Based on the feedback from online survey, design process began by listing the problem domains of music and psychology industry

and stressing on how mobile software could solve them. I found problem spaces out of which 4 essential domains followed by brainstorming for feasible, practical product. Secondary research helped me get insights on what must be the areas of cynosure-Mental wellness and motivation. I surveyed the ideas against different categories extracted from needs assessment document to rate my different thoughts. These points were utilized as a channel to additionally create key outlines. My first prototype was in form of digital sketch.

## Design

From NLP point of view, this project has two parts: Sentiment analysis and text similarity.

### Sentiment Analysis

Sentiment analysis shall be implemented on two sub-categories:

#### User Tweet data

In order to fetch tweets through Twitter API, we need to register an App through our twitter account. Tweepy is the python client for the official Twitter API. I shall be using textblob package. Textblob is the python library for processing textual data. Additionally, the application needs corpora hence I chose textblob corpora. Using the mentioned packages, tweets of any user can be scraped from Twitter using the username as parameter. Passing this data to textblob could fetch polarity and subjectivity scores of the tweet(s). The scale of polarity in textblob ranges from -1 to 1 where 0 denotes neutral sentiment. Similarly, subjectivity scores range from 0 to 1.

#### Music track lyrics

Sentiment analysis on music data must be implemented on music track lyrics. For the sake of simplicity and testing the prototype I chose 10 music tracks. Textblob unfortunately works only on English text hence the music tracks had to be in English. Hence, this system only works on tracks that have lyrics but not on tracks of Genres like Electronic dance music and the lyrics must be in English language. Lyrical data is fed into the same tool I used for Sentiment analysis of tweet data which fetches polarity and subjectivity values.

Depending on the closest polarity and subjectivity values, most relatable music track can be recommended to the user.

#### Text Similarity

This is an improvement on the initial workplan where I test for text similarity between tweet text & lyrical text data using Euclidean distance and Jaccard similarity using nltk. Considering the distance between the tweet text and

each music track for both the distance measures, and the subjectivity values from textBlob better a better recommendation system can be built.

## Conclusion

This system is an attempt to prune, on a higher level, the gap between emotional tone behind a series of words, attitudes, opinions and the ability to quickly understand consumer attitudes and react accordingly so that system looks to take advantage of. This system aims to resolve the uncertainties faced by user in deciding what kind of music, a person wants to listen to, in a general scenario. Technological advancements today made it possible to determining the extent of positivity, negativity, or neutrality of emotions expressed through enormous data but that is not to say that sentiment analysis is a perfect science at all as the human language is complex. Teaching a machine to analyze the various grammatical nuances, cultural variations, slang and misspellings that occur in online mentions is a difficult process. Finally, I believe that this system would be appealing to avid music listeners, especially but not restricted to younger population due to its minimalistic design.

## Future Work

Many different adaptations such as cleaning the twitter data of the user for more accurate polarity values, tests have been left for the future due to lack of time. Future work concerns deeper analysis of particular mechanisms, new proposals to try different methods for analyzing both social media account data of the user and music lyrics. The developed prototype has numerous constraints such as a necessary active user account in Twitter (for the polarity score to change), language constraint on music tracks- fed lyrical data must be in English, single source of music data redirection to only one third party application- Spotify. It could be interesting to consider a system that could work on all the top social media platforms, across various mobile operating systems, and designed for various online music streaming frameworks. Furthermore, I believe the presented idea could break the boundaries of Leisure & Entertainment domain for innovative approaches to potential health & wellness fields like Music therapy and healing, etc.

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