Predicting Your Next Hit Song

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Abstract

In today's day and age, it has become very important to classify music based on its specific genres. The current user base expects to get the music of their preferred genre(s) properly classified and most popular music streaming services are expected to have this data correctly labeled and ordered in their databases as and when the user requires it. For these classified genres, we want to establish the parameters that make a song a 'HIT'-song for each of the classified genres. The list of hit songs shall be procured from popular sources which produce lists on a yearly/ monthly/ weekly basis - Spotify, SoundCloud, and Billboard. Once we get the desirable features for each category, we shall try to predict if any song from our list shall be a 'Hit'-song or not. If not, what are the features it needs to work on to make it a 'Hit'-song. Once we have this, we shall use deep learning models to generate new music that would be a 'Hit', according to the features we have identified for that particular category. The Maestro Dataset shall be used and we shall employ an LSTM architecture to predict the notes based on the input of the tokenized MIDI file. The accuracy measure for our prediction of new songs would be a comparison with the actual note measures. We are in the early stages of employing A.I. model in actual real-world use-cases for the Music industry and we expect this project to be a way to democratize the music industry with each new artist finally getting the option to compare the songs they are creating and have a fair idea of the things they need to work on and the actual notes they can change to make their music into 'Hit'-songs.

1 Group

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2 Introduction

"Music is a moral law. It gives soul to the universe, wings to the mind, flight to the imagination, and charm and gaiety to life and to everything" - Plato. Music is one of the most powerful forces which lets us communicate, feel and heal. Subtle nuances in tone, pitch and other features in a song is what differentiates how one perceives it. Hence, it is important to categorize music into different genres.

The music industry in our opinion is a highly closed environment where new and upcoming artists find it really difficult to get their music noticed and it takes them years to come up with their first 'hit' song. With this project we are trying to democratize the industry and give power back to the people who actually create the music. Hence the onus to create good music and music that the audience is actually interested in, goes back to the creators instead of falling on people who are barely involved in the transaction that happens between music producers and music consumers.

In order to implement our proposed project idea we plan on using the best suited classification and regression algorithms to categorize the songs into their respective genres and to predict if a given song would be a hit or not. For synthesis, we will use neural networks, which is an extension of the concepts that we will be learning in class, and are highly essential for the field of generation as these models outperform most others.

3 Background

We are primarily working with papers such as **"From Artificial Neural Networks to Deep Learning for Music Generation – History, Concepts and Trends"** by Jean-Pierre Briot and **"Deep Learning Music Generation"** by Kinbert Chou. We are pulling our datasets from Kaggle and to extract features from the mp3 or MIDI file we are going to use libraries like librosa which has functions that use Mel-frequency cepstrum to extract features from audio files like spectral roll-off, spectral flatness, and spectral bandwidth, etc. These features are extensively used in applications such as genre classification, audio similarity measures, etc.

For our base goals, we would be implementing simple statistical models along with machine learning models, comparing which would work better on which genres and predicting whether they would be a hit in their respective domains. For synthesizing songs, we would use deep learning models which would alter the features we extracted from MFCC to make the song more appealing.

The dataset we would be using is **"GTZAN Dataset - Music Genre Classification"** this dataset includes about 100 songs in each of the ten genres that are shortlisted, two features files in which the audio is divided into 3 and 30-sec intervals, and features such as RMS mean and spectral centroid are calculated. We also have 10 Mel Spectrogram representations of the sample audio files in each of the genres.

4 Measures of Success

In this project, we are setting our base goal as the classification of a newly released song into a genre that it falls into. The goal also includes predicting whether the song would be a hit in the particular genre it was classified into.

Our stretch goal would be to implement a tool that would allow upcoming artists in understanding what their songs lack in terms of bass, tenor, and tempo which is hampering it to be a hit. We would artificially synthesize their song either using techniques like composition assistance or autonomous generation in some parts or seconds in the audio. This would subjectively make the audio more appealing to the masses.

5 Preliminary Plan

Week 1 : Literature Review and Preparation of Project.

Week 2-3 : Extraction of Audio Features for Genre Classification.

Week 4-5 : Extraction of Audio Features for predicting 'Hit' Song.

Week 6 : Synthesis of Audio files.

Expected Roles:

Keval Shah, Aman Peshin : Data Pre-Processing and Audio Synthesis (stretch goal)

Vidushi Raturi, Shashank Karanth : Classification of songs based on Genre

Bitaan Chakrabarti, Rithik Goyal : Prediction of 'Hit' Song