

ANALYZING AND PREDICTING SONGS USING MACHINE LEARNING TECHNIQUES

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Abstract:

Analysing and predicting songs whether a user like/dislike a song through exploratory data analysis and machine learning. The user data of custom like and dislike dataset is considered for the study. We apply machine learning algorithm to predict the song, whether user like or dislike it. The machine algorithm used for predictions are Logistics regression, Decision Tree and Random forest. We evaluate the three machine learning algorithm and through experimental analysis, we find the best algorithm for song like prediction. The problem of building a machine learning model which classifies music into liked or disliked according to user playlist. Another problem to be studied is to compare the accuracies of this machine learning model and the pre-existing models, and draw the necessary conclusions. Musical genre classification of audio signals, initially explored about how the automatic classification of audio signals into a hierarchy of musical genres is to be done.

The disadvantage of existing system considered music genre classification is music like and dislike prediction is not handled. The results of our proposed approach can be utilized to enrich the input for recommender systems (e. g., to play the song automatically from the play list) or directly for recommending new items (e. g., be understanding the users liked list, new items can be played). In further steps the system could also be used to directly predict topics (e. g., genres) or items (e. g., artists or songs) the user is interested in, thus improving the user experience. The advantages of proposed system is high accuracy of proposed system and song prediction with given attribute possible.

Keywords - Machine Learning, Predictive modelling, Exploratory data analysis, Song dataset, Random Forest.

I. INTRODUCTION

Nowadays lots of music industries like amazon music, wink music, gaana.com are using recommender systems and the old fashioned way of selling music has changed to a totally different cloud based. Now all the music resources are present in their cloud and users can listen to the songs directly from the cloud. But the issue is there are lot of songs present in the cloud system. so we need to classify all the songs based on different genres, artists locations, age groups, languages and the main goal is to classify these set of songs in accordance to the taste of the user. Because user expects valuable return

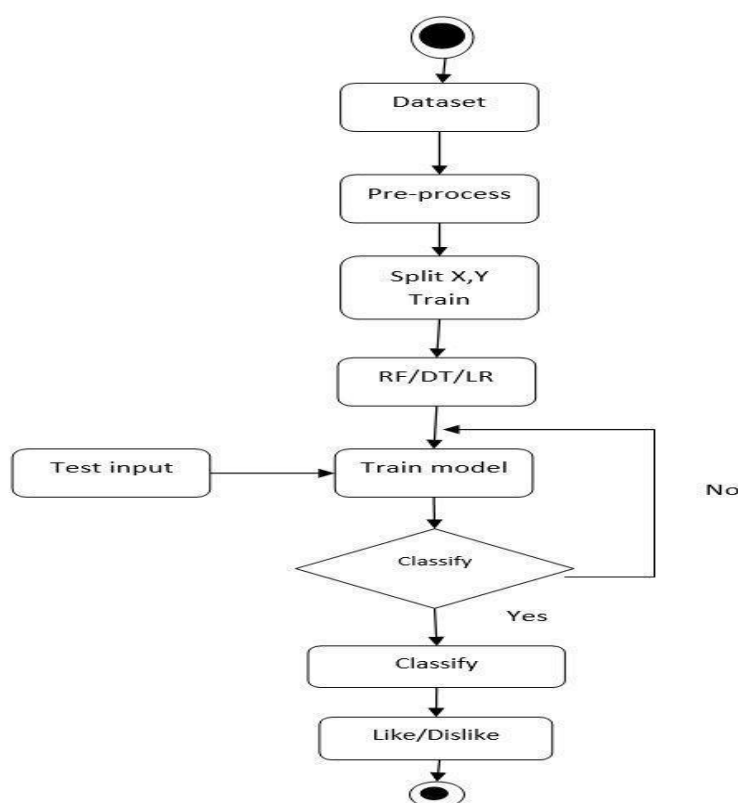
after the investment of time as well as money thereby we can attract a lot of customers by providing various valuable services of their interests. For this project we are using various machine learning algorithms. We have implemented various algorithms and compared the results with one another to find the effective algorithm that suits our model. The most common approaches people have used implementing various recommender systems are collaborative filtering and content based models. These algorithms aim to find similarity between various users various songs and artists. Other than these algorithms we have also used random forest algorithm and decision tree algorithm. Both of these algorithms aim to predict a decision based on different attributes. There were a lot of outliers present in that data set which required complex data pre-processing.

II. RELATED WORKS

In Hareesh Bahuleyan, (2018). Music Genre Classification using Machine Learning techniques, the work conducted gives an approach to classify music automatically by providing tags to the songs present in the user's library. It explores both Neural Network and traditional method of using Machine Learning algorithms and to achieve their goal. The first approach uses Convolutional Neural Network which is trained end to end using the features of Spectrograms (images) of the audio signal. The second approach uses various Machine Learning algorithms like Logistic Regression, Random forest etc, where it uses hand-crafted features from time domain and frequency domain of the audio signal. The manually extracted features like Mel-Frequency Cepstral Coefficients (MFCC), Chroma Features, Spectral Centroid etc. are used to classify the music into its genres using ML algorithms like Logistic Regression, Random Forest, Gradient Boosting (XGB), Support Vector Machines (SVM). By comparing the two approaches separately they came to a conclusion that VGG-16 CNN model gave highest accuracy. By constructing ensemble classifier of VGG-16 CNN and XGB the optimized model with 0.894 accuracy was achieved.

III. METHODOLOGY

Model Diagram:



Algorithms Used:**Random Forest:**

Random forest is a non rigid and easily used and implement machine – learning type of algorithm. In this algorithm we will not even use the hyper parameter tuning, still we will obtain a good result and obtained most of the time. It is also one of the most frequently used algorithms because it is simple and also it uses both classification and regression tasks. The random forest is a controlled type of learning algorithm as it creates a forest and makes it random. This random forest creation enables multiple options and decisions. In simple definition random forest builds multiple decision trees and then merges them to obtain a more optimum and accurate as well as stable prediction.

Decision Tree:

Decision tree is commonly and easy to implement algorithm used all along. The Decision trees can be used both for the classification as well as regression of the problems. The Decision trees frequently copies and then follows the human standard of thinking so that it is simple to understand and make good interpretations of the given set of data . A decision tree effectively and efficiently makes us understand the concept behind for the data so as to interpret it and develop and produce optimum output. This means that a decision tree is defined as a tree in which each node will represent an attribute or a feature, also each of the links will depict a decision and each leaf will represent an outcome. This is somewhat similar torandom forest .It predicts decisions on the basis of gain and split ration and then best node is calculated. This acts as a tree further node selection takes place till the last node by second method.

Logistic Regression:

The logistic regression is a predictive analysis. Logistic regression is used to describe the data and to explain the relationship between one dependent binary variable and one or more nominal, ordinal, interval or ratio-level independent variables. Logistic regression is another technique borrowed by machine learning from the field of statistics.

It is go-to method for binary classification problems (problem with two class values). Logistic regression is named for the function used at the core of the method, the logistic function.

Logistic regression is basically a supervised classification algorithm. In a classification problem, the target variable (or output), y , can take only discrete values for given set of features (or inputs), X .

III. PROPOSED METHODOLOGY

Introducing a new concept of analysing and predicting songs under the basis of machine learning. The main theme of this system is predicting the songs based on users playlist whether the users like or dislike the songs.

We proposed song prediction by users interest from their playlist. We apply machine learning algorithm such as decision tree, random forest and logistic regression.

The song prediction is proposed with GUI, where user can enter the details of the attribute and predict the song whether it is like or dislike.

The accuracy and error values such as MAE, MSE, RMSE and Rsquared are arrived for the proposed algorithm. To find the best suitable algorithm for song prediction.

IV. RESULTS

The following screen shows the application home page

Prediction

Select Dataset Browse Clear

Danceability Acousticness

Loudness Key

Valence Speechiness

Energy Duration_ms

Instrumentalness

Preprocess Logistic Regression Random Forest Decision Tree Predict Quit

The user can give single input on user interface:

Prediction

Select Dataset Browse Clear

Danceability Acousticness

Loudness Key

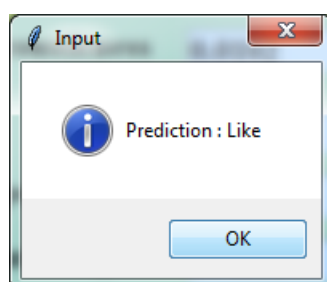
Valence Speechiness

Energy Duration_ms

Instrumentalness

Preprocess Logistic Regression Random Forest Decision Tree Predict Quit

The prediction output is shown :



V. CONCLUSION

The results have shown that a Random forest model achieves more accuracy on Spotify song like and dislike classification based multiple features of song property. This work can be useful to filter a large music library for particular user's like and dislike. A music library filtered in this manner could further be used as input as user's interest.

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