Determining ‘Descriptive Genres’ for Songs

Project by

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Under the guidance of

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as a part of

Algorithmic Machine Learning

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Project Idea

There has been a lot of work done on classifying genres of musical tracks based on their features. However, telling the genre of a song is subjective. Also, a genre can be very wide to tell how song is and even though it might help the listener up to some extent it proves to be of no use in exactly entertaining the listeners as per their mood.

This project is motivated by the very fact that if the listeners can listen to the songs based not just on broad features but on descriptive features exactly aligning to their mood, they, can have a great experience.

Dataset and Data Pre-Processing

The data set for the project has been obtained FMA “Free Music Archive”. As the data is web scrapped, it contains many extra columns, unreadable values, empty values and so on. In order to overcome this, extensive data cleaning has been performed on the data sets and new clean datasets which contain only the necessary columns and values have been generated.

Further, Exploratory Data Analysis (EDA) have been performed in order to observe the correlation between various audio features and to normalise the columns which have exceptionally high values.

Model Implementation

In order to achieve this goal of obtaining descriptive genres, we have implemented certain machine learning algorithms.

K-Means Clustering:

K-means clustering has been implemented on all the tracks to cluster the tracks based on audio features like acousticness, energy, danceability, valence, tempo and so on.

Further, the clustering has also been done for only the electronic tracks to make our descriptive genres more specific.

Hierarchical Clustering:

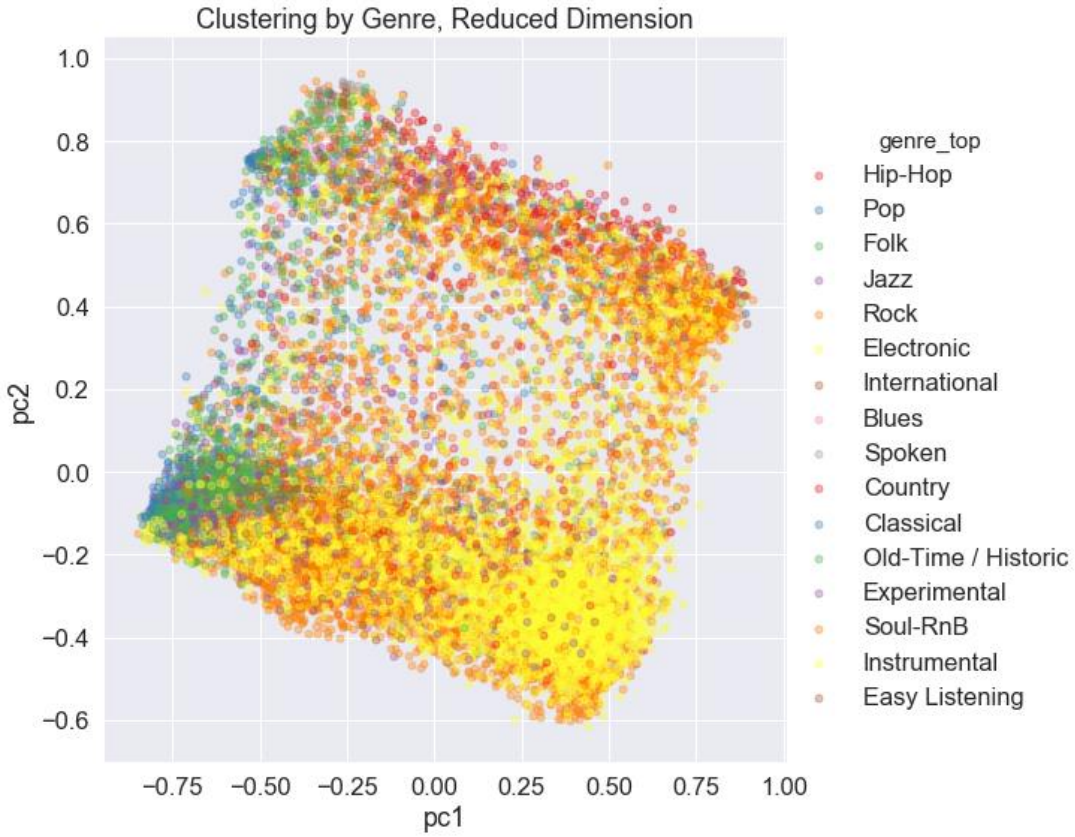
In order to compare our clustering results, hierarchical clustering is also performed on the tracks.

Principle Component Analysis:

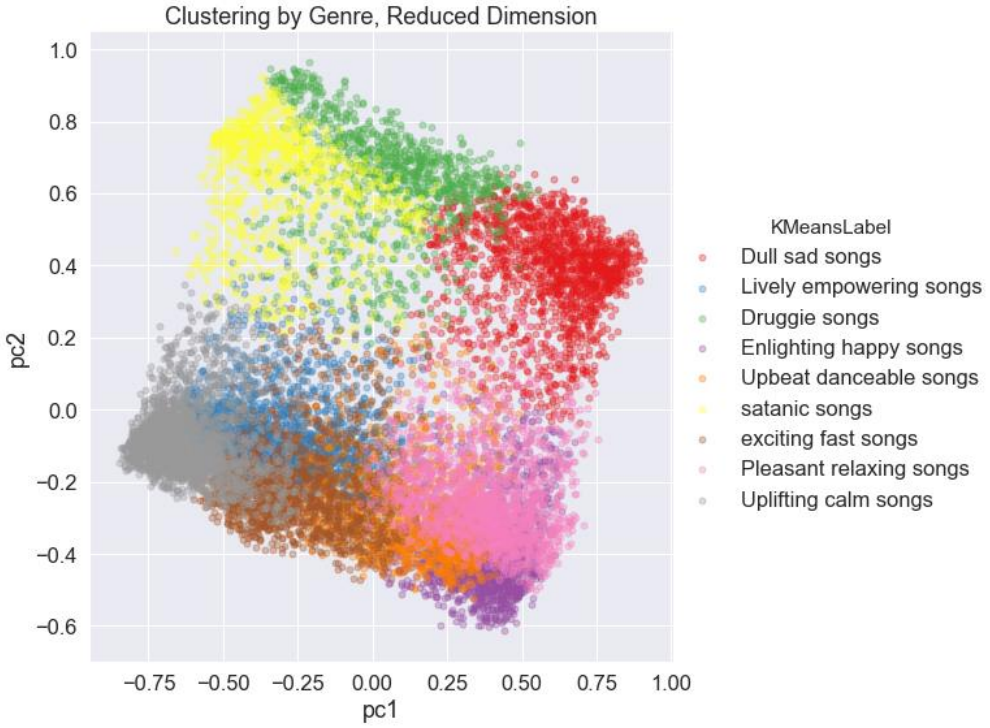
Principle Component Analysis have been applied on the multi-dimensional clustered data set for better visualisation of the determined clusters.

Results

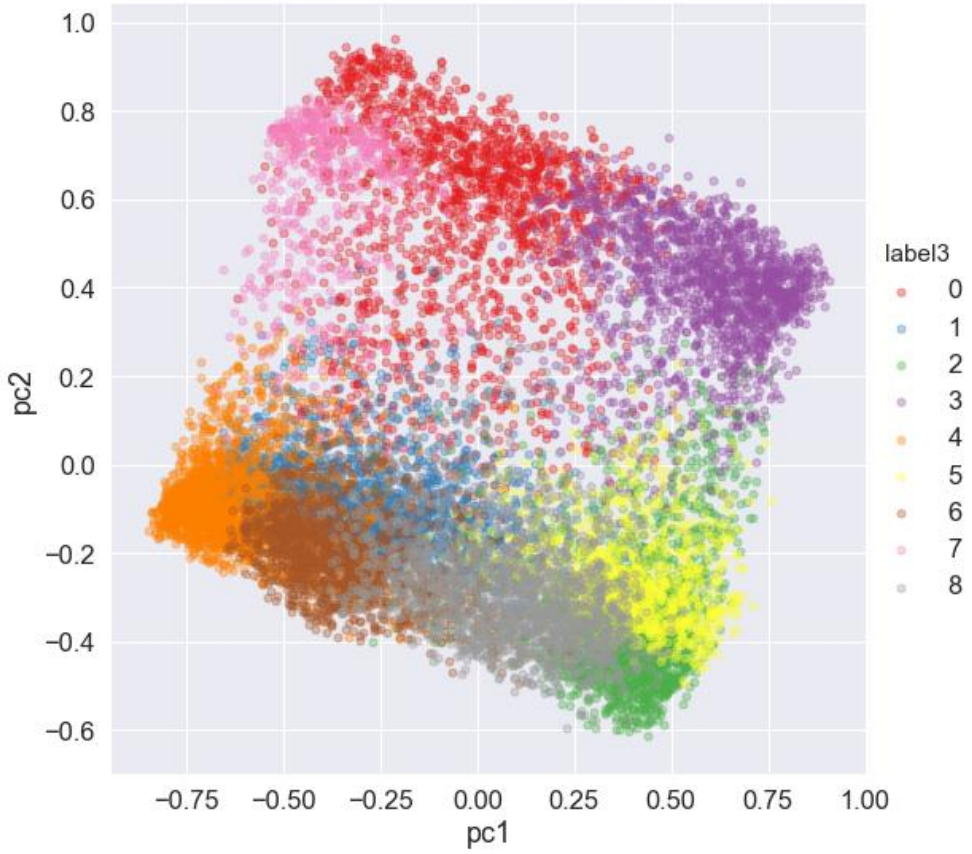
Visualisation before Clustering



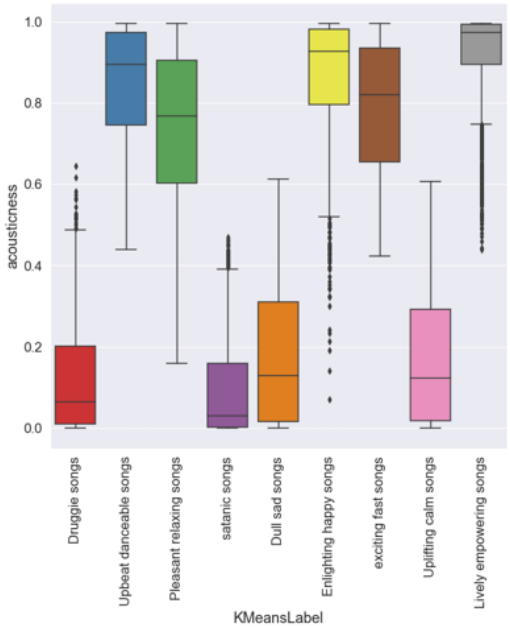
Visualisation after Clustering: (K-Means)

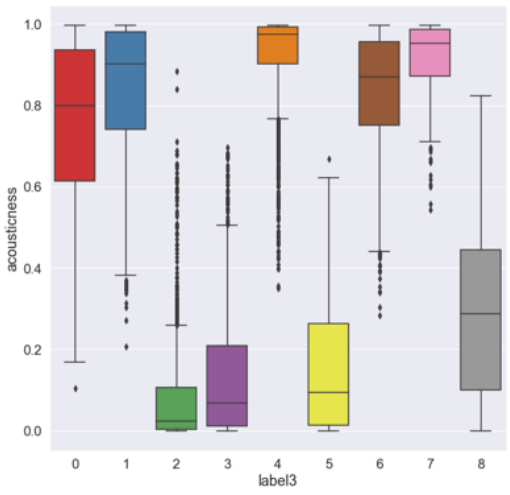


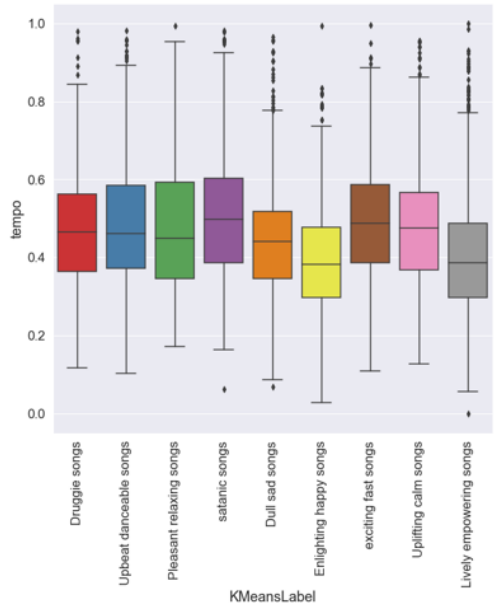
Visualisation after clustering (Hierarchical)

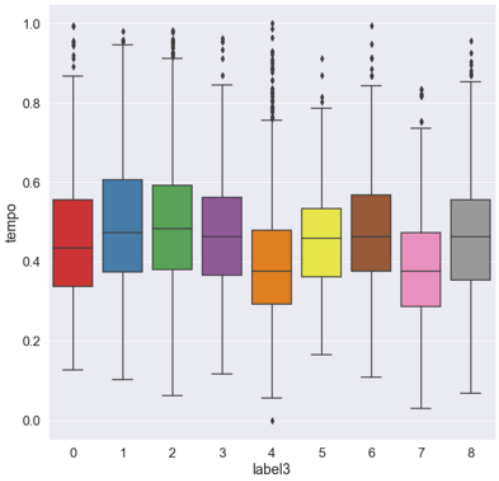


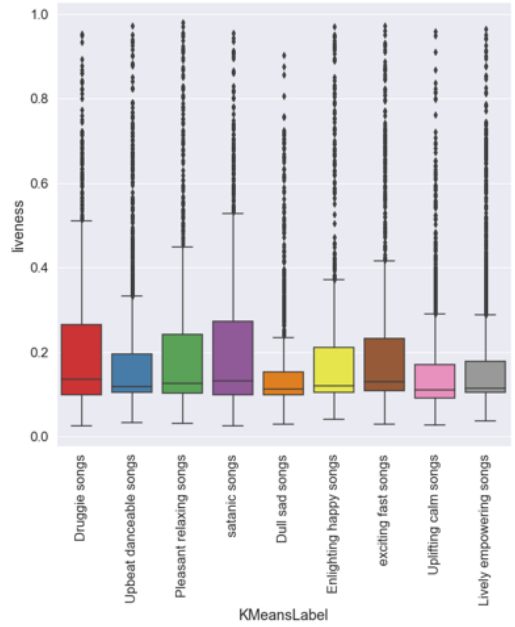
Comparing models through boxplots

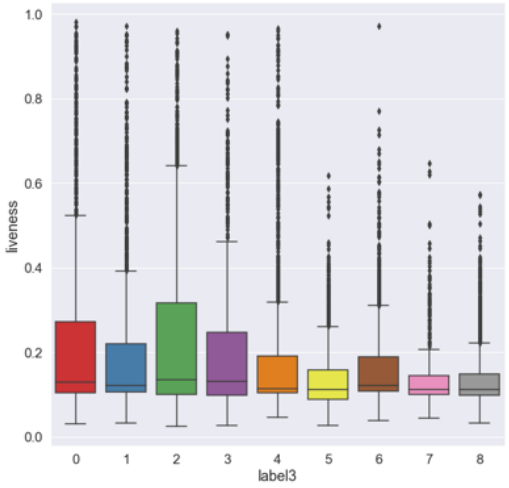












From the above comparison of acousticness, tempo and liveliness, both the models, K-Means and Hierarchical give almost similar results.

kNN Classification:

A model does not sound complete if a new entry can disrupt the results. Hence, to make our model complete, we have also implemented kNN Classification which will classify the descriptive cluster for any new song which is added to the list. We have successfully implemented kNN with 95% accuracy.

Conclusion and Future Scope:

We have successfully created descriptive genres for various music tracks using K-Means and Hierarchical clustering and have also implemented kNN for classification of new tracks. Hence, we have been successful in describing music in a new way.

We can take this project further by clustering on basis of sub genres and further implementing a recommendation system based on descriptive genres.

Division of Work:

Naina Jain

Data Pre-Processing (tracks data set)

Model Implementation (K-Means)

Vishv Brahmbhatt

Data Pre-Processing (echonest data set)

Model Implementation (Hierarchical)

Pranav Deshpande

Exploratory Data Analysis

Model Implementation (kNN)