

The background is a dark blue-grey color. It is decorated with various geometric shapes in orange and white. There are circles of different sizes, some with dotted patterns inside. There are hexagons, some solid orange and some white with orange outlines. There are also triangles and lines. Some shapes are partially cut off by the edges of the frame. The overall style is modern and minimalist.

Song Recommendation

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01. Introduction

- There are more than 100 million songs currently available on the internet.
- Classifying songs based on different attributes has become difficult over time.
- Every song have some similarity index with other songs and thus can be grouped together.
- Our end goal here is to create a recommendation system, which groups different songs based on their features, and suggest songs which belongs to the same group as user's preference.



02. Problem Statement

- Design a model which can recommend songs based on certain attributes and features.
- Create an unsupervised learning model to classify the song dataset into various different clusters.
- Create a precise recommendation model including multiple features of songs. This would be necessary to devise an accurate solution for the problem.



03. Existing body of work

- There are many approaches to design recommendation system. But they do not take into account user's preferences.
- H. Chen presented a collaborative recommendation system^[4] wherein he grouped music samples which were similar to each other and also match with user's preferences.
- Many system computes the mean of the songs preferred by the user and then recommend songs based on these values.



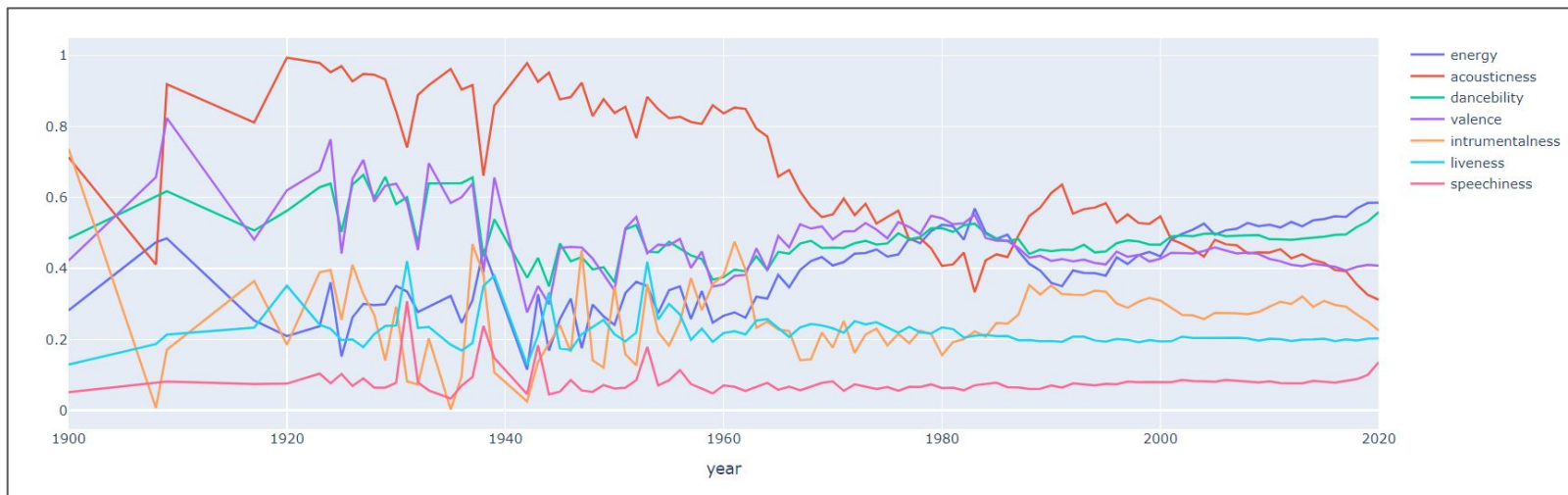
04. Approach

- The dataset is very diverse and there is no such feature which can be taken as a target variable.
- For this type of dataset, the best approach is to use unsupervised learning.
- In unsupervised learning, we use clustering algorithms as our end goal is to recommend songs, which can be achieved by classifying the dataset into different clusters.
- The key algorithm for our project is k-means clustering, which is an unsupervised learning algorithm that solves the clustering problem.



05. Initial Results

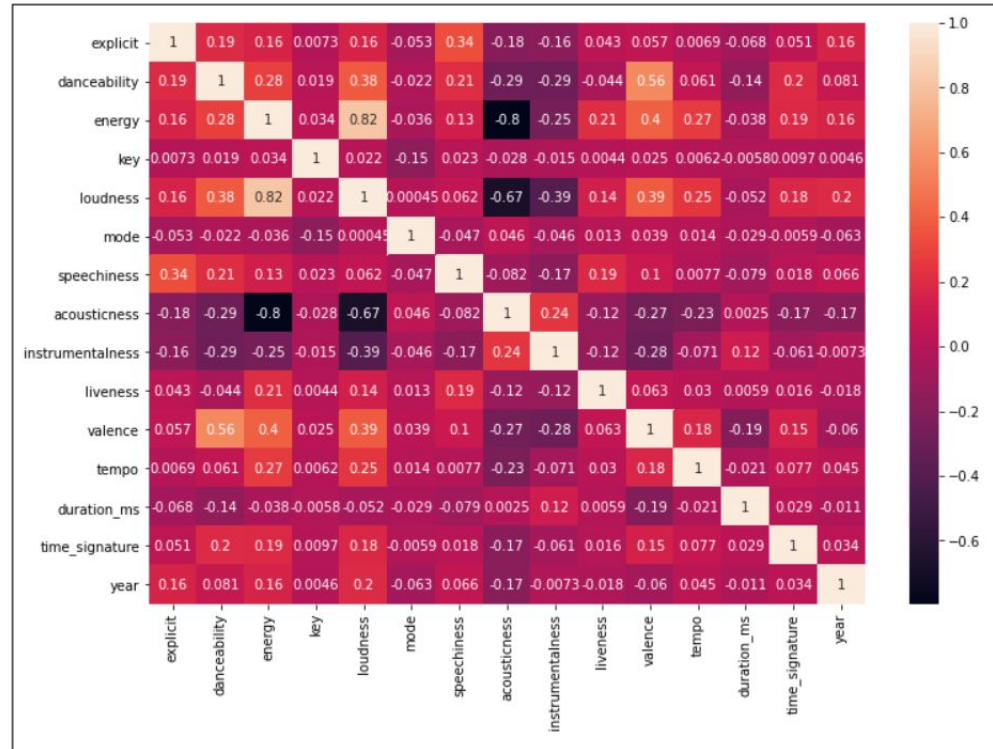
Trend of audio features over decades



05. Initial Results

Correlation between features:
Correlation matrix of all the audio features of the song

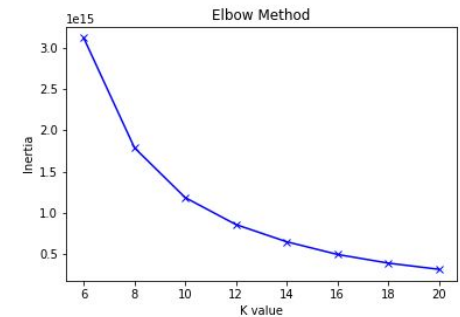
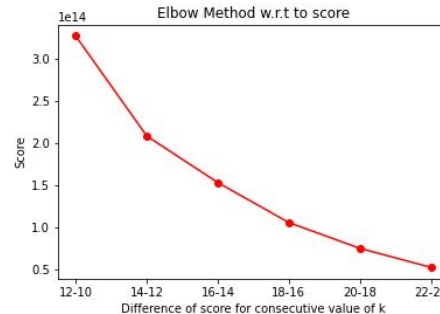
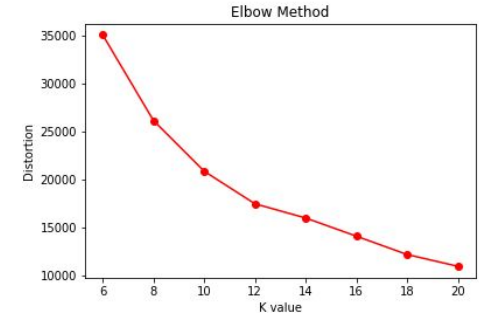
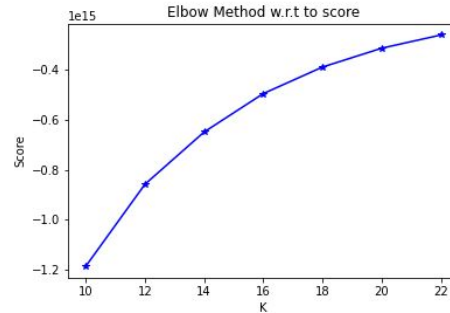
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05. Initial Results

Elbow Method:

Performing elbow method to obtain the optimum value of K to perform k-means clustering

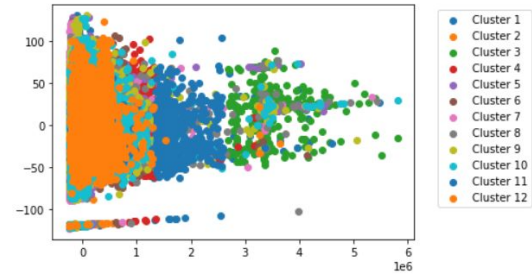
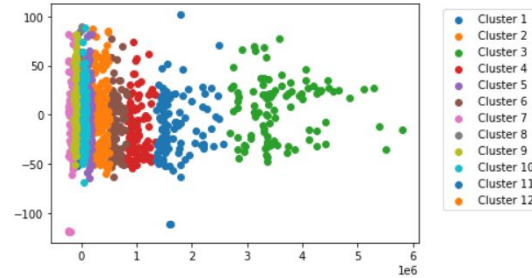


05. Initial Results

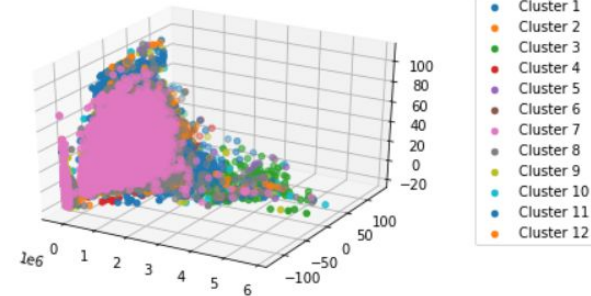
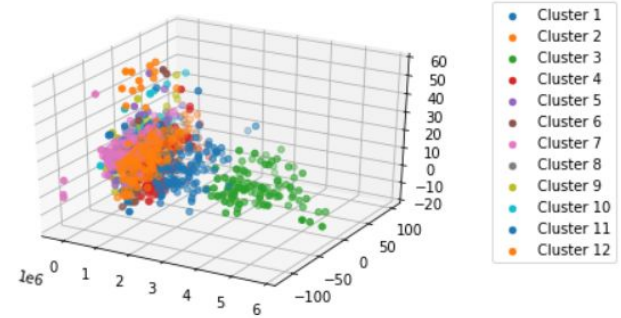
K-means Clustering:

Performing the K-means clustering and then applying PCA to reduce the feature space to 2-3 components for visualization.

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2D



3D

06. Role of group members

Group Member	Dataset Understanding	Understanding k-means	Preprocessing dataset	Elbow Method	k-means clustering	Principal Component Analysis
Namit Shah	✓	✓		✓		✓
Martand Javia	✓	✓		✓	✓	
Suhanee Patel	✓	✓	✓			✓
Devarsh Patel	✓	✓	✓		✓	



07. Future Work

- After clustering the dataset, we will build a recommendation system where the user will enter one or more songs that he/she prefers and the system will recommend similar songs based on the clusters formed earlier.
- Add an additional feature named 'popularity' either from Spotify API, or by defining a model for predicting it.



08. References

1. [Spotify 1.2M+ Songs | Kaggle](#)
2. [K Means Clustering | K Means Clustering Algorithm in Python \(analyticsvidhya.com\)](#)
3. [Understanding K-Means, K-Means++ and, K-Medoids Clustering Algorithms | by Satyam Kumar | Towards Data Science](#)
4. [H. C. Chen, A. L. P. Chen. "A music recommendation system based on music data grouping and user interests," Proc. of CIKM, pp. 231-238, 2001.](#)



The image features a central white rectangular area with the text "Thank You!" in a bold, dark blue, sans-serif font. On either side of this central area are vertical orange bars. These bars are decorated with various geometric patterns: circles, hexagons, triangles, and lines, some of which are filled with a grid of small dots. The overall design is modern and minimalist.

Thank You!