

Hybrid Music Recommendation System Using Content-based Filtering and K-Mean Clustering Algorithm

Karishma Mandloi^{1*}, Amit Mittal²

^{1,2}Department of Computer Engineering, Institute of Engineering and Technology, Devi Ahilya Vishwavidhyalaya, Indore, India

*Corresponding Author: karishmamandloi@gmail.com, Tel.: 919993315549

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Abstract— Data is recognized as an important source for knowledge generation. Sometime user may aware about requirement but sometime may not. Recommender systems are software or technical facilities to provide items suggestions or predict customer preferences by using prior user information. Recommendations can help to increase sales and improve user satisfaction. Music Recommendation system can help to explore relative music based on user preference or internal similarity. A hybrid recommender system is usually developed through the combination of multiple recommendation techniques to boost the quality of recommendations. This paper uses content-based filtering with K-mean clustering algorithm for music recommendation system which provides effective and relevant content to be suggested.

Keywords—: Recommendation system; Content-based filtering; K-mean; Data Mining

I. INTRODUCTION

This method of recommendation system works as suggestion, customization, learning, administration and this all provides user for the items suggestion and decision making. In this world of development, variety of technologies are used for the information suggestion. Suggestion of items, according to user preferences are most important, so suggestion according to similarities provides suitable recommendation. The working of recommendation system for administration have been researched in recent years. Network resources, clients, and administration are all connected and quickly developed. we have lot of choices in the real world and selecting one out of many is the biggest problem. We always take help from some or the other person in choosing the one amongst many. Our family members, friends who have same preference as ours suggest us. But if the same thing happens in virtual world then their selection of interested item is based on recommender system, which is very helpful in selecting the one amongst the many. Through recommender system people can share preferences and most preferred items are offered among them to user from which he can select the interested one. This technique deals with the information overload problem. Useful suggestions are created for customers to get the interesting items.

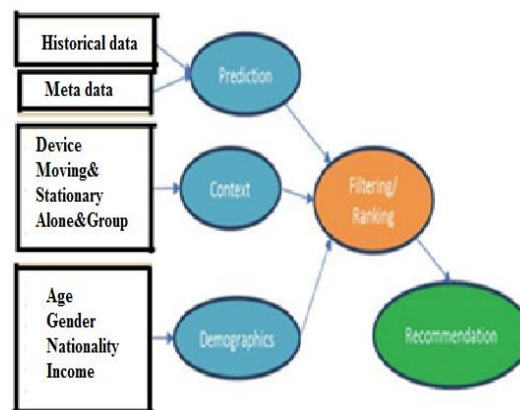


Figure 1. Recommendation System

Section 1 contain the introduction of research paper, Section 2 contain study of related work and of previous works. Section 3 contain Methodology, Section 4 contain results and discussion, Section 5 contains conclusion and future work of research paper.

II. RELATED WORK

2.1 Study of Base Paper:

Paul Chiliguano et al. In[1] proposed a Hybrid music recommender to diminish the issue of cold-start problem in

the strategy of recommendation. Author used CNN and Content Based Mining. Requirement of labelled data is more in CNN and labelling of much amount of data is very costly and consume time.

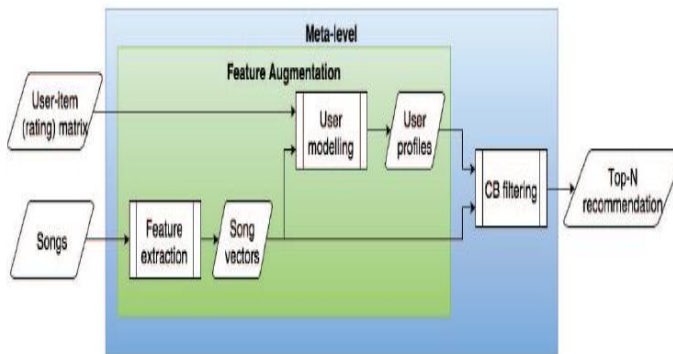


Figure 2. Hybrid Music Recommender

Milind Mathur et al. In[2] propose a new method for training a CNN, with no need for labelled instances. Their method for unsupervised feature learning is then successfully applied to a challenging object recognition task. Selective Convolutional Neural Network (S-CNN) is a simple and fast algorithm, it introduces a new way to do unsupervised feature learning, and it provides discriminative features which generalize well.

Bahram Amini et. al. In[3] proposed a Recommender system which consist user profile and filtering techniques for user preference and relevant information from large volume data. User input plays a very important role in crawling of relevant data and more appropriate suggestions. This paper proposes a comprehensive literature review of recommender systems. It also observes the literature and examines the impression of knowledge extracted from different sources. In the literature, personalization systems are classified in different ways. Some researchers have categorized them based on decision modeling or utility functions.

Jyotsna Chanda et. al. [4] discussed about different types of hypertext documents available on the Internet. Accessing relevant information and serving useful information to the user from the Internet has become a complex and expensive task. To make this process simpler, one of the widely used recommendation systems is item based collaborative filtering recommendation system which predicts web pages based on the browsing activity of the user on the Internet and recommends web pages as per their interests.

III. METHODOLOGY

Problem faced in the existing work is as :

1. Content Based Recommendations are best way for content mining but lack with issue of cold start problem.
2. Cold start often occurs to a new user because there is not enough rating record of the user.
3. Newly released albums or music have little chance to be recommended.
4. Inadequate knowledge of search tool and large amount of data gives poor performance to retrieve or extract desire information.

The proposed recommendation system adopt the concept of content-based filtering and K means clustering for getting the relevant content. The proposed model will consider a music data as the input and generate artist recommendation based on proposed solution.

Hybrid approach is used which is the combination of content-based filtering and K-mean clustering, where content-based filtering is resulted with TF-IDF approach. Content-based filtering works on the basis of content where, user interest and prediction is important for music recommended on the basis of searched music by user or on the basis of searched history. Whereas, K-mean is used to cluster similar pitch and tracks of music and on its basis music artist are also clustered.

Labelling thousands or millions of training examples can be extremely time consuming and costly. Cold start problem explains the issue of first search, problem arises when we used to search first time and it takes time to load data. Solution presents a hybrid music recommender to mitigate the cold-start problem in recommendation strategies using K-mean clustering algorithm and Content Based Filtering. Cold start problem comes with labeling data and this happens in existing work, but in this paper we are not using any labeling data nor working on it. We used K-mean clustering algorithm, which forms cluster of relevant items on the basis of distance and reduces this issue of cold start problem.

3.1 System Architecture:

Here, User preference will be section selection or keyword to be searched into music content and item will be songs.

The proposed model will consider a music data as the input and generate artist recommendation based on proposed solution. Then this original dataset is achieved through the proposed Data Mining Model where techniques applied are content-based filtering using K-mean clustering algorithm which have strong capability to handle unlabeled and labeled data with small training dataset. After this it starts recommending.

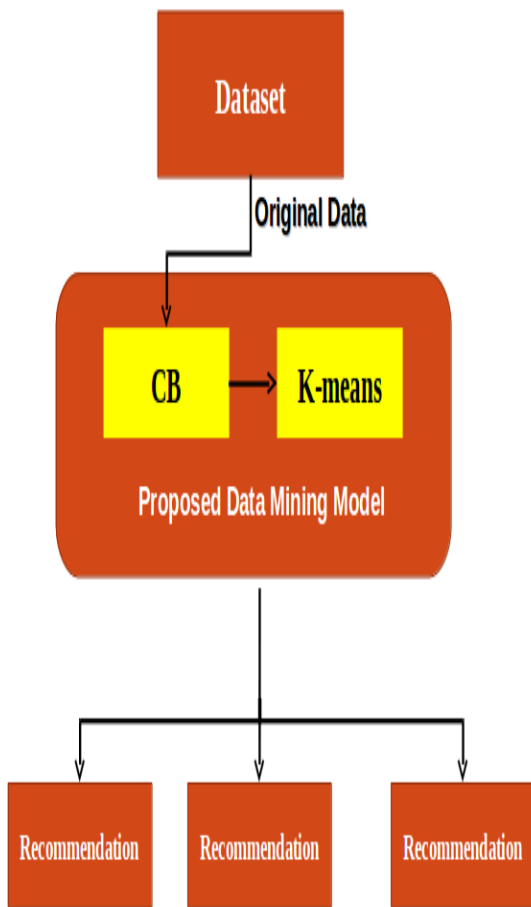


Figure 3. System Architecture

K-mean clustering algorithm is proposed, which clusters the pieces of relevant items in the music list with dynamic adaption of interest and search of particular user. After it a piece of music on the basis of cluster formed is recommended. Also, on the basis of preferences properties of music from user's list is checked to analyse better recommendation. K-mean clustering algorithm serves piece of music from the music list by analysing user's preference. Algorithm is evaluated in this paper to recommend music.

K-mean algorithm is used in this paper which is an unsupervised learning algorithm used to solve issues of clustering. K is the number of clusters which is given in K-mean in advance. What type of music did user like is not known, he/she can prefer any kind of music.

IV. RESULTS AND DISCUSSION

On the basis of preference score of each user is calculated and cluster is formed, piece of music is recommended. Each cluster contains the sum of scores of music.

Result analysis shows the analysis made in this paper by collecting some dataset. Result shown in below shows three figures for three different singers.

In below graph we evaluate the result on the basis of words which is used in the songs. Here firstly we take a single word like Dil and evaluate Precision, recall ,F-score and make the graph on the basis of those value .Similarly take two words ,three words, four words and five words and evaluate the values and make the graph which is shown in below graph.

Figure 4.1, where graph plotted is shown for singer: Ankit Tiwari on the basis of words and these words are differ in numbers.

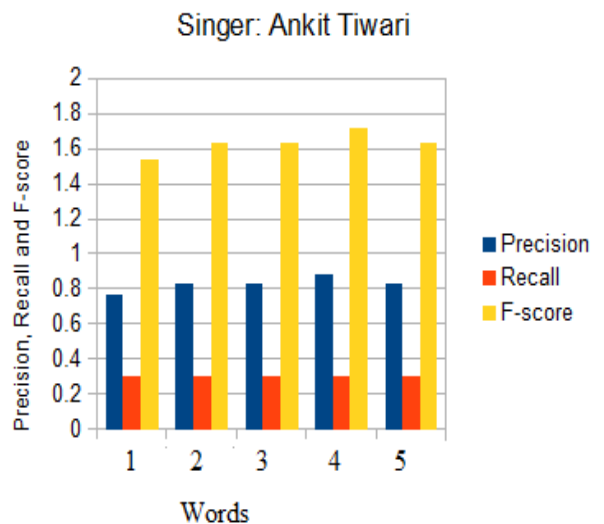


Figure 4.1: Graph representation for Ankit Tiwari

Figure 4.2, where graph plotted is shown for singer: Rahat Fateh Ali Khan on the basis of words and these words are differ in numbers.

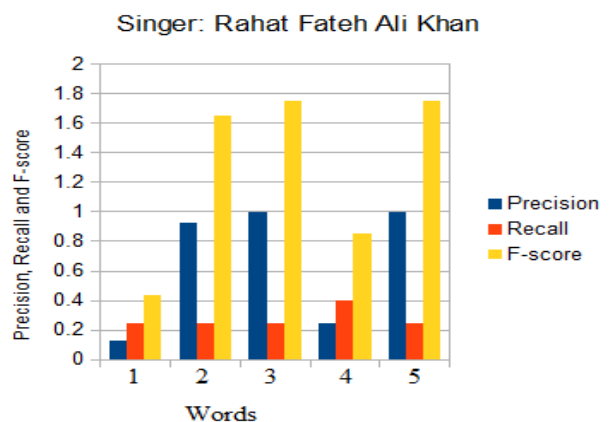


Figure 4.2: Graph representation for Rahat Fateh Ali Khan

Figure 4.3, where graph plotted is shown for singer: Lata Mangeshkar on the basis of words and these words are differ in numbers.

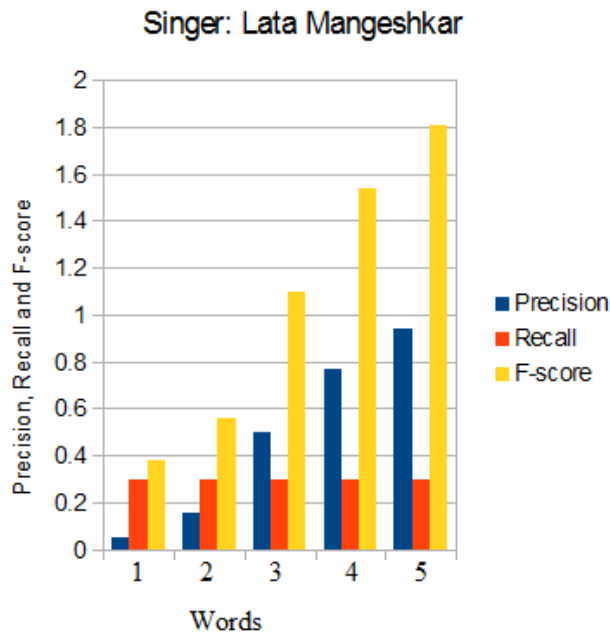


Figure 4.3: Graph representation for Lata Mangeshkar

For many of the different singers and for many different words more results can be plotted.

V. CONCLUSION AND FUTURE SCOPE

The complete work concludes hybrid recommendation system based on K-mean and Content-based filtering algorithm to overcome issue of cold start problem. Proposed solution will be evaluated on basis of computation time, accuracy, precision and recall.

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Authors Profile

Karishma Mandloi was born in Madhya Pradesh in 1994. She graduated in Computer Science from Rajiv Gandhi Proudyogiki Vishwavidyalaya, University of Bhopal, Madhya Pradesh, India in 2016. She is currently pursuing Master of Engineering from Institute of Engineering and Technology, DAVV INDORE.



Amit Kumar Mittal Professor at iet davv Indore M.P Subjects Currently Teaching: Information Retrieval, Machine Learning, Speech & Language Processing, Internet Computing, Soft Computing, Genetic Algorithm. Subjects Previously Taught: Internet Computing; Multimedia Computing; Discrete Structures; Database Management; Neural Network; Object Oriented Programming; C++. Research/Publication:



1. Paper Published in UGC Approved International Journals of Advanced Research of Computer Science (IJARCS), Vol.8 issue 5 20 June 2017 "Segregation of waste Using IOT".
2. Paper Published in International Journal of Advanced Research in Computer and communication Engineering (IJARCCE) Journal, Volume 5 Issue 3 March, 2016 on "A Comparative Study of Chatbots and Humans".
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