# Recommendation System for Music File

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*Abstract—* **Recommender systems are mostly implemented in E-commerce website to help users or customers for finding those items which are liked by them. A recommender system should be so efficient that it should provide data for customers which interest them. The recommendation system provides an innovative recommendation for music data that combines two important aspects that are the interactive genetic algorithm and the content based filtering technique. The recommendation system tries to analyse data used by users and recommends those items which might interest the users or customers. This system provides recommendation depending on user profile. Today there is an increase number of users turning into computation recommender systems. With increasing number of customers and websites system aims to support everyday process of recommendation.**

*Keywords—* **Recommender System, User's preference, Music Extraction, Interactive genetic algorithm, Content based filtering, Cross Over.**

## I. INTRODUCTION

The recommender system is a system which is used to generate a collection of products or item which will interest a particular person. Suggestions of electronic items on flipkart, or movies on Netflix, or books on amazon are some of the real world examples of recommendation system. This system is mostly implemented in E-commerce website to help user or customer for finding what they are looking for or items those might interest them. These systems have the ability to change with respect to change in user's preferences.

This system first extract the music properties like pitch, cord and tempo using a software tool know as CLAM. This data in different items are compared with the past that are liked by user and then other similar items are recommended, stored on the database so that, later using this data the system can recommend items which interest user.

### I.1 What is Recommendation System?

Recommendation System can be defined as the type of information filtering system that is used to recommend the products like books, CDs available at different websites which might interest user.

Recommendation system for music data is proposed for helping users in searching music data and also recommends music data which interest users.

There are 2 ways in which recommendation system can be implemented, those ways are:

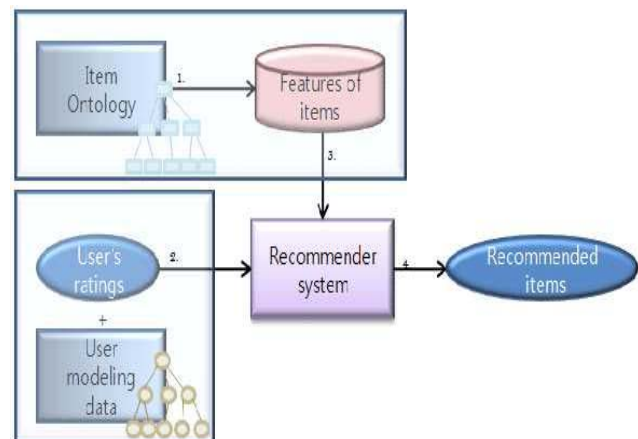- Collaboration filtering
- Content Based Filtering.



Figure 1: A recommendation System

### A. What is Content based filtering.

Content based filtering also referred as cognitive filtering. In this type of filtering, items are recommended based on comparisons between items and user profiles.
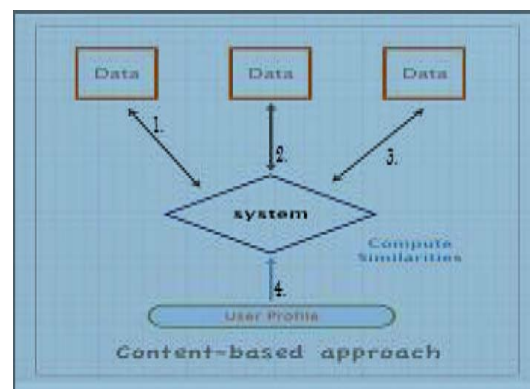


Figure 2: Content based Filtering

Main objective of content based filtering is to learn user's actions regarding one product and use them across different product.

### B. What is Collaboration Filtering?

Collaboration Filtering is most successful recommendation technique. The base idea of the Collaboration Filtering is to recommend items based on the opinion of other people. Applications for collaborative filtering involve very large amount of data.

It recommends items for a user which depends on the items rated previously by same mind set.

## II. RELATED WORK

### A. *Recommendation System – Content based And Collaboration Filtering*

The work that is proposed by other authors like M.Chau and H. Chen S. Pollock and Brain also useful in various in filtering the content based on certain analysis and some rule based systems.

Some systems allows OSN users to have a direct control on the messages posted on users walls. This is achieved by using flexible rule-based system, that allows users to change the filtering criteria for their walls, and a Machine Learning-based soft classifier automatically labelling messages in support of content-based filtering.

Personalized E-Learning system using item response theory. It recommends appropriate course material to students, taking into consideration course difficulty and ability of students. With this system, students can select different category of course and search particular course using keywords .after this items are recommended to students and they have browsed through, the system asks them to answer two questionnaires. This feedback is used by our system to re-evaluate the students' abilities and adjust the course material difficulty used in the recommendation.

### B. *Music Extraction.*

For every music file there are some properties like chord, pitch and tempo. These properties are used by the recommendation system for comparing different type of music before recommending it. In our system, analysis is an important step. We are using CLAM software as a tool to extract these features and provide system with some value.

### C. Interactive Genetic Algorithm.

Basic idea behind the Genetic Algorithm (GA) is to find solution for the search problems using techniques like genetic inheritance, natural selection, mutation, and reproduction. The evolutionary process of GA is simplified version of biological version. It starts from randomly generated population depending upon some probability distribution which is usually uniform and updates this population in steps and this step is called generation . Multiples of individuals are randomly selected with each generation breeding using cross over and are modified during mutation to create new population.

Iterative genetic algorithm is also an optimization method as genetic algorithm. In IGA, however, the fitness values of candidate solutions are based on the evaluations of users according to their own preferences. Our proposed system uses IGA to recognize user favourite's science the user can judge the fitness value of each solution. Thus the user preferences can be detected and traced.

Genetic algorithms (GAs) are general purpose search algorithms which use principles inspired by natural evolution process. Genetic populations to evolve solutions to the problems (Holland, 1975; Goldberg, 1989a). The basic idea is to maintain a population of chromosomes that represent candidate solutions to the concrete problems, this evolves in further time through a process of competition and controlled variation. Each chromosome has an associated fitness to determine which chromosomes are used to form new ones in the competition process, which is called selection. The new born are created using genetic operators such as crossover and mutation. It is found that GAs has had a great measure of success in search optimization problems. The reason for the great part of its success is the ability to exploit the information accumulated about an initially unknown search space in order to bias subsequent searches into useful subspaces, i.e., their adaptation. This is found to be their feature, particularly in complex and poorly understood search spaces where classical search tools (enumerative, heuristic) are inappropriate. Thus offering a valid approach to the problems that require efficient and effective search techniques.

## III. MYTHOLOGY

Genetic algorithms (GAs) are general purpose search algorithms which use principles inspired by natural genetic populations to evolve solutions to the problems.
Genetic Algorithm Procedure:

  i. First select the initial population of individuals.
 ii. Evaluate the fitness of each individual in given population.
iii. Repeat this generation till end limit (time limit, sufficient fitness achieved, etc.).
 iv. Select the best-fit individuals for the reproduction.
  v. Breed new individuals using crossover and mutation operations for giving birth to new offspring.
 vi. Evaluate the individual fitness of the new individuals.
vii. Replace least-fit population with the new individuals.

- Crossover – exchange of genetic material substrings denoting rules, structural components, features of a machine learning, search, or optimization problem.
- Selection – to choose each individual according to the fitness criterion from a population that will continue to reproduce
- Replication – the propagation of individuals from one generation to the next
- Mutation – the modification of chromosomes.

## IV. PHASES OF GENETIC ALGORITHM IN RECOMMENDER SYSTEM:
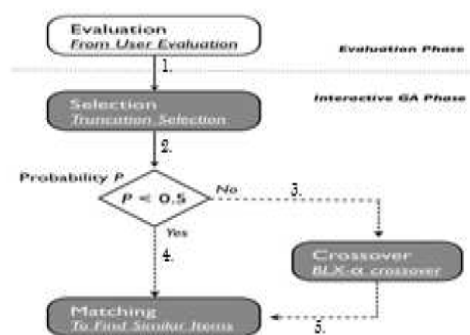


Fig 3: Process of interactive GA phase

1. Selection phase – Music features are extracted using the CLAM software. Items having nearly same values are selected.
2. Crossover phase – The BLX – alpha crossover algorithm is used since extracted features are real numbers. Thus crossover is performed with this algorithm resulting in new generation.

BLX-a:
Input:

1. Select 2 parents X(t) and Y(t) from a parent pool
2. Create two offspring X(t+1) and Y(t+1) as follows:
3. for i = 1 to n do
4. di=|xi(t)-yi(t)|
5. Choose a uniform random real number v from
6. interval <min(xi(t),yi(t))-adi,
7. max(xi(t),yi(t))+adi>
8. xi(t+1)=v
9. Choose a uniform random real number v from
10. interval
11. <min(xi(t),yi(t))-adi, max(xi(t),yi(t))+adi>
12. yi(t+1)=v
13. end do
14. where: a – positive real parameter

Output:

- To give users with useful information which might interest them.
- System recommends products appropriate to user depend on there favourite.
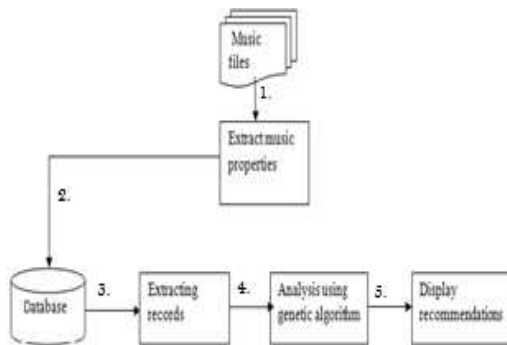
A. Data Flow Architecture :



Fig 4: The flow of the system.

## V. THE EXPERIMENT AND RESULTS

This section describes the implementation of our system. In this system total of 200 music files were used and there properties were extracted by using CLAM software.

## VI. IMPLEMENTATION

The recommended system incorporates with this given system, which is implemented in java Servlet page, the information accumulated in the previous step. After this build a website provides essential information such as artist name and song title; User can rate their preferences about each music data by choosing the corresponding icon. The ratings are represented by a scale from 0 to 100, each time a user evaluates a page 10 times. The initial page is randomly chosen and the successive pages are constructed based on the user's evaluation of the preceding ones. In order to help user's evaluation, it provides a function that enables user to listen to the music tracks which they are not familiar with.

## VII. CONCLUSION

We propose a real time recommendation system using genetic algorithm in order to overcome existing recommendation techniques that are not use to reflect current user detail. Each time new solution is generated when optimal solution is given during run time. This method can be compared with existing one to see the difference.

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