

# Application of Genetic Algorithm for Audio Search with Recommender System

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**Abstract** - Web-based systems are nowadays popular in many different areas, with the users tend to deliver customized information by means of utilization of recommendation methods. The recommendation techniques are collaborative, content-base and by means of genetic algorithm are used in existing systems. They recommend user those items which are based on history and are designed to allow users to locate the preferable items quickly and to avoid the possible information overloads. In this paper, we presented a recommender system for audio files. This system can identify the n-number of user's preferences and adaptively recommends music tracks according to user preferences.

**Keywords:** *Recommender System, Genetic Algorithm, CLAM Tool.*

## 1. INTRODUCTION

Genetic Algorithms are adaptive heuristic search algorithms based on evolutionary ideas of natural selection and genetics. As such they represent an intelligent exploitation of random search used to solve optimization problems. Although randomized they exploit historical information to direct the search into the region for better information [2].

*Crossover*—exchange of genetic material (substrings) denoting rules, structural components, features of a machine learning, search, or optimization problem. *Selection*—the application of the fitness criterion to choose which individuals from a population will go on to reproduce.

*Replication*—the propagation of individuals from one generation to the next.

*Mutation*—the modification of chromosomes

A Recommender system for music data is proposed which assists customers in searching music data and provides result with items resulting in own user preference. This system first extracts unique properties of music like pitch, chord, and tempo from the music file using a CLAM annotator software tool. This extracted data is then stored on the database [4]. Recommendation Systems forms a specific type of information filtering technique that attempts to present

information items. (Like movies, music, books, images, etc.) Typically, a recommendation system compares the user's profile to some reference characteristics, and seeks to predict the 'rating'. These characteristics may be from the information item or data [1]. Each stored property is analysed using content based filtering and interactive genetic algorithm. After acquiring records, the system recommends items appropriate to user's own favourite.

## 2. LITERATURE REVIEW

Recommender systems are changing from novelties used by a few E-commerce sites to serious business tools that are reshaping the world of Ecommerce.

Many of the largest commerce Websites are already using recommender systems to help their customers find products to purchase. A recommender system learns from a customer and recommends products that she will find most valuable from among the available products [3]. Recommender systems are used by E-commerce sites to suggest products to their customers. The products can be recommended based on the top overall sellers on a site, based on the demographics of the customer, or based on an analysis of the past buying behavior of the customer as a prediction for future buying behavior. Broadly, these techniques are part of personalization on a site, because they help the site adapt itself to each customer. The ability of promptly responding to the changes in user's preference is an asset for such systems. An innovative recommender system for music data that combines two methodologies, the content based filtering and interactive genetic algorithm. The system aims to effectively adapt and respond to immediate changes in user's preferences.

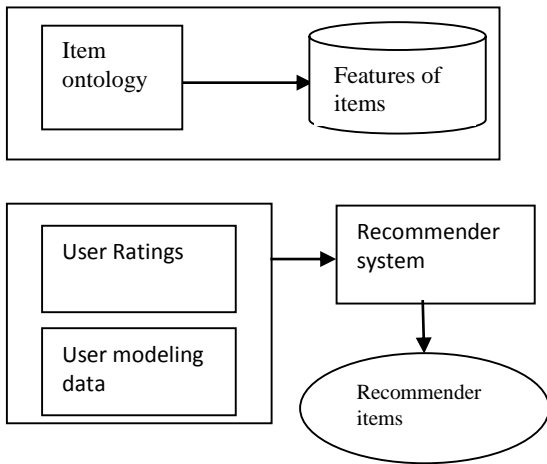


Fig.1 Block Diagram

3. METHODOLOGY

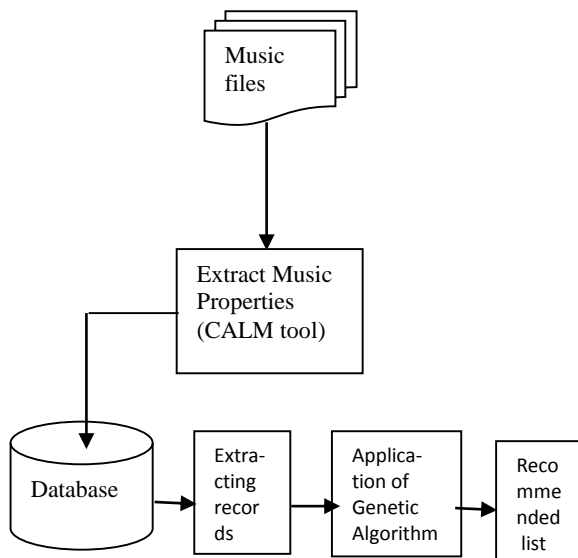


Fig.2 System Module

The modules are as follows:

A. Storing Music files

This project aims to recommend music items to the user based on user preference. The first step is to store mp3 audio files in database and use those files in clam tool. Around 300 mp3 files are stored onto the database. Each file is the given to calm music annotator tool to extract the music features like pitch, tempo, chord, root, octave. These features of each music files are then stored back to the database.

B. Use of clam tool

Clam annotator tool- CLAM framework and can be used to manually edit any previously computed audio descriptors. The application offers a convenient GUI that allows editing low-level frame descriptors, global descriptors of any kind and segmentation marks. It is designed in such a way that the interface adapts itself to a user-defined schema, offering possibilities to a large range of applications.

C. Extracting records

The clam software is provided with music files one by one low level and high level descriptors are computed. After computation, pool file is created which describes and stores the features of each file. The clam software gives output as XML file. This file is parsed and low level descriptors like pitch, tempo, octave, and root are extracted from the xml file and stored in the database.

D. Genetic algorithm

The evolutionary process of a GA is a highly simplified and stylized simulation of the biological version. It starts from a population of individuals randomly generated per some probability distribution, usually uniform and updates this population in steps called generations. Each generation, multiple individuals are randomly selected from the current population based upon some application of fitness, bred using crossover, and modified through mutation to form a new population

E. Recommended items

The final step after applying genetic algorithm is displaying the items that are closest to the items which the user has given the highest rating. Using Euclidean distance formula, the nearest possible music features which are matching with the one generated by crossover step of genetic algorithm are matched and given as out for recommended items.

4. DISCUSSION

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. To help user's evaluation, it provides a function that enables user to listen to the music tracks which they are not familiar with.

5. CONCLUSION

In this paper, we proposed real-time genetic recommendation method to overcome the existing recommendation techniques are not reflect the current user's intend. With the genetic algorithm, newer solutions can be generated providing optimal solution each time when the algorithm is made to run, thus providing mutations. This method can be compared with the existing ones which lack the quality of providing accurate results. With the genetic algorithm, newer solutions can be generated providing optimal solution each time when the algorithm is made to run, thus providing mutations. This method can be compared with the existing ones which lack the quality of providing accurate results. Different collaborative filtering techniques have been proposed to decrease the processing time and the data latency. The results from different recommendation systems indicate that collaborative filtering techniques afford the systems enough ability to provide recommendations to users This is because EM approaches perform better when the probability space is more complete.

The accuracy of the prediction performed by hierarchical approaches may also be affected since the recommended items would be too general due to the lack of detailed categorizations. By combining social and content-based music recommendation algorithms, music an approach to decrease online computational time is to allow recommendation systems perform the clustering offline. Local search is useful to for solving pure optimization problems, in which the goal is to find the best state per an objective function.

#### 6. FUTURE SCOPE

Genetic algorithm is applied to audio search recommender system. Normal system is not capable to solve this issue as we must go through the vast data. So, our system proposes the best method which goes through the process of selection, ranking, crossover and mutation to obtain the best outcome for recommendation of audios according to users choice. In this system, we are going to apply the genetic algorithm for the data of 1000 audio clips of different types which will be generated to users according to their choice of audios and provides the robustness to the large amount of data. This method of optimization can be applied to the large amount of data to get the recommendation of songs. The proposed method is a robust method which finds the solution for almost any size of audios (1000 node) for any possible music constraint. Any new audio constraint required by the application can be easily added without changing the other functions. The proposed method also provides multiple parallel solutions which helps in fetching the best choice for users type. Finally, the proposed audio search recommender system method based on genetic algorithm has potential to achieve better results for any size of network. Altogether, these are some interesting research challenges for the near future. We can also use this algorithm for the ecommerce site of music where a user can create his own id and can search for the song of his type and later own he will be automatically recommended with the audios of his choice. We can also develop the android application for mobiles.

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