

Detecto – A Music Search Engine

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Abstract: Music plays an important role in every person's in life. Music is a common way of expressing emotions. This paper conveys our proposed system Detecto using music detection. Detecto is a mobile phone based music recognition application that takes a short sample of the music and identifies the song. The service provided by this application will take a sample of music recorded and finds the matching track. In this paper we are describing about the usage of audio fingerprinting algorithm in our application. Though this is a very complex process which involves higher mathematical knowledge, in this paper we have discussed this technology with a basic point of view. The different aspects covered here are the primary process of extracting, storing and matching the fingerprints to identify songs. These processes in a flow are also given. This algorithm is certainly not very new, it is used, tested and testified for its efficiency and robustness. Some of the existing applications similar to the proposed one and their functions are also discussed in this paper.

Keywords: Music Recognition; Audio Sample; Audio Fingerprinting; Fingerprints; Hashing; Matching; Extraction; Database.

I. INTRODUCTION

Music is an essential aspect in human's life. Most of the people are very much fond of music and do listen to music in their life through different medium. People are found to listen to music every now then if not always.

Music is a very broad term, as it has a very wide range. Music, for laymen, can be slow music or loud music. But, basically music has many genres in it. People come across different kinds of music and want to know about the music they liked. The different genres of music are ranging from traditional rock music to world pop, bluegrass, electronic music, trance, classical music and country music. Music can also be referred to as a short instrumental piece, jingles, songs etc. Here, in this paper we are referring to songs.

Detecto is a song identification android application which provides service that could connect people to music by recognizing the music in the environment by using their mobile phones to detect the music directly.

The key point is it uses Algorithm that recognize short audio sample of music that has been broadcast ,mixed with heavy ambient noise, subject to reverb and other processing, captured by small cell phone's microphone subjected to voice codec compression, and network dropouts, all before arriving at our servers.[4]

The algorithm is noise and distortion resistant, computationally efficient, and massively scalable, capable of quickly identifying a short segment of music captured through a cell phone microphone in the presence of foreground voices and other dominant noise, and through voice codec compression, out of a database of many tracks. [4]

II. LITERATURE SURVEY

A. Origin of concept:

Recognizing and identifying information from known music is not new, but identifying the music from unknown environment is a new concept. This process is based on fingerprinting which is new idea. [2]

B. Fingerprinting:

Fingerprinting does a not mean human fingerprints but fingerprint is identifying audio from small audio sample [2]. The process of fingerprinting is to extract a small fingerprint from audio sample and compute it with the pre-computed

fingerprints in the huge database [6]. It is a method which allows to link short snippet audio content and match to corresponding data/information of that content. This process has many applications and are adopted based on its process [3].

C. Audio detection using fingerprinting:

Each audio file is “fingerprinted,” a process in which reproducible hash tokens are extracted. Both “database” and “sample” audio files are subjected to the same analysis. [4] The fingerprints from the unknown sample are matched against a large set of fingerprints derived from the music database. [4] The candidate matches are subsequently evaluated for correctness of match. [4] Some guiding principles for the attributes to use as fingerprints are that they should be temporally localized, translation-invariant, robust, and sufficiently entropic. [4]

Audio fingerprints are extracted from small audio samples of very small duration length. [2] This extracted fingerprint are then compared to the audio samples that are been known to the application and stored in the database. [2] The audio fingerprints are mapped with the large set of the fingerprint derived from the database. [2]

The audio fingerprints of the segments do not necessarily have to be of high quality to be a match. [2] Distortions and interference of the original signal makes matching of the fingerprints less reliable, but to a certain extent, it will still be recognizable. The distortions and interferences can be compared to a smudged or partial human fingerprint. [2]

Identifying music from unknown environment is an unique technique but leaves out some major key points which allows the application to the fault such as noise in the environment ,the volume of the audio sample(a very minute or slow volume may result failure in extraction of audio sample). [2]

D. Existing System Examples:

□ musiXmatch

musiXmatch is a searchable lyrics catalogue of more than 7 million lyrics in 38 languages. [8]

This application provides the lyrics for the music user or the people wants to. [8]

The process is it reads all the music file which is there in one’s cell phone or music player and find all the lyrics for the possible music track in their music library and provide the user with the set of lyrics. [8]

1. Select the music library [8]
2. Read the music library from the cell phone or music player [8]
3. Find all possible lyrics for the music tracks and provide to user [8]

□ Shazam

Shazam is a multi-platform application which is supported by iOS, Android, Windows etc. It is a song detection application which provides user with set of information of particular music by using an appropriate algorithm. [7]

Following are the features offer by Shazam:

1. Share your music with your friends on Facebook and Twitter. [7]
2. Tag the songs and can be recorded in user’s playlist. [7]
3. Discover new artist through identifying the music. [7]
4. Allows user to create its own search list history. [7]

III. PROPOSED SYSTEM

The proposed model is able to extract the audio music sample from the environment and extract the sample and detects the music and allow the user to know which music is been played which he/she is willing to know .

The working of the system is it takes audio signal i.e., music as an input it extracts a small sample of the audio from the actual audio provided by the user.

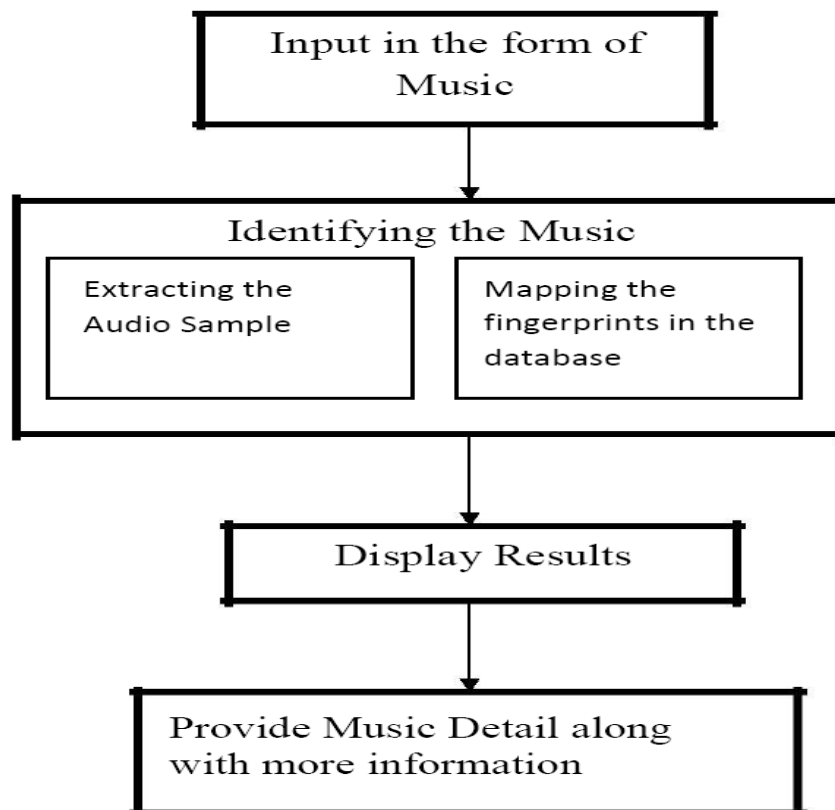


Fig. 1- Flow of Detecto – Music search engine

We then find the match of the audio fingerprint from the sample which are been recorded or derived in the application's database. As the match is found the result is acquired and the user is responded back with the meaningful and correct result with a list of information provided related to the given music sample. [3]

A. Audio Extraction:

This is the first step from applications side is to extract the audio sample provided by the user Extraction does not mean extracting the whole music given by the user as it may be time consuming and the application needs only a sample that is fingerprint. [3] Fingerprint is the small sample of the actual audio played by the user.[2]

The audio samples are of 30-35 seconds and to take the fingerprint of the audio signal of just 10seconds is enough for further processing from applications point of view. [2]

B. Mapping of fingerprints:

To perform a search of above fingerprints the application has to perform on a captured sample sound file to generate set of hash: time offset record [4]. This hash are then used to make match with the hashes which are stored in the database. All the hashes of the audio signal are matched with the hash present in database. After scanning all the hashes of the fingerprints in the database, if all the matches are found in the database of the fingerprint samples the audio sample [4].

In some case if we do not find enough match of the hash then the maximum matched audio signal is been provided as a result . in worst case sometimes if none of the hashes are been able to get matched to the fingerprint sample derived in the database then it may not give out the expected results.

C. Displaying and providing the result:

After detecting the audio from the applications database the expected result is drawn out and given to user .the result is in the form of providing the name of the audio followed by the information of the audio such as the album it belongs to, the artists, lyrics of the audio and the other related information in the form of success screen provided by the application to the user who participated in the process

D. Technologies to be used:

For development of this Intelligent music player one will require Android Software Development Kit and to execute it Mobile phone or tablet with Android Operating system and RAM of minimum 290 MB size.

IV. CONCLUSION

Recognizing music remains a challenging problem. In the past 5 years, the performance of automated music recognition systems using a wide range has advanced significantly.

Most of the media players provide music library and option to select or search the song but it becomes increasingly exhaustive task for searching a piece of music

Our system comes handy in such situation. System allows the user to search and detect any music which is playing around his/her environment which they are willing to know. This application allows user get to know about more music which they don't know and increase their playlist choice.

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