Music Recognition using Audio Fingerprinting

Dolly Gadiya[1] Divyam Saraf[2] Dinki Popli[3] Mrs. Deepika Jain[4] Ms. Kavita Namdev[5]
[1,2,3]Student [4]Assistant Professor [5]Sr. Assistant Professor
[1,2,3,4,5]Department of Computer Science and Engineering
[1,2,3,4,5]Acropolis Institute of Technology & Research Indore, India

Abstract— The purpose of this application is to present a detailed description of the song playing in the background. The related ecosystem that this project will be implemented to are anticipated to and should have a large number and variety of users, all of whom will be incorporated in to the project need such 5 system to find whatever it is they need. From another point of view, there might be users that don't exactly know what they are looking for and such situations can also make a useful solution out of this project. At a basic level, the Program will interrupt an audio signal as a spectrogram, and compare that representation with spectrograms contained within a database. Some of these spectrograms will implement its own different signal, which holds its own set of information. Through such a process, one could find and retrieve additional information for a pair of matching spectrograms, thereby tagging the audio file which the spectrogram represents with the appropriate metadata. In order to fully comprehend the entire process, there are a few terms and concepts that must be described in more detail.

Keywords: Music Recognition using Audio Fingerprinting

I. INTRODUCTION

A. Background

Mobile applications, refers to mobile device operating software systems. These applications are rapidly evolving and make the accessibility of ubiquitous information a true reality at anytime and anywhere. People usually spend 3040 seconds identifying music so there should be something to entertain or open your app not only to find the name of the song they are listening to. Development plays a very important role in these applications, because it is one of the reasons that encourage consumers to use your software. People recognize sound not by comparing every bit we hear to a memorized version, but by recognizing specific chords in succession which trigger our memory. Computers can only simpy compare data and have no way to identify patterns implicitly as easy

B. Aim & Objective

The ultimate goal of the project is the final program that carries o ut the automatic tagging, but it is not entirely what the project wil l be studying. More focus should be paid to the actual process behind the scenes that results in a properly tagged paper. In other words, the project's purpose is solely to research different audio matching techniques and to use the best of the techniques studied to automatically identify MP3 files with their proper metadata.

C. Motivation

The technology's original vision was to enable someone to use their mobile phone to identify the playing of ambient music at any place. We thought that if we could encourage people to identify music, this would become the point of entry for a vast number of thing s people could then do with the music that influenced them. We believed there was a period of musical inspiration we called "the moment,"

When a piece of music moved someone and there was no way to take action at that moment even if you knew that the song affected a small niche of digital media users. However, more and more studies show that the majority of users are suffering from problems in managing overabundance communication both at work and in their personal lives.

II. LITERATURE SURVEY

A. Related Work

An technological strength algorithm for audio scanning. Music recogniton has been used to recognise songs more than fifty billion times since it began in 1999, and that's not even counting Shazam's IDs, Sound hound, Music ID, and other sound recognition devices. It is easy from a user's perspective: start the app, click a button and let your phone listen to the song. After a few seconds, the app will tell you what the song is, even with a background noise and distortion. It works so quickly and so well that it almost seems like sorcery but, as with most amazing stuff these days, it's actually run by algorithms.

The app is noise and distortion resistant, computationally demanding and massively flexible, capable of quickly assessing a short segment of music captured in the presence of a cellphone microphone foreground voices and other strong noise, and through voice file format, from a database of more than a million songs.

B. Problem Statement

This description of question was so complex that, with the following constraints, the algorithm had to correctly identify the music samples.

- Mixed sample with heavy ambient noise.
- Samples which are subject to reverberation and processing.
- A little cellphone microphone needed to capture samples.
- Samples subject to compression by voice codec.
- Network dropouts before it reaches its servers.

III. SYSTEM

A. Approach

As technological advances becomes more and more fundamental to everything we do, it can sometimes divert us from the things that matter most to one another .Audio fingerprinting is a solid domain, even with large commercial success as This application , which provides accurate, fast and efficiency.

B. Architecture

1) Connectivity Diagram

A connectivity diagram is a graphical view of a scenario that describe the tasks of objects and help provide important information to assess class obligations and interface.

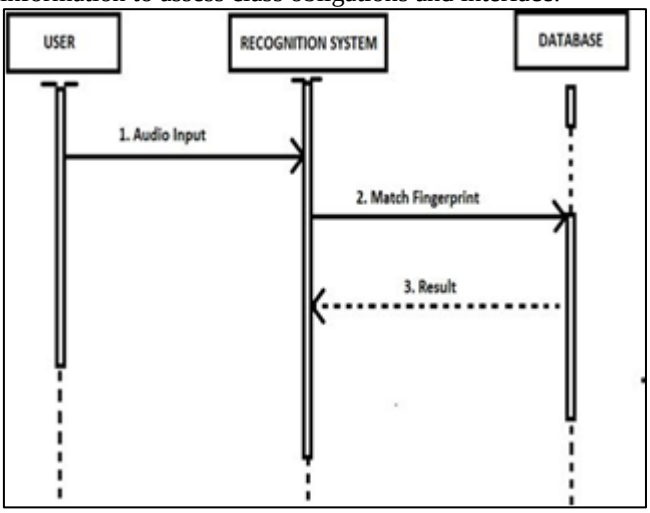

Fig. 1: Connectivity diagram

C. Basic Steps

1) Step 1: User will connect from mobile phone.
2) Step 2: Android device will send request.
3) Step 3: Device will get connect to server side.
4) Step 4: It will make a fingerprint using frequencies.
5) Step 5: Using fingerprint, it will match to databases.
6) Step 6: Server will then gives result to client.

D. Scenarios

1) Normal Scenario

The server will start listening request from the client in normal scenario. The Client must send the connection request to the Server for link establishment. Once the link has been created, Client will have the song information they want.

E. Project Plan

1) Analysis:

Analyzing the signal in the frequency domain simplifies a lot of things. It is more convenient in the world of digital signal processing because the engineer can study the spectrum and determine which frequencies are present, and which are missing.

IV. LITERATURE REVIEW

This software application identifies tracks based on an audio fingerprint defined on a time frequency graph called a spectrogram. It uses a smartphone or a computer built in microphone to collect a short sample of the audio being played. It stores an audio fingerprint catalog in a database.

The user tags a song for 10 seconds and creates an audio finger print for the application. It works by analyzing the sound captured and searching for an acoustic fingerprint match in a song database. If a match is found, it sends information such as the artist, the title of the song, and the album back to the user.

V. METHODOLOGY

- We have defined in this paper the goals, motivation and justification of the application.
- Review of the entire research process is achieved by describing the extensive work and usefulness of the research work carried out.
- Explains the numerous findings obtained after the project has been fully implemented and also draws conclusions from the research outlined in previous chapters and explores possibilities for future growth.
- We have provided references. Each section is an exhaustive list of the cited articles and academic papers during report preparation.

A. Process:

1) Step 1. Music recognition uses the microphone of a smartphone or device to capture a short sample of music that is being played. If the sound is vague, there is noisy noise or people are talking, that's not a concern. The principal part will be defined by music recognition.
2) Step 2. Music recognition produces a sample-based acoustic fingerprint and matches it for a match against a central Music recognition database.
3) Step 3. When it finds a match it sends back to the user details like the artist, song title, and track. Song recognition also includes direct links to iTunes, Spotify, YouTube to purchase, listen or read more about the album.

The audio fingerprinting and matching algorithm must be reliable in order to still identify the distorted audio sample as the same audio material that is stored in the fingerprint database. The audio signal is translated from the time domain to the frequency domain, where it is filtered and converted. The audio fingerprints are then extracted to be matched with similarly examined music files in the audio fingerprint database. Once a match occurs, the corresponding song information would be returned to the user and displayed.

A robust acoustic fingerprint algorithm needs to take into account the audio's perceptual properties. When two files sound similar to the human ear, their acoustic fingerprints will fit, even though they have very different binary representations. Acoustic fingerprints are not bitwise fingerprints and need to be prone to any minor data changes. Acoustic fingerprints are more natural equivalent One can consider the case of a smeared human fingerprint impression that can be reliably compared in a reference database to another fingerprint sample; acoustic fingerprints work in a similar way.

B. Testing:

Tests are carried out at the module level where the main functionality is tested and then work towards the integration of the entire system.

C. Output

1) ServerSide:

The server side output will give us the frequency printout and crea te a hash table accordingly. The frequency matches the hash table will then give the client a result from the databases.

2) Client Side:
This is the Client Side where we can see that there are some buttons that are used to connect the server and send details to the server there are some text boxes that contain some information on how to connect and send details to the server.

VI. RESULT

Results from this research paper shows that even an easy implementation without incorporating any more significant changes can still perform to a high level, and an accuracy rate of 84.15 percent is very impressive. Considering the design of the music recognition device, of course, The scale on which it is measured is fairly low, meaning that accuracy levels could vary on the basis of various variables, such as the ratio of audio files present in the database to non-audio files, the number of files in general, the similarity of spectrogram level files, etc., which could influence the results in any direction. The application is successfully built and had been tested on various android platforms.

VII. APPLICATION

- Major applications of the music recognition app are that when someone is too curious to learn about songs, music composers and writers can also check copyright issues using the music recognition app.
- It detects music by matching the audio fingerprint of a user-supplied recording with fingerprints of identified songs from its database.
- An audio fingerprint is a series of samples of a song with hash tags, or signatures. They calculate which frequencies are the strongest in each sample.
- The algorithm distills samples of a song into fingerprints and matches those fingerprints against fingerprints from known songs, taking their timing relative to each other within a song into consideration.

VIII. CONCLUSION

We have given a preview of the audio-fingerprinting study. Additionally a variety of applications were addressed that can benefit from audio fingerprinting technology. Generally, an audio fingerprinting device consists of two components: an algorithm to produce fingerprints from recordings, and an algorithm to scan for a similar fingerprint in a fingerprint database. While different researchers have taken different approaches, we have shown that the proposals fit more or less in a general context. In this case, the extraction of fingerprints involves a front end where the audio is separated into frames, and a variety of discriminative and robust features are extracted from each frame. Subsequently, a fingerprint modeling system transforms these features into a fingerprint which further compacts the representation of the fingerprints. According to some similarity test the searching algorithm seeks the best matching fingerprint in a large repository. To speed up the discovery process and avoid a sequential data base scan, strategies are used to remove fingerprints which do not fit easily. A number of the audio fingerprinting algorithms addressed are currently being commercially implemented, which shows the substantial progress made in this field of research. In the quest for more lightweight, reliable and discriminative fingerprints and powerful search algorithms there is scope for development, of course.

REFERENCES

[1] Avery Li-Chun Wang and JuliusO. Smith, III., WIPO publicationWO02/11123A2,7 february2002,(Priority 31July2000).
[2] http://www.musiwave.com
[3] JaapHaitsma, Antonius Kalker, Constant Baggen, and Job Oostveen., WIPO publication WO02/065782A1, 22 August 2002, (Priority 12February,2001).
[4] Jaap Haitsma, Antonius Kalker, "A Highly Robust Audio Fingerprinting System", International Symposium on Music Information Retrieval (ISMIR) 2002,pp.107-115.
[5] Neuros Audio web site: http://www.neurosaudio.com/Sean Ward and Isaac Richards, WIPO publication WO 02/073520A1, 19 September 2002, (Priority13March2001)
[6] Audible Magic website: http://www.audiblemagic.com/

