

A IoT Model for Examining and Mining the Relationship between Music and Emotion

Yogesh Prabhakar Pingle

Assistant Professor

Department of Information Technology

Vidyavardhini's College of Engineering & Technology, Vasai, Maharashtra, India

Abstract— In the classification of Indian aesthetics, there are nine emotions called 'nava rasa' and it also includes the aesthetic evaluations of three cultural groups based on Indian classical audio stimuli. Predicting that cultural and learning issues are essential to the musical experience, the Indian classical music carries intrinsic stimulus features such as moods and emotions in virtue of the way its musical notes are arranged. An IOT model for understanding the relation between music and emotions is based on three level descriptions such as the biological processes of the brain, the conceptual mapping of the experience and the first person account of the appreciation of music experience. The idea of imposing the Indian classical music might have the power to invoke in the listener its intrinsic affective properties, even if the listener might not be aware of such influence. IOT is a concept in which machine interact with the human world. This interaction is possible due to sensors. We would try to observe the effect of music on the person with the help of graph and data received from the sensors.

Key words: IoT Model, Relationship between Music and Emotion

I. INTRODUCTION

Of all the problems that may confront a music psychologist, none is perhaps more important than to explain listeners' reactions to music. Some kind of musical experience is the basis for every musical activity, regardless of whether it involves composing, performing, or listening to music. Several studies have suggested that the most common goal of musical experiences is to influence emotions: People use music to change emotions, to release emotions, to match their current emotion, to enjoy or comfort them, and to relieve stress.

Yet, music's apparent ability to induce strong emotions is a mystery that has fascinated both experts and lay people at least since ancient Greece. To explain how music can induce emotions in listeners is all the more important since music is already used in several applications in society that presume its effectiveness in inducing emotions, such as film music, marketing, and therapy.

Research indicates that people value music primarily because of the emotions it evokes. Yet, the notion of musical emotions remains controversial, and researchers have so far been unable to offer a satisfactory account of such emotions. We argue that the study of musical emotions has suffered from a neglect of underlying mechanisms. Specifically, researchers have studied musical emotions without regard to how they were evoked, or have assumed that the emotions must be based on the "default" mechanism for emotion induction, a cognitive appraisal. Here, we present a novel theoretical framework featuring change in facial expressions or mood after listening to music.

We propose that these expressions or mood differ in every individual regarding such characteristics as their information focus, key brain regions, cultural impact, and dependence on musical structure. By synthesizing theory and findings from different domains, we are able to provide a framework representing the relationship between music and emotions.

Music is an important element to a person's emotions. Hence Music helps us in identifying the person's mood at the moment. Using the right music, the emotions of the person can be altered. Music comprises of different pitches and tempos. So our solution approach would be to alter music and make people listen to the music and analyze their response.

The idea of this project is to claim how music can cause a distinct and recognizable behavioral and physiological pattern in different individual listeners.

The paper illustrates about the current research on the linkage between music and emotions, discusses their relationship as well as whether or not the emotions expressed by a piece of music evoke arousal of the same emotion in the different individual listener.

This paper will outline the psychological relationship between human effect and music. It draws upon and has significant implications for such areas as philosophy, musicology and aesthetics, as well the act of musical composition and performance.

Before making the database, we conducted a small experiment among us. We listened to 10 different songs and note down our individual emotion for that song. We concluded that music can evoke different emotion in different listeners.

Now, after making the database, we are going to make individual users listen to a song and match it with the database. In this way, if the user is a patient of stress-issues or any such medical conditions, we can be able to detect it with our match and provide a therapy or give recommendation for the same.

II. REVIEW OF LITERATURE

Music psychology research shows us that non-knowledgeable listeners respond emotionally to music as do music performers, both during playing and during listening to music. But how can these experiences be described? Is it accurate to state that 'musical emotions' are experienced? Researchers discuss if it is legitimate to state that feelings experienced in relation to music are actual emotional states.

For many lay people, these descriptions are their idea of what music therapy is all about. Many people have read about the 'Mozart Effect' and a music therapist is often pictured in non-medical journals as being an equivalent of 'a healthcare deejay'. There are, however, many disciplines involved in the study of the effects of music on the listener. It is the music psychologist who looks at effects of music in the general listener, e.g. what emotions can be induced by music in the listener? Cognitive theory studies how music is perceived and how cognitive schemata are activated when listening to music. How does our brain react to music? The music therapist uses music as a therapeutic medium with a variety of different client populations in yet another discipline.

The traditional way to approach this concept was by capturing the emotions or moods of the audience that changes through the particular ragas in a musical performance or even 'Natya - Shastra'.

III. SOLUTION APPROACH

The following diagram shows the solution approach in which the steps are given to get the desired results.

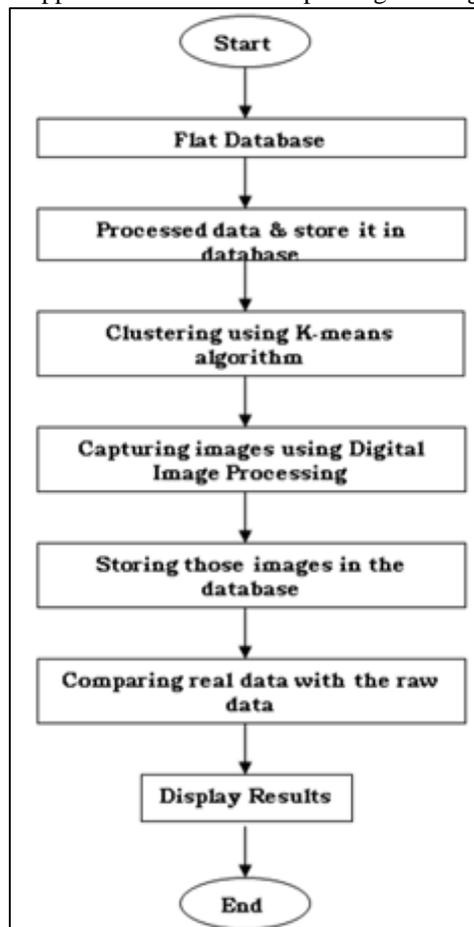


Fig. 1: Basic flowchart of solution approach

A. K – means Clustering Algorithm:

K-means clustering is the most common partitioning algorithm. K-Means re-assigns each record in the dataset to only one of the new clusters formed. A record or data point is assigned to the nearest cluster (the cluster which it is most similar to) using a measure of distance or similarity.

IV. COMMUNICATION TECHNOLOGIES

To transfer the data from Arduino to server or cloud we need use MQTT protocol i.e. Message Queuing Telemetry Protocol. This protocol is the device to server (D2S) communication protocol i.e. in our context it is sensor to cloud communication protocol. It is internet of things connectivity protocol. It is very much in use for connections where network bandwidth is limited. It has been used in small device scenarios. Therefore it has selected this protocol for our project. Eclipse Paho version

is used which provides open source client implementation of MQTT. This version of eclipse contains all inbuilt functions required for Arduino as well as functions for using MQTT.

The module uses AT commands for sending data to the data platform. These commands are used to connect to the access point i.e. Wi-Fi router. Some of these AT commands are as follows:

- AT+RST: Reset the module.
- AT+CWJAP: Join a access point
- AT+CIPSTART: set up TCP or UDP connection
- AT+CIPSEND: send data

After connecting to the access point, we would connect to the data platform, Thingspeak.

V. BUSINESS INTELLIGENCE

In our project we would use the data platform to analyze the data received from the Wi-Fi module. This platform would be used for visualization of data. The data platform is able to receive the data after 15 seconds of delay. The data platform can store the data for few years. This data can be accessed at any time.

The data platform can be used to find out types of emotions of the input data. The analyzed data can be used to select music according to the algorithm. The algorithm would analyze according to the types of emotions of the individual user.

This data would be used to select a music using an http request from the music database. This music would be sent to the user's account and he/she would listen to the music. This data can be accessed and analyzed when required.

VI. RESULTS

Song No.	Song Name	Expression/Mood (Neha)	Expression/Mood (Hemal)	Expression/Mood (Alqamar)
1	Badtameez Dil	Excitement	Excitement	Happiness
2	Tum Hi Ho	Romantic	Romantic	Romantic
3	Main Tumko Nahi Chodungi	Excitement	Angry	Angry
4	Pyaar Kar	Romantic	Happiness	Happiness
5	Awari	Sadness	Sadness	Sadness
6	Chikni Chameli	Excitement	Excitement	Disgust
7	Mera Rang De	Patriotic	Patriotic	Patriotic
8	Deva Shree Ganesha	Devotion	Devotion	Excitement
9	Johnnu Johnny	Excitement	Excitement	Excitement
10	Maine Khud Ko	Romantic	Romantic	Romantic

Table 1: Results on Experiments of 10 songs

VII. CONCLUSION AND FURTHER WORK

Internet of things is an upcoming technology and it might boon after a few years. So the use of IOT in our daily life will increase the standard of living. IOT would be used to control almost all devices. Also, music is being applied to reduce the stress of human being. Depending on the emotions, music is listened.

Thus we tried to observe the effect of music on the person with the help of graph and data received from the sensors. We conclude that music evokes emotions through mechanisms that are not unique to music, and that the study of musical emotions could benefit the emotion field as a whole by providing novel paradigms for emotion induction.

Medical researchers could track the person's health and prescribe music to the person. It would simplify the method of diagnosing a person's health without personal attending particular individual. This would in turn increase the number of doctor available for other people.

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