

## MUSIC PREDICTION BASED ON EMOTION USING MACHINE LEARNING

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**Abstract :** A variety of circumstances, including job pressure, emotional issues, catastrophe, violence, and so on, cause people to experience stress on a daily basis. Stress deteriorates asthma, cerebral pains, tension, coronary illness, misery, Alzheimer's disease, and different dangers to one's physical and emotional wellness. Music treatment can assist with peopling track down a good overall arrangement between their psychological and actual wellbeing. Music therapy is a form of therapy in which music is used to meet a person or group's emotional, physical, and mental needs. We needed to construct music order and expectation for music treatment utilizing the Random Forest machine learning procedure. People's age, education level, interest in music, preferences for individual and therapist-specific music, and relaxation scales before and after music therapy are all taken into account in this study. This classification achieves an accuracy performance of approximately 89, as indicated by our research, and it identifies the main factors involved in music prediction for music therapy.

**Index Terms :** *Music therapy, random forest, and machine learning*

### 1. INTRODUCTION

This project is called "Music Prediction and Music Therapy for Random Forest." Therapy is one type of treatment that aims to improve a person's mental and physical health. Music listening is a common habit that can improve mood and stimulate different parts of the brain. The study of how music affects health is the focus of the field of music therapy. Music treatment is additionally a loosening up technique that assists individuals with managing pressure and medical conditions brought about by pressure, similar to heart disease, sadness, nervousness, headaches, and others. Although the value and popularity of music therapy are well-established, it is unclear which kinds of music produce which benefits and how the therapist selects music for treatment. The project's primary objective is to understand people's despair; We are able to comprehend the user's emotions thanks to this research. People's stress levels are significantly reduced in their lives when they listen to music. Music has been used to treat chronic illnesses like Alzheimer's and dementia. We can use this to identify the source of the user's sadness, connect with it, and suggest the best music for

their rehabilitation.



Fig 1 Example Figure

Notwithstanding the way that we have various music applications for unwinding here, we expect the mind-set utilizing their facial acknowledgment. The fact that we are able to predict the user's stress level based on their facial expression is the most important aspect of this study. The music will be played naturally founded on the client's face demeanor. The result is displayed on the command prompt and captured as a picture of the user's



expression. The user's feelings, such as joy, sadness, rage, and so on, are included in the output. The output is used to play music. Python and HTML code are used to create our music page. Following the execution of the code, the music website will go live. It's easy to use. A phone app for both Android and iOS smartphones could be developed from this.

## 2. LITERATURE SURVEY

### **Machine learning techniques to predict the effectiveness of music therapy: A randomized controlled trial**

Foundation The exploration shows that paying attention to music is valuable, yet it's not satisfactory which angles and sorts of music assist with treatment or how music advisors could pick music. We depict a review that distinguished the essential indicators of music listening's quieting impacts utilizing ML methods. Techniques 22 solid workers were uniformly dispersed regarding age, level of training, melodic experience, and orientation. They each focused on music for nine minutes. ( either to the music they like or to music made by a calculation). Utilizing a visual analogue scale (VAS), unwinding levels were estimated both when the listening meeting. Individuals were then placed into three social occasions considering their level of loosening up: expanded, diminished, or continued as before A decision tree was made to expect the impact that paying attention to music has on unwinding. Results A choice tree with a 0.79 in general exactness was made. The construction of the choice tree shed light on the absolute most significant variables for anticipating the effect of music tuning in, including the degree of unwinding toward the start, the mix of schooling and melodic preparation, age, and recurrence of music tuning in. Ends Prescient elements that impact remedial music listening results can be distinguished through the decision tree and investigation of this interpretable model. It is proposed that the utilization of ML procedures as a fundamental and imaginative strategy for helping music treatment practice since restorative music listening is exceptionally abstract.

### **Modeling Music Emotion Judgments Using**

### **Machine Learning Methods**

Feeling appraisals and five channels of physiological information were assembled from 60 people who paid attention to 60 music pieces. A few machine learning (ML) procedures, including neural networks, linear regression, and random forests, were used to address feeling evaluations. Models of how an individual feels were fed by audio elements from music recordings. Models of perceived emotion were based on physiological characteristics gleaned from physiological recordings. With the traditional music emotion debate between cognitivists and emotivists in mind, models were trained and interpreted. Emotion judgments were influenced by both observed and felt emotions, according to our models, which suggested a hybrid viewpoint. Neural networks produced models that were adaptable and interpretable, making them the best of the various ML methods used for modeling. Assessments of excitement were fundamentally impacted by felt feeling, while valence decisions were basically impacted by seen feeling, as per an assessment of a council machine that incorporated an organization gathering.

### **From emotion perception to emotion experience: Emotions evoked by pictures and classical music**

Most of past neurophysiological examinations utilized obvious signs to evoke feelings. Models of the inclination circuits in the cerebrum have to a great extent disregarded the feelings evoked by melodic boosts. This is, supposedly, the primary feeling cerebrum study to inspect what visual and hear-able information sources mean for mind handling. High-invigorating pictures from the Global Emotional Picture Framework and old style sound concentrates were decided to inspire the three essential sensations of satisfaction, misery, and dread. For 70 seconds, the different close to home improvement modalities were introduced in an offset irregular request, either without anyone else or in blend (compatible). 30 scalp terminals from 24 sound female workers were utilized to quantify EEG Alpha-Power-Thickness, which is conversely connected with cerebral electrical



movement. Also, psychometrical appraisals, breath, temperature, skin conductance responses (SCR), and heart rate (HR) were recorded. As per the discoveries, the accomplished nature of the feelings that were conveyed was most elevated in the mix settings, halfway in the picture circumstances, and least in the sound circumstances. Psychometric appraisals and physiological association measurements (SCR, HR, and breath) were additionally altogether higher in blend and sound circumstances than in picture conditions. At last, a rehashed measures ANOVA uncovered that the consolidated circumstances had the most elevated enactment in a disseminated feeling and excitement network made out of front facing, worldly, parietal, and occipital brain structures, while the sound circumstances had the most noteworthy Alpha-Power-Thickness, the image conditions were transitional, and the joined circumstances had the least. Taking everything into account, our discoveries show that full of feeling symbolism prompted feelings might be essentially improved by music.

### **Neural Networks for Pattern Recognition**

For people who are just starting out in the field of artificial neural networks, there has been a pressing need for an authoritative textbook that teaches the major concepts in a straightforward and consistent manner using the fundamental tools of linear algebra, calculus, and elementary probability theory. There have been a number of attempts to make such a text available, but none of them have been successful. Some authors haven't been able to tell the difference between the fundamental ideas and principles and the soft and hazy intuitions that lead to some models and most overstated claims. Others have been reluctant to employ the fundamental mathematical abilities necessary for a comprehensive understanding of the material. On the other hand, some people have tried to cover too many different kinds of neural networks without really understanding any of them. "Introduction to the Theory of Neural Computation" by Hertz, Krogh, and Palmer has been the most successful effort to date. Sadly, the

book started out as a graduate course in statistical physics, and the results are obvious. Consequently, despite its numerous positive aspects, it is inappropriate as a general textbook. Diocesan is a top scientist who has a careful perception of the subject and has gone to impressive torments to place it in a coherent request. In order to concentrate on the kinds of neural networks that are utilized in the majority of practical applications, he skillfully resisted the urge to include everything by excluding exciting topics like reinforcement learning, Hopfield networks, and Boltzmann machines. He uses these tools from the very beginning because he assumes that the reader has the fundamental mathematical literacy required for an undergraduate science degree. Before presenting the multilayer perceptron, for instance, he establishes a solid foundation of fundamental statistical principles. Consequently, the crucial concept of overfitting is first presented with straightforward one-dimensional polynomial examples before being applied to neural networks. The fact that this book takes the reader from the most fundamental linear models to the most advanced Bayesian multilayer neural networks without requiring any significant conceptual leaps makes it an amazing book.

### **The Use of Spatio-Temporal Connectionist Models in Psychological Studies of Musical Emotions**

An imaginative strategy for examining the elements of close to home reactions to music is portrayed in this article. A PC concentrate on utilizes spatiotemporal brain organizations to "imitate" the profound reactions that individuals need to music and to guess how they will respond to startling music groupings. As per the discoveries, abstract feeling evaluations are upheld by emotional components that reverberate with spatiotemporal examples of sound. energy and valence). A critical part of the audience's personal reaction can be anticipated by an assortment of six psychoacoustic properties of sound: uproar, rhythm, surface, mean pitch, pitch variety, and sharpness. We can determine the contribution of an assortment of psychoacoustic factors, like beat

and din, in the close to home evaluation of music by directing a thorough examination of the qualities and elements of the organization. This study adds new data and bits of knowledge to the investigation of melodic feelings, which is especially significant for the local area of scientists concentrating on music insight and perception.

### 3. METHODOLOGY

a system for movie recommendations based on collaboration and filtering. Collaborative filtering uses information from all users to make suggestions. A hybrid system that combines content-based and collaborative approaches has been described. Both conventional approaches to recommendation have been looked at. Another system that combines a collaborative methodology with a Bayesian network was presented due to the shortcomings of both of these systems. Prior to the recommendation system, individuals would physically select movies from movie libraries to watch. They had to choose a movie at random or read user reviews and pick a movie based on them. Negative aspects: low forecast accuracy; procedures that cost a lot and aren't affordable for everyone. The system must be constructed effectively to overcome all of these constraints and increase accuracy.

By recommending movies based on the preferences of the user, our objective is to reduce human labor. We developed a method that combines a content-based and collaborative approach to address these issues. When contrasted with different frameworks that utilization a substance based approach, it will give more unequivocal outcomes. Content-based suggestion frameworks are restricted to people; Your options for further investigation are limited because these systems do not provide predefined recommendations. We have therefore focused on creating a system that addresses these issues.

Benefits: The system is simple to set up and use. The system works in almost every setting and uses very few system resources. The following are some of its characteristics:

- Accurately beneficial for mental and physical well-being.

- Reduce development, consumption, and upkeep expenses.
- The user does not want to select songs by hand. A playlist doesn't need to be there.
- The user does not want to classify the music according to how it affects them.

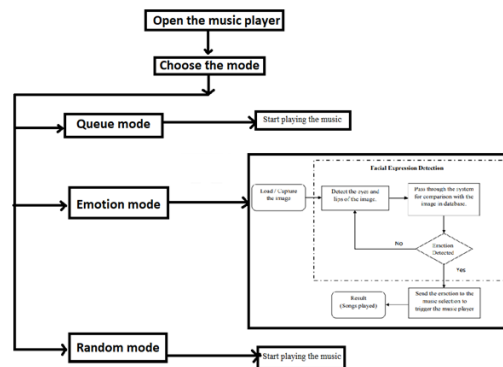


Fig 2 Proposed Architecture

From input to final prediction, this project architecture shows how machine learning is used to predict music.

We are presented with a webpage that contains a collection of tracks as well as three distinct modes for playing songs when we access the music player html website. They come in three varieties: There are three modes: emotional, random, and queue. We begin by taking a picture of the user's face with a camera and examining it for data base toragematch because we are dealing with the user's emotions. The music will be played in accordance with the user's emotion if it is accessible.

### 4. EXPERIMENTAL RESULTS

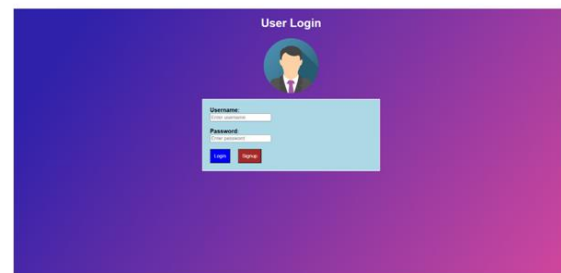


Fig 3 Output Screen



Fig 4 Output Screen

## 5. CONCLUSION

A music categorization and prediction system for music therapy was presented in this study. Personal circumstances and therapist goals influence music categorization, which is the focus of the analysis of music therapy. By highlighting significant characteristics, this article also discusses a comparative study on the role of features in system performance. The random forest strategy is more valuable since it tends to be utilized for characterization and relapse simultaneously. The calculation was precise in a decent manner. In addition, the significance of music therapy and how it may benefit mental and physical health are the subject of this study. This classification can be used by music therapists to select music that will assist them in achieving their therapeutic objectives and enhancing people's psychological well-being. Numerous machine learning algorithms for prediction may be utilized to enhance this study after a number of parameters, including age category, gender, education level, and current mood state, have been identified. New capabilities for need-based prediction could be added.

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