Music Recommendation through Facial Expression using ML

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Abstract — *Facial expression is one of the most difficult and highly convoluted procedures that have been undertaken in the image processing paradigm. Facial expression can be used for other purposes such as recognizing a person's mood as humans convey most of their emotions through their facial expressions. Identification of a person's mood is one of the most useful implementations as it can be used in various applications to improve the quality of life for an individual. Therefore, for this purpose, there has been an extensive analysis of the related works in this survey article for the purpose of reaching our approach for song recommendation through the mood analysis of the individual. Our prescribed approach utilizes convolutional neural networks along with fuzzy classification for effective song recommendation. This approach will be expanded in future research articles on this topic.*

Keywords: **Convolutional Neural Networks, Fuzzy Classification.**

1. INTRODUCTION

The process of facial expression is a complex interaction of the muscle and the muscle fibers in the face of human beings. This can be explained physiologically through the use of various medical terms and other related procedures. But it is a lot more complex and is primarily utilized by humans as a means of communication. With humans, a lot of communication and conversation is through language and the use of facial expressions. Most of the gestures in the facial expressions convey a lot of the information pertaining to what is being said by the individual. Therefore it is an integral part of communication and social dynamics that play a very large role in the overall wellbeing of a particular individual.

Humans are highly social animals and this is what differentiates us from the other species that are living on this planet. Humans have Complex interactions that are very useful for the mental and physical health of the individuals and the group of individuals at the same time. Humans are highly adept at recognizing human faces through the use of their brains that are designed to identify faces efficiently. Faces from the majority of the gestures that are used by human beings for the purpose of effective and insightful communication and interaction.

The facial expressions alone can be highly useful for the purpose of determining the purpose and the meaning of the conversation. This approach is not as developed in the electronic systems as they are unable to differentiate a face or a facial image from any other image. This is due to the fact that the computer regards the image as a collection of pixel values rather than identifying the objects in the image. This thought process is entirely different from how humans evaluate and generate an understanding of the outer world and other individuals

Therefore there is a need for an effective system that can utilize facial features to determine the expression along with what it conveys. In human beings, a lot of facial expressions are connected to what the individual wants to express or is feeling at that time. This is provided as a marker for other humans to effectively identify and interact with this individual using these facial expressions as a cue for the emotions being experienced. Therefore the facial expressions need to be identified and can be effectively used for the purpose of determining the mood of the individual with surprising accuracy.

There have been multiple types of research that have been performed on this approach for the purpose of extracting the mood of an individual through the use of facial images. These techniques have been analyzed for their role in image processing and machine learning applications for the purpose of deploying our methodology. This analysis of these approaches has been significant in achieving the design of our approach which will be expanded further in the future.

This literature survey paper dedicates section 2 for analysis of past work as a literature survey, and finally,

section 3 concludes the paper with traces of future enhancement.

2. RELATED WORKS

A. Cernian states the behavior of a person can be determined by personality and temperament. The mood of the person is depended on his emotions. [1] Daniel Schacter defines emotions as positive or negative experiences that are directly linked with psychological activity. Thus the proposed paper proposes a mood detector application to detect the mood and emotional state of the person by using pulse, skin electro conductivity, and temperature parameters. The machine learning algorithms were tested and validated till it provides the correct output. The application also recommends the music to the person according to his or her mood.

K. Lam describes emotions is one of the important factors for identifying the mood of the person. A mood disorder is a mental illness one of the serious chronic behavioral illness where the person cannot control their behavior. [2] The main reason for mental illness is depression and mania. People suffering from depression may lose interest in life. Thus the proposed paper author came with a solution by developing SmartMood, a system of mood tracking and analysis system for patients suffering from this mania.

T. Yuan states to provide suggestions to people on large-scale recommendation systems are designed for the many scenarios due to a huge number of data is available on the internet. In recent years there have been many recommendation systems designed but there is a problem such as inaccurate recommendations for users. [3] Thus the proposed paper develops a mood-sensitivity application by using user-based collaborative filtering (UCF) for the accurate reliability of the recommendations. By analyzing user comments MS identifies the mood of the person then the UCF is used to detect the target users.

W. Yang presents LAMF (Lighting Adjustment for Mood by Food) system which is an RFID based lighting control system and food ordering system in restaurants. [4] The lighting of the system is depended on which menu is ordered. This communication is done by using RFID (Radio Frequency Identification) it is one of the cheapest so it can be widely used for the recognition methods and also provides efficiency and accuracy. Thus proposed system automatizes food order and mood-associated lighting control by using RFID technology.

A. Baharum presents DeMuse as a music mood application because listening to music can reduce stress. This application can identify the music and mood categories. In different moods, people listen to different types of music.[5] The personal Feelings Survey (PFS) questionnaire method was created by Bob Barrios-Choplin and Mike Atkinson to study the state of mental behavior and mood. Thus the music is one of the options to change the mood of the people or make his mind calm thus to maintain the positive mood of the people from stressful situations music is the best option.

A. Ujlambkar narrates that a lot of research has been made in the field of music mood recognition systems in recent years. In the proposed system the author develops classification algorithms for representing the mood of audio songs. [6] The data generated by the system is to learn, train and test for future study and it will be helpful for identifying the mood and also for recommending the song. Thus by using the classification tree techniques the proposed system recognizing the music mood. The proposed paper provides satisfactory performance.

S. Nimeshika categorizes the mood as happy, sad, calm, and angry and these mood swings are frequently changed during the day. [7] Some people daily share their activities and feeling on social media. Thus in the proposed paper, the researcher uses their social media contents to identify their current mood. This social media content can be images, text, and emoticons too. Emoticon classification and the text classification with Convolution Neural Network is used for the survey. Thus the accuracy of the proposed paper is 85%.

R. Hossain Md states music industry are inducing various songs with various languages on the different platform in day to day to life. [8] Every song has its music and its lyrics which are joyed by the people. Thus this lyric is the most powerful part of any song. In the proposed paper the author provides the title song based on its lyric. Thus they applied Latent Dirichlet Allocation (LDA) to find the secret topic of the song. The proposed system is implemented on the 200 English songs.

Kuang Mao expresses singing is one of the popular to express the feeling to one's feelings and it is a popular social activity. Many times the singer fails to select a suitable song and gives an unsuccessful singing performance. Thus the author presents a novel competence-based song recommendation system singing purpose where the music best music is recommended [9]. The system gets a singer's vocal competence as a singer profile which takes the pitch, intensity, and quality of voice of the singer then a learning-to-rank scheme is developed for recommending songs for the singer.

C. Dhahri focuses on music recommendation by using the emotion of the person and this can help to improve the mood of the users. In the past few years, many music recommendation services have been developed but they rely

on the user's input to generate recommendations [10]. Thus the proposed paper develops an autonomous and adaptive framework that is dependent on the user's moods. The Reinforcement Learning (RL) framework and Page-Hinkley (PH) are used to personalize the song according to the user's mood and the song is extracted from the online available data.

G. Zhao narrates in this world of the digital era personalized recommendation system is considered as one of the effective techniques to solve the consumer product overload problem [11]. The main approach of the proposed system is to plan problems, namely, reason generation for the application and to overcome the problem such as a lack of training data for creating conversational reasons in song recommendation technique. Thus the proposed paper shows the effectiveness of the proposed method and improves the click-through rate substantially. Thus the dataset is created which consist of song, user tag, and reason triplets.

Caroline Langensiepen defines that majority of the recommender systems are reliant on the process of grading the songs based on the score or the ratings given by the users. This causes the recommender system to determine highly similar or inaccurate recommendations as songs for the user. This is highly unacceptable as the size of the dataset is extremely large that leads to a number of collisions. To ameliorate this effect the authors in this approach have utilized the Principal Component Analysis along with the K-Means clustering algorithm to achieve effective and useful song recommendation.

3. CONCLUSION AND FUTURE SCOPE

The paradigm of song recommendation through the use of mood identification by facial expression evaluation has been served in this article. Machine learning algorithms are highly useful for the implementation of such a process effectively. For the effective realization of this approach, a number of research articles on this topic have been studied and expanded in this literature survey paper. The researches evaluated in this article have been instrumental in attaining our methodology for mood recognition through machine learning techniques. These approaches have been effective in the implementation of machine learning in our methodology which implements skin detection along with convolutional neural networks and fuzzy classification to identify the mood of the user. The identified mood is then utilized for performing a song recommendation appropriate for the person's mood. This approach will be further discussed in detail in the next research article.

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