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A Survey on Emotion Based Music Player through Face Recognition System

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***Abstract:** This research constructs a face emotion framework that can examine fundamental human facial expression. The approach suggested was used by humans to classify the humans' mood and eventually to play the audio file that links to human emotion using this result. First of all, the device takes the face of the human being as a part of the process. It is carried out facial recognition. After this, the human face can be recognized using attribute extraction techniques. This way the emotion of humans can be identified using the image element. Those signature points are located by the extraction of tongue, mouth and eyebrows, eyebrow. If the input face precisely matches the emotion dataset face, we will detect individual feelings to play the emotional audio file. Training with a small range of characteristics faces can gain recognition in varying environmental conditions. An easy, effective and reliable solution is proposed. In the field of identification and detection, system plays a very important part.*
***Keywords:** Face Detection, Feature Extraction, Face Emotion.*

I. INTRODUCTION

One of the most interesting areas of human computer interaction is face detection and identification. Distinguishing facial features are comparatively low and it is most interesting task to observe these. Detection and identification face objects from face is a challenging task.

Finding a human emotion using human's face which can be one of the most challenging assignments you will handle in your career. A face is the best way to detect and recognize a human. No recognition algorithms will work without face detection step. Rate of detection affects the recognition stage. With all these noise is a very intriguing task to detect and localize an unknown non-face from still image.

Mood detection based on emotion is the one of the current topic in the various fields which provides solution to various challenges. Beside traditional challenges in captured facial images under uncontrolled settings such as varying poses, different lighting and expressions for face recognition and different sound frequencies for emotion recognition. For the any face and mood detection system database is the most important part for the comparison of the face features and sound Mel frequency components. For database creation features of the face are calculated and these features are store in the database. This database is then use for the evaluation of the face and emotion by using different algorithms.

Face emotion detection applications is still a challenging task since face images may be affected by changes in the scene, such as pose variation, face expression, or illumination. The main goal to this system is to find the human mood with the help face image as input and after that using these emotion results to play the audio file.

II. BACKGROUND

Emotional aspects have more impact on Social intelligence like communication understanding, decision making and also helps in understanding behavioral attitude of human. Emotion play important role during communication. Emotion recognition is implemented out in diverse way; it may be verbal or non-verbal. Voice (Audible) is verbal way of communication & Facial expression, action, body postures and gesture is non-verbal form of communication.

Human can recognize emotions without any meaningful delay and effort but recognition of facial expression by machine is a big challenge.

III. RELATED WORK

The work presents the study of various famous and unique techniques used for facial feature extraction and emotion classification. Various algorithms of facial expressions research are compared over the performance parameters like recognition accuracy, number of emotions found, Database used for experimentation, classifier used etc [1].

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This work proposes a system that will automatically identify the facial expression from the face image and classify emotions for final decision. The system uses a simplified technique called `Viola Jones Face Detection' technique for face localization. The different feature vectors are club together using a subset feature selection technique to improve the performance of recognition and classification process. Finally the combined features are trained and classified using SVM, Random Forest and KNN classifier technique [2].

This work proposes technique use three steps face detection using Haar cascade, features extraction using Active shape Model (ASM) and Adaboost classifier technique for classification of five emotions anger, disgust, happiness, neutral and surprise [3].

In this work implement an efficient technique to create face and emotion feature database and then this will be used for face and emotion recognition of the person. For detecting face from the input image we are using Viola-Jones face detection technique and to evaluate the face and emotion detection KNN classifier technique is used [4].

This paper objective is to display needs and applications of facial expression recognition. Between Verbal & Non-Verbal form of communication facial expression is form of non-verbal connection but it plays pivotal role. It expresses human related or filling & his or her mental situation [5].

In this system it is attention on the human face for recognizing expression. Many techniques are available to recognize the face image. This technique can be adapted to real time system very easily. The system briefly displays the schemes of capturing the image from web cam, detecting the face, processing the image to recognize few results [6].

In this work, adopt the recently introduced SIFT flow technique to register every frame with respect to an Avatar reference face model. Then, an iterative technique is used not only to super-resolve the EAI representation for each video and the Avatar reference, but also to improve the recognition performance. Also extract the features from EAIs using both Local Binary Pattern (LBP) technique and Local Phase Quantization (LPQ) technique [7].

In this study, a frame of emotion recognition system is developed, including face detection, feature extraction and facial expression classification. In part of face detection, a skin detection process is support first to pick up the facial region from a complicated background. Through the feature detection of lip, mouth, and eyes, eyebrow, those feature points are launch [8].

In this work, a new technique for facial emotion recognition is found. The proposal involves the use of Haar transform technique and adaptive AdaBoost technique for face identification and Principal Component Analysis (PCA) technique in conjunction with minimum distance classifier for face recognition. Two techniques have been investigated for facial expression recognition. The former relies on the use of PCA and K-nearest neighbour (KNN) classification technique, while the latter advocates the use of Negative Matrix Factorization (NMF) and KNN technique [9].

Authors proposed on Learning face age progression: A pyramid architecture of GANs. In this paper author suggests a novel GAN-based strategy and offers an alternative but more practical solution to its two main problems, namely age transformation accuracy and identity preservation. This method uses age estimation and face verification techniques, and it makes use of a compound training critic that combines a simple pixel-level penalty, an age-related GAN loss that achieves age transformation, and an individual-dependent critic that maintains the stability of the identity information[10].

Authors proposed on face aging with identity-preserved conditional generative adversarial networks. In this paper, they can produce high-quality faces with the same identity and target age in this way. Qualitative and quantitative testing support the efficacy of our strategy [11].

Authors proposed on Global and local consistent wavelet domain age synthesis. In this paper, in order to create a face conditional on the age labels, this study suggests the Wavelet-domain Global and Local Consistent Age Generative Adversarial Network (WaveletGLCA-GAN) approach. With the provided age labels, Wavelet GLCA-GAN concurrently achieves age progression and regression and produces positive results [12].

Authors proposed on exprgan: Facial expression editing with controllable expression intensity. In this study, ExprGAN for altering face expressions is introduced. To the best of our knowledge, it is the first GAN-based model that can change the facial image into a new expression, allowing continuous control over the emotion's intensity [13].

Authors proposed on Geometry guided adversarial facial expression synthesis. In this paper, a geometry-guided adversarial framework for face expression generation has been created in this paper. Photo-realistic face synthesis and an operationally convenient method for setting goal expression have both been aided by the use of facial geometry [14].

Authors proposed on GANimation: Anatomically-aware facial animation from a single image. They provided a novel, fully unsupervised GAN facial animation model that can be trained in the wild. It advances recent efforts that had previously only addressed the issue with portrait photographs and distinct emotions category modification. The outcomes are quite encouraging and display seamless changes between various expressions [15].

Authors proposed on photorealistic facial expression synthesis by the conditional difference adversarial autoencoder. In this study, we present the Conditional Difference Adversarial Autoencoder (CDAAE) for the synthesis of new faces' facial expressions. This network creates a facial image of the same individual with an arbitrary target facial expression while considerably maintaining identification information given one query face with a random facial expression and a target label (AU label or emotion label) [16].
Authors proposed on Geometry contrastive GAN for facial expression transfer. In this paper to transfer facial expressions between individuals. Facial expressions are driven to exist on a continuous semantic-aware manifold using contrastive learning. This has numerous advantages, including the weakening of pixel-wise misalignments between various subjects and the generation of identity-preserving faces with more expressive features. According to the results of the experiments, there is semantic consistency between the image space of faces and the latent space of facial expressions [17].
Authors proposed on Deep cost sensitive and order-preserving feature learning for cross-population age estimation. For the difficult cross-population age estimation problem, we have put up a DCP model in this study. There are two training phases in the model. To learn transferrable low-level ageing features on the source population, age estimation is first structured as a ranking issue, and a unique cost-sensitive multi-task loss function is devised [18].
Authors proposed on StarGAN: Unified generative adversarial networks for multi-domain Image-to Image translation. In this paper, a single generator and a discriminator, we introduced StarGAN in this study as a scalable image-to-image translation.

IV. EXISTING TECHNIQUES

Feature Extraction for face identification.

A. *Steps*

1) *Color Feature:* Is one of the most widely used visual features in image retrieval, for its invariance with respect to image scaling, rotation, translation. In this work, an image is divided into four equal sized blocks and a centralized image with equal-size. For each block, a 9-D color moment is computed, thus the dimension of color comment for each image is 45. The 9-D color moment of an image segment is utilized, which contains values of mean, standard deviation and skewness of each channel in HSV color space.
2) *Edge Detection:* Most of the shape information of an image is enclosed in edges. So first we detect these edges in an image and by using these filters and then by enhancing those areas of image which contains edges, sharpness of the image will increase and image will become clearer.

B. *Canny Edge Detection*

Canny edge detection is a technique to extract useful structural information from different vision objects and dramatically reduce the amount of data to be processed. It has been widely applied in various computer vision systems. Canny has found that the requirements for the application of edge detection on diverse vision systems are relatively similar. Thus, an edge detection solution to address these requirements can be implemented in a wide range of situations. The general criteria for edge detection include:

1) Detection of edge with low error rate, which means that the detection should accurately catch as many edges shown in the image as possible
2) The edge point detected from the operator should accurately localize on the center of the edge.
3) A given edge in the image should only be marked once, and where possible, image noise should not create false edges.

The Process of Canny edge detection algorithm can be broken down to 5 different steps:

a) Apply filter to smooth the image in order to remove the noise
b) Find the intensity gradients of the image
c) Apply non-maximum suppression to get rid of spurious response to edge detection
d) Apply double threshold to determine potential edges
e) Track edge by hysteresis: Finalize the detection of edges by suppressing all the other edges that are weak and not connected to strong edges.

Texture feature describes the structure arrangement of surfaces and their relationship to the environment, such as fruit skin, clouds, trees, and fabric. The texture feature in our method is described by hierarchical wavelet packet descriptor (HWVP). A 170- D HWVP descriptor is utilized by setting the decomposition level to be 3 and the wavelet packet basis to be DB2.

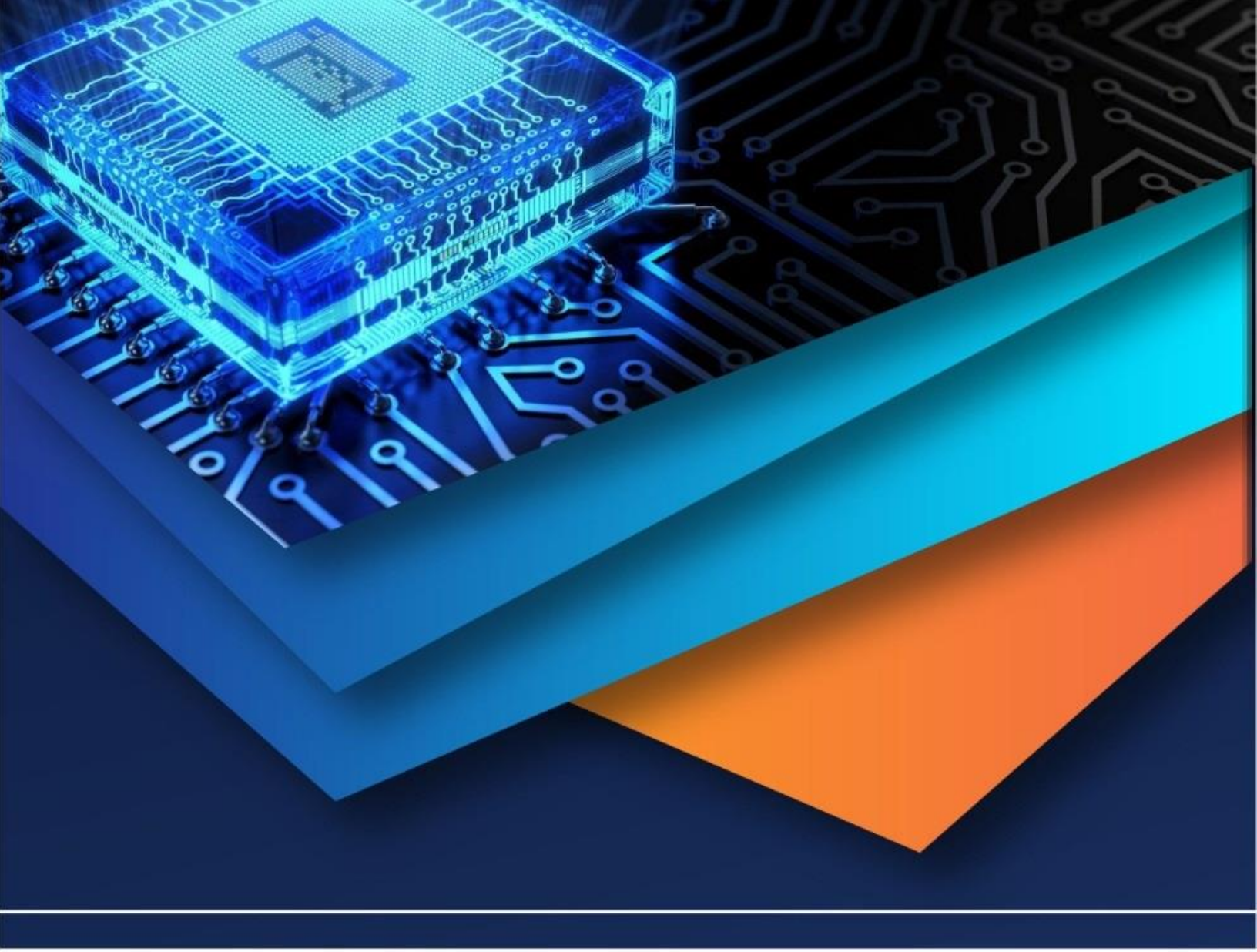
Model across many domains. Because of the generalization capabilities inherent in the multi-task learning scenario, StarGAN created photos of superior visual quality when compared to existing approaches [19].

V. CONCLUSION

Identification of a human emotion based on human face emotions n has many applications in real life. The face recognition in the images is challenging. In this work a method has been introduced where the algorithm has been modified for the detection of human emotion using the face image, extraction of the feature information and matching the features to the training emotion's based human face dataset.

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