(IJISE) 2019, Vol. No. 9, Jan-Jun **e-ISSN: 2454-6402, p-ISSN: 2454-812X**

DEVELOPING A SMART FACE RECOGNITION SYSTEM TO ENHANCE THE EFFICACY OF EMOTION BASED MUSIC PLAYER

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ABSTRACT

This study develops a framework for face emotions that can be used to investigate fundamental human facial expressions. Humans used the suggested method to categorize people's moods and then used this result to play the audio file related to human emotion. As part of the process, the device first takes the human face. Facial recognition is used to carry it out. Attribute extraction methods can then be used to identify the human face. The image element can thus be used to identify human emotion. Extracting the tongue, mouth, and eyebrows reveals these signature points. We will play the emotional audio file by identifying individual emotions if the input face matches the emotion dataset face precisely. Faces trained with limited characteristics can be recognized in various environments. A simple, dependable, and efficient solution is proposed. The system is very important in the identification and detection process.

INTRODUCTION

Face detection and identification are one of the most intriguing aspects of human-computer interaction. It is difficult to detect and identify face objects from the face. Observing facial features is an interesting task because distinguishing features are relatively few. One of your career's most challenging assignments could be identifying a human emotion from a face. The best way to identify a person is by looking at their face. Without the face detection step, no recognition algorithms will function. The recognition stage is affected by the rate of detection. Finding and locating an unknown non-face from a still image amid all these noises is an intriguing challenge.

One of the hottest topics in various fields, mood detection based on emotion, offers a solution to several problems.

In addition to the usual difficulties that come with taking pictures of faces in uncontrolled environments, such as using different expressions, lighting, and poses for face recognition and different sound frequencies for emotion recognition, When comparing face features and sound Mel frequency components, the Database is the most crucial component of any face and mood detection system. Face features are calculated and stored in the Database for database creation. The face and emotions are then evaluated using various algorithms from this Database.

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Face images may be affected by changes in the scene, such as pose variation, face expression, or illumination, making face emotion detection applications challenging. Using facial images as input, this system aims to determine a person's mood and use these emotional results to play the audio file.

RELATED WORK

This work examines several well-known and novel methods for emotion classification and facial feature extraction.

Performance metrics like recognition accuracy, number of emotions found, the Database used for experimentation, classifier used, etc., are used to compare various facial expression research algorithms. 1].

A method for automatically classifying emotions and determining facial expressions from an image is proposed in this work. The system uses the "Viola-Jones Face Detection" method for face localization. A subset feature selection method is used to group the various feature vectors to boost the recognition and classification process's efficiency. SVM, Random Forest, and KNN classifiers train and classify the combined features at the end [2].

Face detection with the Haar cascade features extraction with the Active Shape Model (ASM) and the Adaboost classifier technique are the three steps this work suggests for classifying five emotions: anger, disgust, happiness, neutral, and surprise [3].

Create a face and emotion feature database that can be used for personal face and emotion recognition using an effective method in this work. We are evaluating face and emotion detection and using the Viola-Jones face detection technology to identify a face from the input image. [4] The KNN classifier is utilized.

An expression is a nonverbal connection between the verbal and nonverbal forms of facial communication, but it plays a crucial role. It conveys human-related or filling information and their mental state [5]. This paper aims to demonstrate the requirements and uses of facial expression recognition.

In this system, expression recognition requires a focus on the human face. To recognize the face image, numerous methods are available. The real-time system can easily be adapted using this method. The system briefly shows the methods for capturing the image from a webcam, identifying the face, and processing the image to recognize a few results [6].

This work uses the recently developed SIFT flow method to register each frame involving an Avatar reference face model. The EAI representation for each video and the Avatar reference is then super-resolved using an iterative method to boost recognition performance. Additionally, the Local Binary Patterns (LBP) and Local Phase Quantization (LPQ) techniques can be used to extract the features from EAIs [7].

A frame for the emotion recognition system, which includes face detection, feature extraction, and facial expression classification, is developed in this study. First, a skin detection process is

supported in face detection to distinguish the facial area from a complex background. The feature detection of the lips, mouth, eyes, and brows initiates those feature points [8].

A novel method for recognizing facial emotions is discovered in this work. For face recognition, the proposal uses the Principal Component Analysis (PCA) technique in conjunction with a minimum distance classifier and the adaptive AdaBoost technique for face identification. To recognize facial expressions, two approaches have been investigated. The former advocates the use of Negative Matrix Factorization (NMF) and the K-nearest neighbour (KNN) classification technique, whereas the latter relies on PCA [9].

Authors suggested for Learning face advancing age: GAN-based pyramidal structure. The author of this paper proposes a novel GAN-based strategy and a different but more practical solution to its two primary issues: accuracy in age transformation and identity preservation. This method uses 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 identity information's stability, which employs age estimation and face verification techniques[10].

Identity-preserved conditional generative adversarial networks were used in the authors' proposal for facial ageing. This paper demonstrates that they can produce high-quality faces with the same identity and target age. Our strategy's efficacy is supported by qualitative and quantitative testing [11].

The Wavelet-domain Global and Local Consistent Age Generative Adversarial Network (WaveletGLCA-GAN) strategy is suggested in this study as a method for creating a face conditional on the age labels. Wavelet GLCA-GAN achieves age progression and regression simultaneously with the provided age labels, resulting in positive results [12]. The authors proposed consistent global and local wavelet domain age synthesis.

The authors suggested Experian: Editing facial expressions with controllable intensity. This study introduces ExprGAN, a method for altering facial expressions. To the best of our knowledge, the first GAN-based model can change the facial image into a new expression, allowing continuous control over the intensity of the emotion [13].

The authors proposed geometry-guided adversarial facial expression synthesis. This paper presents the development of a face expression generation geometry-guided adversarial framework. Facial geometry has been helpful in both photo-realistic face synthesis and a practical method for determining an expression's goal [14].

On GANimation, the proposed authors are Facial animations with anatomical awareness from a single image. They provided a novel GAN facial animation model that can be trained in the wild and is completely unsupervised. The results are encouraging and show no discernible differences between expressions [15]. It advances recent efforts that had previously focused solely on portrait photographs and category modification for distinct emotions.

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EXISTING TECHNIQUES FOR FACE IDENTIFICATION INCLUDE FEATURE EXTRACTION.

A. First Step: Color Feature Because it does not change when it comes to image scaling, rotation, or translation, this is one of the visual features that is used in image retrieval the most. This work divides an image into four blocks of equal size and a single image of equal size.

The colour comment for each image has a dimension of 45 because a 9-D colour moment is calculated for each block. An image segment's 9-D colour moment, which includes each channel's mean, standard deviation, and skewness in HSV colour space, is used.

2) Detection of Edges: The edges of an image contain information about the shape. Therefore, we begin by identifying these edges in an image. After using these filters and enhancing those areas of the image that contain edges, the image's sharpness and clarity will improve.

B. Canny Edge Detection Canny edge detection is a method for significantly reducing the amount of data that must be processed and extracting useful structural information from various vision objects. It has been used extensively in several computer vision systems. Canny has discovered that different vision systems share many of the same requirements for using edge detection. As a result, various scenarios allow for implementing an edge detection solution that meets these requirements. The following are some general criteria for edge detection:

1) a low rate of error in detecting edges, which means that as many edges as visible in the image should be accurately detected. 2) The operator should accurately locate the edge point in the edge's centre.

3) Only one mark should be placed on an image edge; False edges should not be caused by image noise whenever possible.

The Canny edge detection algorithm's procedure can be broken down into five distinct steps:

a) Smooth the image using a filter to get rid of noise; b) Find the image's intensity gradients; c) Get rid of spurious responses to edge detection using non-maximum suppression; d) Find potential edges using double threshold; e) Track an edge using hysteresis: Suppress all other weak edges that are not connected to strong edges to complete the detection of edges.

Fruit skin, clouds, trees, and fabric are surfaces whose texture features describe their relationships to the surrounding environment and their structural arrangement. A hierarchical wavelet packet descriptor (HWVP) is used in our method to describe the texture feature. By setting the decomposition level to 3 and the wavelet packet basis to DB2, a 170-D HWVP descriptor is created.

Model in a variety of domains. StarGAN produced photos with better visual quality than previous methods [19] due to the multi-task learning scenario's inherent generalization capabilities.

CONCLUSION

The identification of human emotion using facial expressions has numerous real-world applications. It is difficult to identify faces in the images. This work proposes a method for detecting human emotion using a face image, extracting feature information, and matching the features to the training dataset of emotion-based human faces.

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