Retraction

Retraction: An Efficient Real Time Face Expression Identification System Using SVM (J. Phys.: Conf. Ser. 1916 012229)

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This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

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An Efficient Real Time Face Expression Identification System Using SVM

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Abstract. Real-time emotion detection and recognition system (REDRS) has been rapidly grown in the current era, especially in human-computer interaction and artificial intelligence field. The mutual interaction of human-computer like service-based sectors including online classrooms, e-business, banking services, robotic automation, and others to utilize the growing technology for the base analysis i.e. tracing the human face recognition for the state of the receiver to adapt the strategy that useful for growing sectors. However, the robust emotional identification of the facial emotions from the images and videos residues a big challenging task because of the accuracy of the emotional features. These features can sometimes represented in several forms, like point-based geometric, static, dynamic, or region-based appearance. Changes of facial features like feature position and shape movements are usually affected by the changes of facial elements and muscles during the expression of emotion. Trying to predict an individual's spirit during a spoken form, usually requires decoding his/her face. Repeatedly, body language and particularly facial expressions, speak quiet words about the state of mind of a person. The proposed paper focuses on experimenting with a person’s countenance and classifying the mood of the person.

1. Introduction

The shape of a person's face is very important in social interaction. Communication usually involves speaking. Non-verbal communication is expressed through face. Facial expressions are critical signs of greater communication [1], [2]. The communication between humans and animals is non-verbal through eye contact, Visual communication, facial expressions, and language of disability. A mixture of ideas is provided by eye contact [3] and controls contribution and builds communication with others. Expressions of a human are smiles, sadness, anger, disgust, surprise, and fear. This part includes the objective of the paper and the need for the study.

This paper contains, studying existing methods to performing automatic emotion detection. The paper would deliver a face detection mechanism, a method for feature extraction, a trained classifier [4]. Attempting to find a person's expression in the course of a nonverbal form, generally, requires decoding the human face. Repeatedly, body language and particularly facial expressions, tell us quite words about one's state of mind. The proposed paper focuses on the experiment of a private and classifying [5] [6] the mood of the person. Human performance understanding, detection of mental disorders, and artificial human expression Existing algorithms mostly based on the features of geometric and appearance. The geometric feature model contains the shape and size of the human...
face. Eyes, lip corners, eyebrows are the facial components. Based on the facial feature's position the emotion of the human is categorized. These type of models usually required very accurate position of facial features which is very difficult to achieve because of different face shapes and sizes.

Attempting to understand a human's expression state. Basically, it requires decoding human facial emotion. Many times, body language and particularly facial expressions tell more than words about a human's mind. The rest of the papers are organized as follows. Section 2 presents a review of related system works. The proposed framework is presented in Chapter 3 and discusses the facial landmark detection and feature extraction technique respectively. Followed by Chapter 4 Experimental results of the paper and discussion. And the conclusion of the paper is given by chapter 5.

2. Related Work

Many existing systems facial emotion recognition systems have three main problems which include detection of face view, facial features change, and the problem of face to finding a division problem. Studying existing methods to performing automatic emotion detection. The paper would deliver a face detection mechanism, a method for feature extraction, a trained classifier [7]. Attempting to find a person's expression in the course of a nonverbal form, generally, requires decoding the human face.

It uses FER (Facial Expression Recognition) system, which gives the correlation between human facial expression and extracting the image size and shape features. Automatic analysis of facial expressions from standard images is very challenging. It used Support Vector Machine (SVM) and Histogram of Oriented Gradient (HOG) feature [8] [9] is working for categorization. Cohn-Kanade (CK+) data set has basic expressions. And the main drawback of all of the previous work is the lack of training dataset [10], accuracy, and less speed of processing.

3. Related Work

A. Face Emotion Detection Using Svm

The purpose of this study is to examine the literature available to discover the emotions of the human. An important part of human communication is expression. Facial expressions are identified using feature extraction. There are many methods/ algorithms for identifying facial expressions. This paper is going to identify them is that person is threatened [11] by anyone and examine or study the effective and accurate way for identifying human's facial expression. This paper is generally for improving the accuracy of the emotion classification. And mainly for Researching existing methods to perform automatic Face Emotion recognition [12]. The proposed paper focuses on the experiment of a private and classifying the mood of the person. And also to detect Behaviour understanding, artificial human expression, and detection of mental disorders.

B. Face Recognition

Figure 1 mentioned architecture is used here, the first image get from the camera it processes the image by pixel by pixel then it identifies the face by some facial pattern then it searches for the facial components like eyes, mouth, nose, etc. then feature extraction will be done then each result will be compared to the dataset classifier then at last best match will be shown as result. This is the main concept behind the facial emotions recognition system [13-16].
C. Methodology Overview
Facial Emotion Identification system, from the standard image, and it requires a pipeline algorithm that includes different working procedure. The first step is to find the faces of the people in the image under analysis and the faces. This initial operation allows the system to get the same shape as the eyes. The following HOG adjuster can be using the corresponding reference location. The vector of the highlights delivered by the HOG is eventually utilized for the arrangement of facial feelings by the SVM component. Finally, the management of the provision of temporary photographs is required in the law of a specific decision. The following subsections gives the explanation of each step of action.

D. Face Detection and Registration
In this phase, the individual’s face is distinguished as an info picture and the enlistment cycle is finished. Enrolment is an essential advance for pre-handling as the accompanying calculations work best when they can test the information face with a predefined shape, size, and position. The proposed framework pipeline is utilized to cut the face part and enrolled and the HOG definition is utilized to build a vector of information given as a contribution to the SVM bank that runs estimations of the visual surface. At last, the expectation is arranged in a transitory window that is abused by law and order to sift through the conceivable negative impacts. At the point when a face is discovered, facial enlistment is done as follows: at first, the framework fits the circle in the face box. At last, eye positions, whenever recognized, give an estimation that has the standard size having 65 × 59 pixels. At long last, it is given as an info yield include built on the HOG definition.

E. HOG DESCRIPTOR
The appearance of an item and its shape can be obviously seen through the circulation of neighbourhood angles/edge pointers, even without the exact information on the relating edge zones or inclination. This gives a clarification of the HOG technique utilized in its high - level structure. The meaning of HOG depends on a bunch of angle headings over the pixel of a little cell called a phone and in the progressive development of a 1D histogram whose intersection gives a vector of objects to be considered for different arrangements. We should have a strong (dark) work that portrays the image to be examined. The picture is separated into N × N size pixel cells and the arrangement θx, y inclination [14] for every pixel is determined by the accompanying standard as shown in equation (1)

\[ \theta_{x,y} = \tan^{-1} \frac{L(x,y+1) - L(x,y-1)}{L(x+1,y) - L(x-1,y)} \]  

(1)

Subsequently, indicators θj i = 1 ... N2, i.e., the cell j are measured and collected in the M-bins histogram. Lastly, all acquired histograms are calculated and grouped into a unique HOG histogram which is the final result of this algorithmic step, i.e. the vector of the elements to be considered for subsequent processing.
In Figure 2 in cells, the size of pixels N x N The shape of all pixels is calculated and accumulated in the M-bins histogram for direction. Finally, all cell histograms are collective to form a vector for the final symbols. On a tree, the 10 found faces are enclosed in a circle which is used to surround [15] the face vertically; consecutive eyes are available and used to measure the image and increase the space.

E. Svm Prediction and Data Setup
HOG features are carried out as inputs to SVM prediction. This is a discriminating separator defined by a divisive hyperplane. Group of training vectors is given \( x_i \in \mathbb{R}^n, i = 1, l \) and the equivalent group of labels \( l \in \{1, -1\}, \) the following performance problem has been resolved as shown in equation (2)

\[
\begin{align*}
\min_{w,\xi} & \quad \frac{1}{2} w^T w + C \sum_{i=1}^{l} \xi_i \\
\text{subject to} & \quad y_i(w^T \phi(x_i) + b) \geq 1 - \xi_i, \\
& \quad \xi_i \geq 0, i = 1, \ldots, l,
\end{align*}
\]

(2)

Where they are the fault of the mismatched vector of training; \( \xi \) is a complete error of improper classification; \( w \) indicates normal vector of hyper plane; \( b = -w^T \) defines the removal of the hyper plane from the root vector \( w \); maps \( \phi(x_i) \) maps \( x_i \) enter the maximum space and \( C \) is greater than 0 is the Pre-defined parameter. The classical SVM method is only suitable for the problem of two classes but, unfortunately, FER incorporates a lot of management. Multiclass problems can be solved by the proposed one-against-one approach, a method based on the SVM classification of two classrooms and a voting system that assisted in selecting the predicted category when examining an intangible object. Figure 3 shows the Face registration process.

![Face registration process](image)

Figure 3. Face registration process

All test sessions were performed in a sequence of two publicly available images of images obtained directly from FER problems. The first site is Chon Kanade (CK +) built with a sequence of images of people who create a 6 face look.
4. Results and Discussions

This chapter examines the development of a real-time face emotion recognition program. OpenCV having any type of function because it is easy for image relations. The software submits an OpenCV library to resolve the computer vision mechanism and is used to retrieve integrated data and tracking materials. CK+ (Extended Cohn–Kanade) dataset is used to testing the data. This database contains a sequence of 593 videos from different parts. Below figures (figures 4-9) gives result of happy, sad, angry, disgust, surprise and fear emotion identification.

5. Performance Measures

Below figures (figures 4-9) gives result of happy, sad, angry, disgust, surprise and fear emotion identification.
Figure 6. Accuracy Graph of Angry Detection

Figure 7. Accuracy Graph of Disgust Detection
Figure 8. Accuracy Graph of Surprise Detection

Figure 9. Accuracy Graph of Fear Detection

6. Conclusion
Real-time facial recognition helps to identify a person’s face that can be used to identify a person’s intentions and verify. This paper delivered a proposed model for solving emotional vision problems based on real time environments in facial recognition, and accuracy and efficiency are monitored simultaneously facial detection is performed using a precise vector detector. The accuracy of both facial recognition and sensory detection can be increased by increasing the number of images during training. The recovery time is very short which is why the system offers less working time and higher accuracy. For efficiency and accuracy this paper uses CK and JAFFE facial database. Future work involves implementing the plan and making the accuracy more accurate.
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