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Face Identification System

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Abstract: ***Face identification is a computer technology being used in a variety of applications that identifies human faces in digital images. Face identification from image or video is a popular to pic in biometrics research. Many public places usually have surveillance cameras for video capture and these cameras have their significant value for security purpose. It is widely acknowledged that the face recognition have played an important role in surveillance system as it doesn't need the object's cooperation. The actual advantages of face based identification over other biometrics are uniqueness and acceptance. Face identification also refers to the psychological process by which humans locate and attend to faces in a visual scene. Face detection can be regarded as a specific case of object-class detection. In object-class detection, the task is to find the locations and sizes of all objects in an image that belong to a given class. Examples include upper torsos, pedestrians, and cars. Face-identification algorithms focus on the detection of frontal human faces. It is analogous to image detection in which the image of a person is matched bit by bit. Image matches with the image stores in database. Any facial feature changes in the database will invalidate the matching process.***

I. INTRODUCTION

Since last few years huge amount of work is done in the field of image based face identification the main reason behind which is that it is a great way of person face identification because of the fact that it does not require any human interaction in this procedure. Therefore, it is very trending topic in the field of biometrics and security.

As there are several ways that are proposed for the method of face identification which are assumed to be a great milestone in this field still many times it has been observed that when we use these approaches for same purpose on a fixed data it is of not much use because no method was able to give the good performance on the overall basis when evaluated.

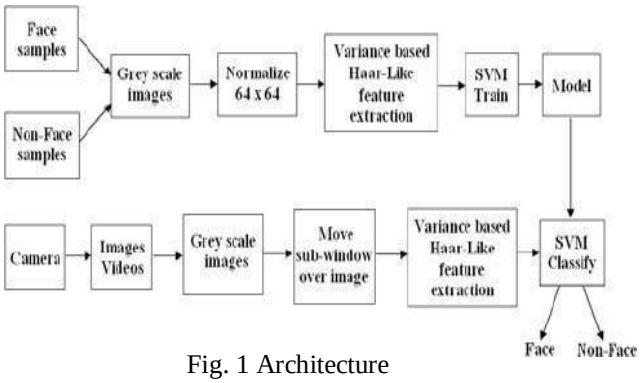


Fig. 1 Architecture

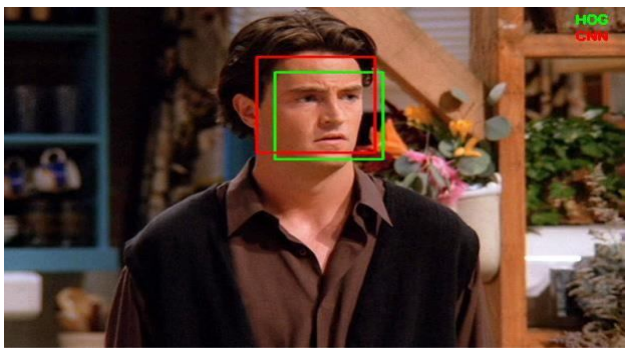


Fig.2 Basic Example Of Face Detection

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A. *Paper Organization*

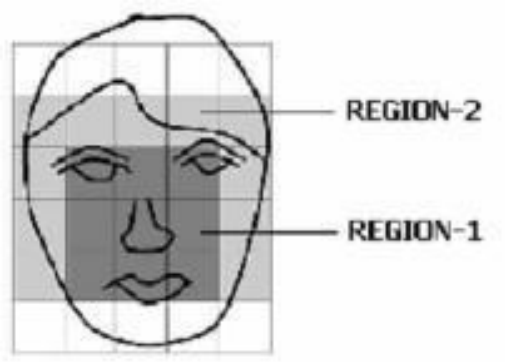
This research paper tells us about the various face identification methods that can be used and on the basis of the outputs of these methods summary has given, Also some of the sample cases have been shown along with the final conclusion about the whole research is provided.

B. *Face Detection*

There are various methods of face identification that can be used for detecting a face from an image. Some of these methods has been discussed in this research paper. The major four type of face identification methods are as follows:

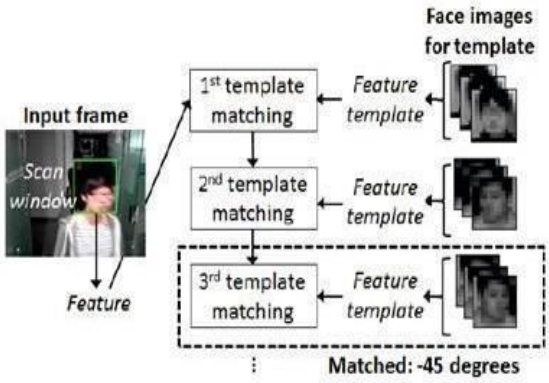
C. *Knowledge Based*

The knowledge Based method is dependent on the set of rules and these rules are made on the basis of human knowledge of detecting the faces from an image. Example: for detecting any face the key components that are firstly observed are it must have eyes, nose, mouth at appropriate positions distanced from each other at a fixed scale. The main issue regarding the knowledge Based method are making such rules which are based on the human knowledge. If the rules are not made properly then the whole system could fail easily which will be of no use to us. Using this method all alone is not affective and this approach mainly fails when there are multiple faces in an image



D. *Template Matching*

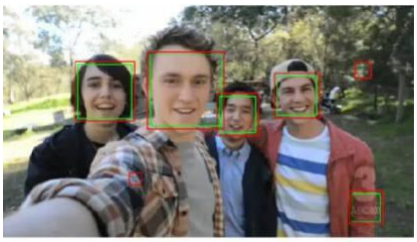
The template matching method uses already defined or parameterized face templates to find the faces in an image by the correlation between the already defined templates and the images that have been inserted into the program for the process of face detection. Example: any human face can be divided into various sections like nose, eyes, ears, mouth etc. along with which same can be done in a template by building the edges using edge detection method. The template Making method is simple to implement but using this approach it's a little bit hard to detect the faces in an image so to overcome this problem the deformable templates are more in use in todays scenario of face detection.



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E. Feature Based

The Feature Based method is based on the approach to locate faces by extracting all the structural features present in a face. The main idea behind this approach is to overcome the limitations which are faced during the process of knowledge Based approach. The feature Based approach is divided amongst several steps. Using this method the images which have multiple faces are almost detected correctly and this method have approximately 94% of success ratio.



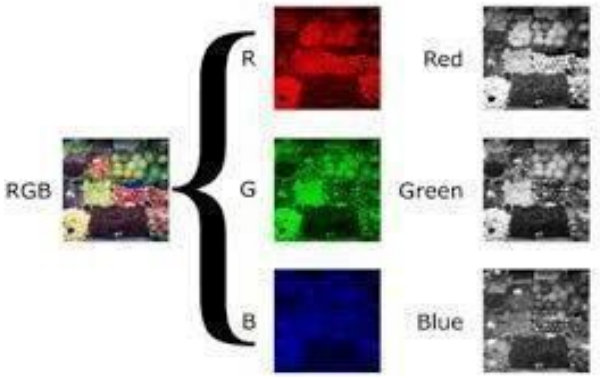
F. Appearance Based

The appearance Based method is dependent on the set of delegate training face images to find the most appropriate models for the process of face detection. The appearance Based method is the most effective method as compare to rest of the three methods as it makes use of statistical analysis and also used most effective and trending technique that is machine learning to find the relevant features of the images of a face. This approach is also used widely in the process of face recognition.



G. Implementation

The first and foremost part of any face detection process is uploading the image on which the face detection algorithm is to be applied. The face detection algorithm used is using opencv. In opencv technique the image is to be uploaded by giving the location address of the image. Once the picture is uploaded it is converted into grayscale from its original RGB format. The reason behind the conversion of an image to grayscale is that face detection is much easier in the grayscale mode.

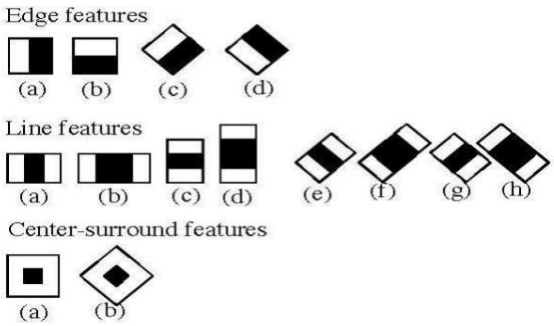


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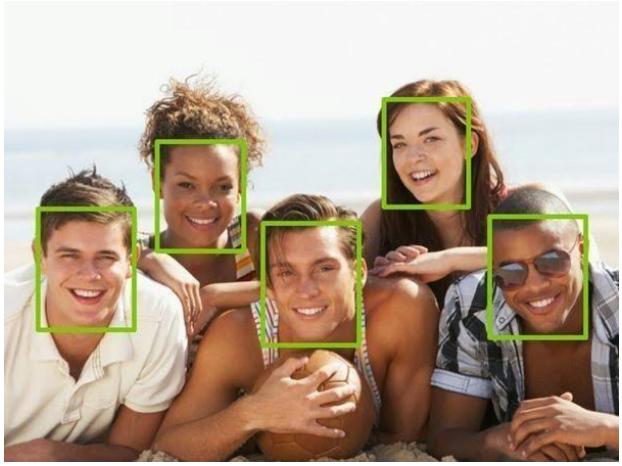
After the image is converted to grayscale essential processes of manipulation of an image such as cropping, sharpening, blurring, resizing of image is done if required. After all the manipulation procedures the segmentation of an image is done so that all types of objects can be segmented for quicker detection of faces by grouping all the segments into a single image.

Now the famous process of Haar-Like features algorithm is applied. This algorithm is used for detecting the faces in an image. This algorithm is based on some universal facts about the human faces such as nose region is usually brighter than its neighbor pixels whereas the eyes region have darker pixels from its surroundings.





After completion of all the above steps the coordinates are allotted to make a box around the face. Once the coordinates are calculated a box is made on the uploaded image showing us the region having human faces in our image.



The application of these face detection techniques can be extended to various new types of applications such as smile detection, blink detection, eye detection and many more.

The current applications of face detection that are being used widely nowadays is motion capture, facial recognition, photography, marketing, emotional inference, lip reading etc

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II. CONCLUSION

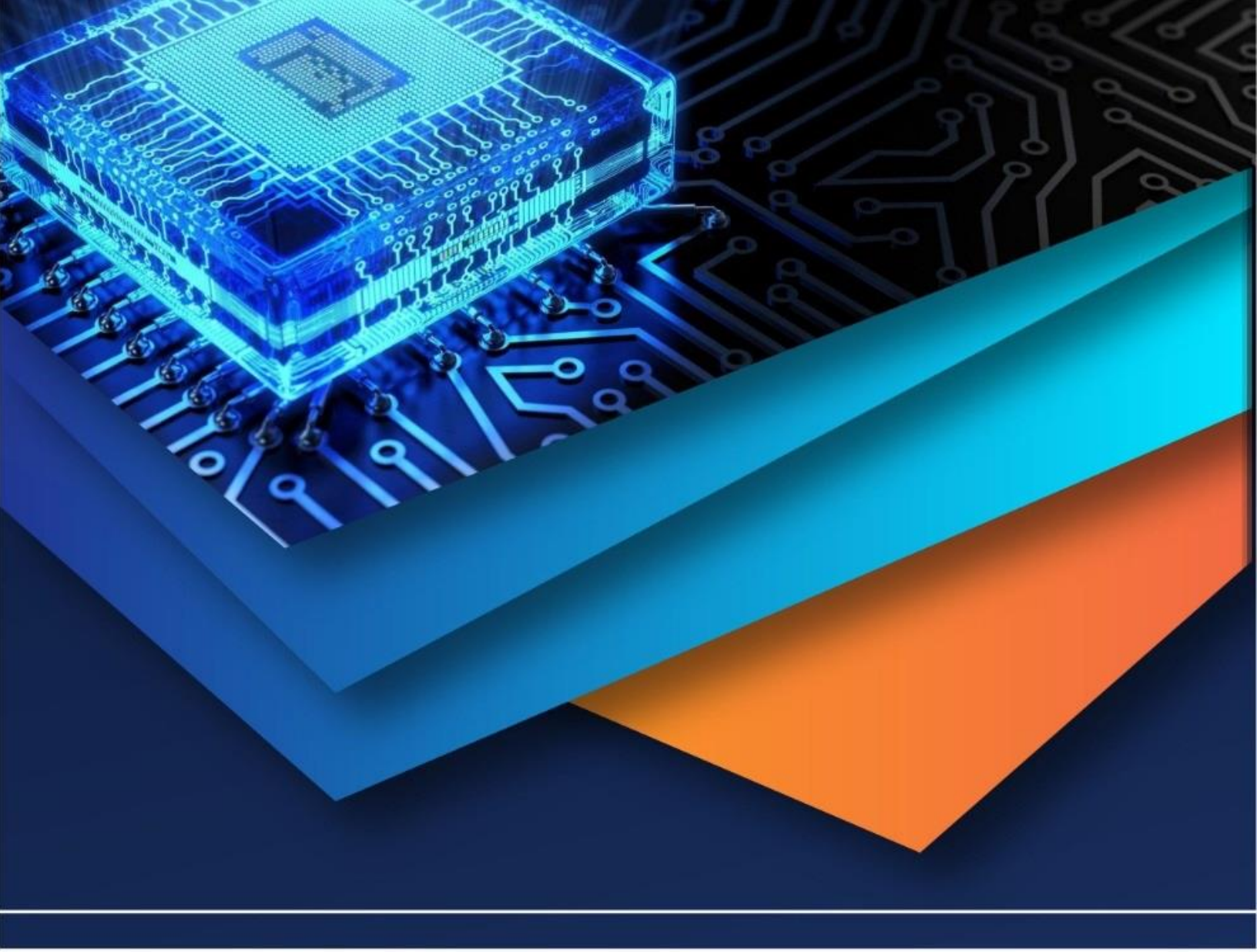
In the following research paper and work we have built a program that has an ability of face detection using an image. Some of the approaches are performed several times over various kinds of images on the other hand some approaches are applied randomly.
In this current system it has overcome the issues related with delayed face detection and false face detection but it still has issues regarding some blurred faces detection and detection of faces in huge crowds like when the faces in an image are greater than 50. This approach can be used in surveillance for now and increasing its capacity of detecting faces in very low quality must also be increased.

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