

# Face and picture face detection recognition technique.

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**Abstract:**In today's world security of data, person and information is very important aspects. So biometric systems for user authentication are becoming increasingly popular due to the security control requirement in identity verification, access control, and surveillance applications. An effective method with high accuracy and security for user authentication using skin color and depth information is presented. The aim of this review paper is to introduce an intelligent algorithm for face detection and recognition. For accurate face detection template matching method, haar cascade feature, adaboost algorithm are use-full. Depth value helps to determine real or fake (picture) face. PCA or LDA algorithm used for face recognition. Combination of these methods helps user authentication system to secure itself from cheating.

**Keyword:** Template matching method, haar cascade features, depth information, PCA, LDA

## I INTRODUCTION

User authentication is becoming increasingly popular due to the security control requirement in identity verification, access control, and surveillance applications. Face recognition, among other conventional biometric authentication techniques is most suitable alternative because it is non-intrusive and economic with low cost cameras and embedded systems. Over the past few years, extensive research works on various aspects of face recognition by human and machines have been conducted by psychophysicists, neuroscientist and engineering scientists.

Face recognition is one of the most studied topics in computer vision and one of the most successful applications of image analysis, pattern recognition and machine learning. Although there are many successful applications already, face recognition is still a challenge. This is due to the variance in face images, such as viewpoint, illumination, expression, occlusion, makeup and even aging.

There are mainly two approaches for face recognition, content based and face based. In content-based approach, recognition depends of the relationship between human facial features such as eyes, mouth, nose, profile silhouettes and face boundary. Face based

approach attempts to capture and define the face as a whole.

There are various methods have been proposed for face detection and recognition. But main aim is to get more accuracy and high security. Therefore there is need of combine existing methods and design intelligent algorithm for face detection and recognition of real face and picture face based on skin colour detection and depth information technique.

## II RELATED WORK

There are various methods for face recognition using different algorithms. But these methods do not give best solution. These methods operate individually in particular conditions. Hence to obtain best solution the combined algorithm can be formed which extracts advantage of all these methods.

The face provides different important information, as it reflects the identity and emotional states of individuals. Face detection is a preliminary step to face recognition, tracking, and many other applications. This topic was the subject of several studies. Different solutions are proposed that may be separated into four categories: Knowledge based, Invariant features approach, Template matching approach, learning techniques [1].

The difficulties in face recognition arise when the image of the subject to be recognized cannot be captured in a controlled environment. All face recognition algorithms try to eliminate the effects of variances in pose and illumination. The approach given by Erol Seke puts no limits on illuminants. To reduce complexity select only sampling points instead of selecting whole face. For that combination of two criteria is used higher intensity variance with illumination changes and lower intensity variance with face changes [7].

P.Viola presented an Adaboost algorithm which can be used for fast image retrieval and face detection. The Adaboost algorithm was often used to

detect face area in an image. The main idea of this algorithm is to boost up a large number of generally weak classifiers to form strong classifier, and the strong classifier has strong classification ability [2].

The distribution of skin colour of different people has proven to be grouped into a small area of the colour space. To establish colour model it is important to choose proper colour space, available colour spaces are YUV(Y- luminance component, U and V chrominance component), YCbCr(Y- luminance, Cb- blue chrominance, Cr-red chrominance), RGB(red, green, blue), Normalised RGB(normalised red, green, blue), HSV(hue saturation value) [11].

Skin colour distribution of the same person under different lighting conditions differs. Changes in illumination have a great impact on skin detection effect, so a successful skin-color model should own good ability of adapting to the changes in lighting and the viewing environment. Using the raw input image in the RGB colour space is not suitable tool for skin detection. This is due to that the RGB colour space is highly sensitive to intensity difference. The YCbCr colour space is commonly used in image processing as it separates the luminance, in Y component, from the chrominance described through Cb and Cr components [6].

Skin part can be segmented from non-skin parts by threshold segmentation method. In the threshold method, because of the complexity background, different lighting conditions and interference, the image quality of images detected is different. If the threshold is too high or too low, it will cause the serious miscarriage justice of skin colour and background, affecting the segmentation effects, often causing undetected. Viola & Jones et al, have presented a face detection method based on an over-complete set of Haar-like features and skin colour detection [10].

Skin pixel has Cr value about 100 and Cb value about 150. Pixel is classified as skin or non-skin pixel using these values. The area of skin other than face region is comparatively small and is eliminated using the morphological operations - erosion and dilation [11].

For detecting whether the face is real or fake (picture face) formulae and methods are defined in Junfeng Qian, Shiwei Ma, Zhonghua Hao, Yujie Shen, "Face Detection and Recognition Method Based On Skin Colour and Depth information". For calculating depth map it is necessary to take 3 D image for that binocular camera is useful [2].

Advantage of 3D images over 2D images is given in Gang Pan, Shi Han, Zhaohui Wu and Yueming Wang, "3D Face Recognition using Mapped Depth Images" [8]. Many researchers have worked on face verification using 2D images. The drawback of 2D image based techniques is that real world 3D objects are mapped into a 2D plane; thereby losing out on the 3D features of objects. 3D features provide depth information which does not change much with translation and changes in illumination [12].

According to the character that there is disparity field between two stereo images of the binocular camera, depth image of a face can be estimated. For calculating depth map, depth value of the each pixel in the face area is calculated, considering  $N$  total number of pixels in the face area. From depth value of each skin pixel calculate average depth value. Using difference between depth value of each skin pixel and average depth value, calculation of variance decision value of detection result is done. Generally difference value varies much on real face as compared to picture face. So the variance decision value gives appropriate result which helps to detect whether the face is real or fake [2].

3D face recognition categorised into four groups feature based, spatial matching based, shape descriptor based, recover and synthesis based [8]. Sirovich and Kirby first proposed using Karhunen- Loeve (KL) transform to represent human faces. They proposed the idea of eigenfaces. Turk and Pentland developed a face recognition system using PCA. Principle component analysis (PCA) compares principle components of current face to those of the known individuals in a facial database built in advance. But common PCA-based methods suffer from two limitations, poor discriminatory power and large computational load. The 3-level wavelet has a good performance in face recognition applications. This method works on lower resolution instead of the original image resolution, thus reducing calculation complexity. Applying PCA on DWT sub-image gives better recognition accuracy and discriminatory power than applying PCA on the original image. Linear Discriminant Analysis (LDA) for face recognition and requires multiple instances per face e.g. under varying illumination, pose or expressions. This method maximizes the ratio of between-class variance to the within-class variance in any particular data set thereby guaranteeing maximal separability [13].

Detailed comparison between face recognition algorithm PCA and LDA is given in Shou-Jen Lin, Chao-Yang Lee, Mei-Hsuan Chao, Chi-Sen Chiou, Chu-Sing Yang, "The Study and Implementation of Real-

Time Face Recognition". The prime difference between LDA and PCA is that PCA does more of feature classification and LDA does data classification. Using CUDA (Compute Unified Device Architecture), developed by NVidia, a real-time face recognition system, which focused on accelerating the recognition process by parallel computing [9].

### III SCOPE

There are various methods for detection and recognition of face using different algorithms. But still face detection and recognition with high accuracy and security is challenging task. So, keeping in view, proposed algorithm is useful to detect and recognise real or fake (picture) face using skin colour detection and depth information. So, here main objective is to detect and recognise real or fake (picture) face with high accuracy and security.

### IV CONCLUSION

The problem of automatic face recognition is complex task that involves recognition of human faces in cluttered background. The goal of face recognition is to provide high accuracy and security for biometrics authentication. Face recognition techniques includes detection of face, match it with database and give accurate recognition. Now days, biometrics authentication is used for various purpose. So because of that only one method of detection or recognition is not useful. We should use two to three method of detection or recognition. Proposed work intended to achieve good performance by combining different algorithms for detection and recognition of real and fake (picture) face. This algorithm is fast and simple for implement and gives higher accuracy and security.

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