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A NOVEL APPROACH FOR FACE RECOGNITION BY USING NEAR SET THEORY

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ABSTRACT

The main aim of this paper is to develop an efficient interface to detect the iris and use this information to identifying the person. Interacting with real or virtual objects with help of a human eye is gaining popularity. The biometric identification system is one of the technologies used in the recognition system. Iris recognition system is the most reliable system for an individual identification. Nowadays, many applications have been implemented with this feature such as the time attendance system for high security environment, hospitals, airports, government agencies, educational facilities, and etc. The conventional method applied on the security is not reliable such as the passwords may be forgotten or hacked and ID cards may be lost or forged. Iris-based biometric authentication is gaining importance in recent times. Iris biometric processing however is a complex process and computationally very expensive. In the overall processing of iris biometric in an iris-based biometric authentication system, feature selection is an important task. This approach is based on the iris and the retina of the eye. The iris and retinal patterns are captured via a camera or video-based image acquisition system. The uniqueness of an individual's iris and retinal patterns helps in identifying and verifying the user. In Iris recognition authentication process, iris and retina are used as the previous inputs using to recognize the eye with different mechanisms like opening operation, edge detection, histogram equalization and median filter. In this paper, entirely biometric-based personal verification and identification methods have gained much interest with an increasing accent on safety. Iris recognition using feature detection techniques in Matlab simulink model blockset. The iris texture pattern has no links with the genetic structure of an individual and since it is generated by chaotic processes externally visible patterns imaged from a distance. Iris patterns possess a high degree of randomness and uniqueness. Video and Image Processing Blockset is a tool used for the rapid design, prototyping, graphical simulation, and efficient code generation of video and image processing algorithms. The developed process involves object feature identification, detection. In this paper present an approach to feature Detection Method.

Keywords: *Matlab,Original image datase ,Image processing, Damage face images, Feature Extraction ,Iris Recognition ,Face recognition system, etc.*

I. INTRODUCTION

Image processing is a rapidly growing area of today's world. Its growth has been fuelled by technological advances in digital imaging, computer processors and mass storage devices. Fields which traditionally used analog imaging are now switching to digital systems, for their flexibility and affordability. Important examples are medicine, image and video production, photography, remote sensing, and security monitoring. These and other sources produce huge volumes of digital image data every day, more than could ever be examined manually. Digital image processing is concerned primarily with extracting useful information from images. Ideally, this is done by computers, with little or no human intervention. Image processing algorithms may be placed at three levels. At the lowest level are those techniques which deal directly with the raw, possibly noisy pixel values, with de-noising and edge detection being good examples. In the middle are algorithms which utilize low level results for further means, such as segmentation and edge linking. At the highest level are those methods which attempt to extract semantic meaning from the information provided by the lower levels, for example, handwriting recognition. Eye detection is a technique where by an individual's eye are measured so that the researcher knows both where a person is looking at any given time and the sequence in which their eyes are shifting.

Eye detection can also be captured and used as control signals to enable people to interact with interfaces directly without the need for mouse or keyboard input, which can be a major advantage for certain populations of users such as disabled individuals. The field of mathematical morphology contributes a wide range of operators to image processing, all based around a few simple mathematical concepts from set theory. The operators are particularly useful for the analysis of binary images and common usages include edge detection, noise removal, image enhancement and image segmentation. The two most basic operations in mathematical morphology are erosion and dilation. Both of these operators take two pieces of data as input: an image to be eroded or dilated, and a structuring

element (also known as a *kernel*). The two pieces of input data are each treated as representing sets of coordinates in a way that is slightly different for binary and gray scale images.

Table 1: Description of steps in a biometric system based

Steps	Description
1. Capture biometric data	The biometric data is presented to the capturing device by the user.
2. Pre-processing stage	The biometric data is captured and pre-processed by enhancing the input from the sensor, removing any background noise or any piece of input that is not required. Normalization is done on the input stream to enhance quality and correct any deformity in the input stream in order to attain the desired format for efficient feature extraction.
3. Feature extraction	The pre-processed data is then further worked upon and features extracted in an optimal way as all the data captured is not necessarily essential for biometric evaluation.
4. Template creation	A template is created from all the relevant characteristics extracted from the user. Elements of the biometric data that are not required for the comparison algorithm are purged from the template to reduce file size and protect the identity of the user.
5. Storage of the template	The template is then stored in retrievable databases, which can be accessed while performing the matching process.
6. Matching/ test phase	This step involves using an algorithm to perform a comparison between the obtained biometric template and the stored template in the system to determine a match. The output of the comparison is then passed on to some application device.

The paper is organized in following sections. Section1: gives a brief introduction; Section 2: overview near sets; Section 3: will focus on proposed approach followed by experimentation and simulation result, Conclusion and future scope.

II. RELATED WORK

Verification Based on Face Biometrics and the K nearest neighbour algorithm this method used in that system. In first method range and distance of the person should be measure. They use the at least minimum distance of person .in second face verify using FACE-SDK and VJ-SRC method. In that system verify face of the person. But in that depending on the scenario, some labels may not be visually present and others may be occluded. P. Tome et al. [1] proposed an experimental study of the benefits of soft biometric labels as ancillary information based on the description of human physical features to improve challenging person recognition scenarios at a distance. They also analyse the available soft biometric information in scenarios of varying distance between camera and subject. A.K. Jain et al.[2] explored Facial marks (e.g., freckles, moles and scars) are salient localized regions appearing on the face that have been shown to be useful in face recognition. An automatic facial mark extraction method has been

developed that shows promising performance in terms of recall and precision. N. Kumar et al [3] used two method first is – "attribute" classifiers – uses binary classifier strained to recognize the presence or absence of describable aspects of visual appearance (e.g., gender, race, and age) and second method – "simile" classifiers – removes the manual labelling required for attribute classification and instead learns the similarity of faces, or regions of faces, to specific reference people. Other works like [4] are focused on the automatic extraction of soft biometrics from video datasets. On the other hand, D. Adjeroh et al. [5] studied the correlation and imputation in human appearance analysis of using automatic continuous data focusing on measurements of the human body.

Other works like [6] are focused on the automatic extraction of soft biometrics from video datasets. On the other hand John Wright et al. [7] exploit the discriminative nature of sparse representation to perform classification. Instead of using the generic dictionaries, they represent the test sample in an over complete dictionary whose base elements are the training samples themselves. PAUL VIOLA et al.[8] describes a face detection framework that is capable of processing images extremely rapidly while achieving high detection rates. S. Samangooei et al [9], introduced the use of semantic human descriptions as a soft biometric. They carefully selected a set of physical traits and successfully used them to annotate a set of subjects. Koichiro Yamauchi et al [10] explored challenging to recognize walking human sat arbitrary poses from a single or small number of video cameras. P.Petchimuthu et al. [11], this paper retrieves similar faces using content based method. It's a challenging technique since all the faces will be similar due to its similar geometrical configuration of face structure. K. Bhandwalkar et al.[12] explored about E-learning. E-learning institutions are currently facing two key challenges related to identity management. The latest works such as Fuqing Duan et al. [13] introduce the use of craniofacial superimposition and craniofacial reconstruction method for skull detection.

III. BASIC TERMINOLOGY

A. FACE DETECTION

The basic principle of the Viola-Jones algorithm is to scan a sub-window capable of detecting faces across a given input image. The standard image processing approach would be to rescale the input image to different sizes and then run the fixed size detector through these images. This approach turns out to be rather time consuming due to the calculation of the different size images. Contrary to the standard approach Viola-Jones rescale the detector instead of the input image and run the detector many times through the image – each time with a different size. At first one might suspect both approaches to be equally time consuming, but Viola-Jones have devised a scale invariant detector that requires the same number of calculations whatever the size. This detector is constructed using a so-called integral image and some simple rectangular features reminiscent of wavelets

B. NEAR SETS: AN OVERVIEW

The idea of near set was first presented by James Peter in the year of 2006. In near set theory, each object is described by a list of feature values. The word feature corresponds to an observable property of physical objects in our environment. For instance, for a feature such as nose on a human face, nose length or nose width will be the feature values. Comparing this list of feature values, similarity between the objects can be determined and can be grouped together in a set, called as near set. Thus near set theory provides a formal

basic for the observation, comparison and recognition or classification of objects. The nearness of objects can be approximated using near sets. Approximation can be considered in the context of information granules

(Neighbourhoods).

Near set theory provides a formal basis for the observation, comparison, and classification of elements in sets based on their closeness, either spatially or descriptively. In Near Sets theory, each object is described by a list of feature values. The word feature corresponds to an observable property of physical objects in our environment. For instance, for a feature like the nose of a human face, the feature values would be nose length or nose width as shown below.

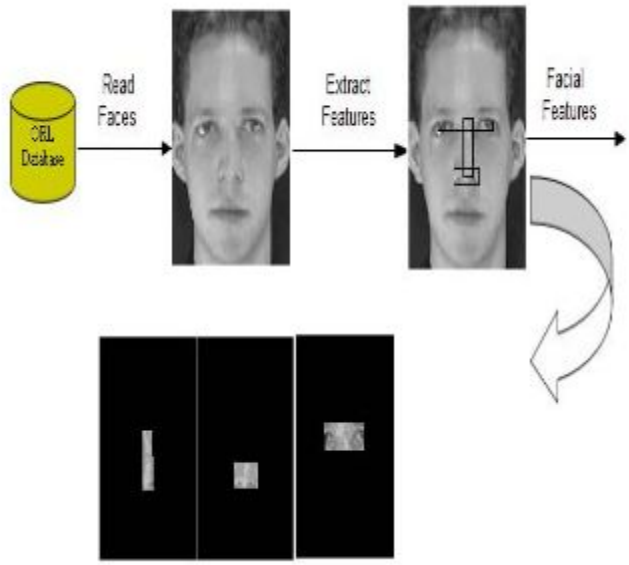

Fig: Near Set Theory

Comparing this list of feature values, similarity between the objects can be determined and can be grouped together in a set called as Near Sets. Thus Near Set theory provides a formal basis for the observation, comparison and recognition/classification of objects. The nearness of objects can be approximated using Near Sets. Near Set for facial feature Selection is used to find partition selection and then to select the best features which can be matched.

IV. DETAIL WORK

For recognizing face it must have a database for matching recognizing face with database. So first have original face database of irises, this database given from the face detection method. For this we apply Violo Gones algorithm for face detection and knn for data mining and image processing. Database having information of each person like their age, ethnicity, gender, height etc.....

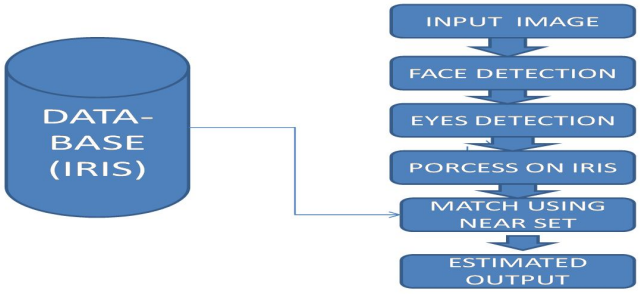

Fig: Flow of Implementation

When we authenticate any plastic surgery image or burn face image then give this image to the face detection. By using this face detector ,it detect face, eyes (iris).We use eyes for detecting face because if any person done plastic surgery, its eyes can't change even they change all body part. Because of in plastic surgery and in burn face eyes can't change its measurement. Each irises having its threshold value by using hat we match or recognise face.

When we get irises from face detection then it go its next part that is near set theory for match iris with database. Then it give estimated output.

V. EXPERIMENTAL ENVIRONMENT

A. Matlab

MATLAB (matrix laboratory) is a numerical computing environment and fourth-generation programming language. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran. Although MATLAB is intended primarily for numerical computing, an optional toolbox uses the MuPAD symbolic engine, allowing access to symbolic computing capabilities. An additional package, Simulink, adds graphical multi domain simulation and Model-Based Design for dynamic and embedded systems.

B. Data mining and Image Processing

System objects are algorithms that provide stream processing, fixed-point modelling, and code generation capabilities for use in MATLAB programs. These new objects allow one to use data mining and image processing algorithms in MATLAB, providing the same parameters, numeric's and performance as corresponding data mining and Image Processing . System objects can also be used in Simulink models via the Embedded MATLAB Function block. This environment provide platform for model-Based Design and code generation out of a user- Friendly block diagram environment.

Snapshot of processing

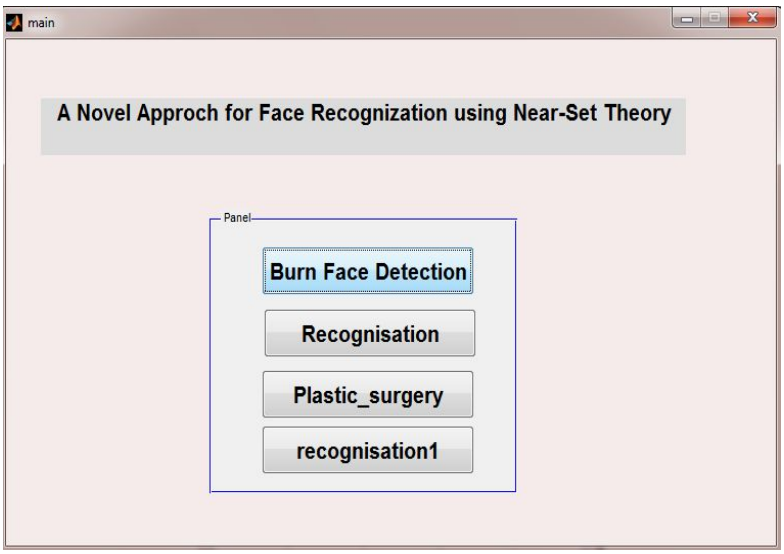

Fig 5 – Face recognition module

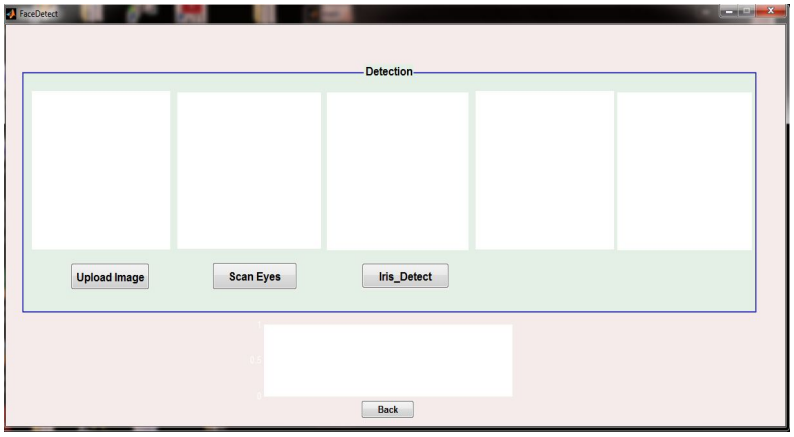

Fig 5.1- Face recognition system

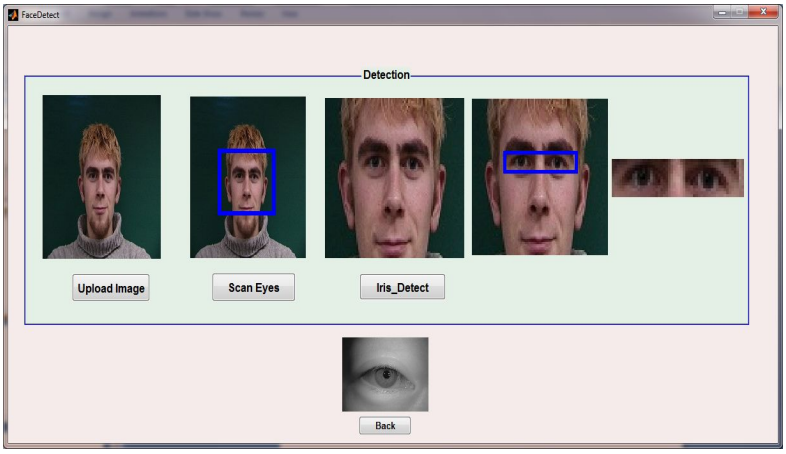

Fig 5.1.1-Original image dataset

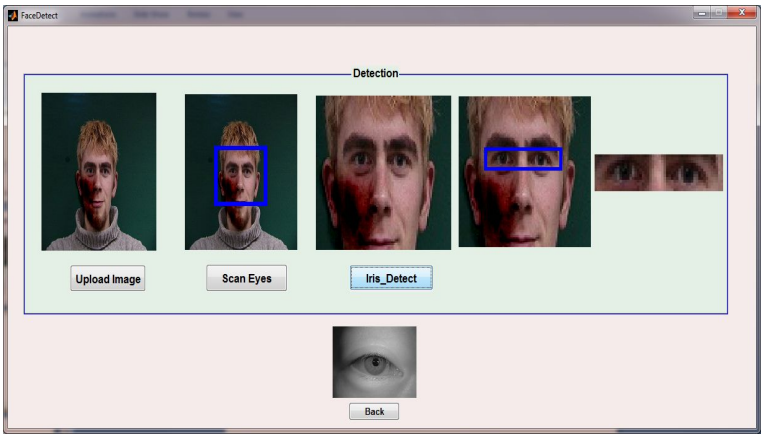

Fig 5.1.2- Burn face recognition

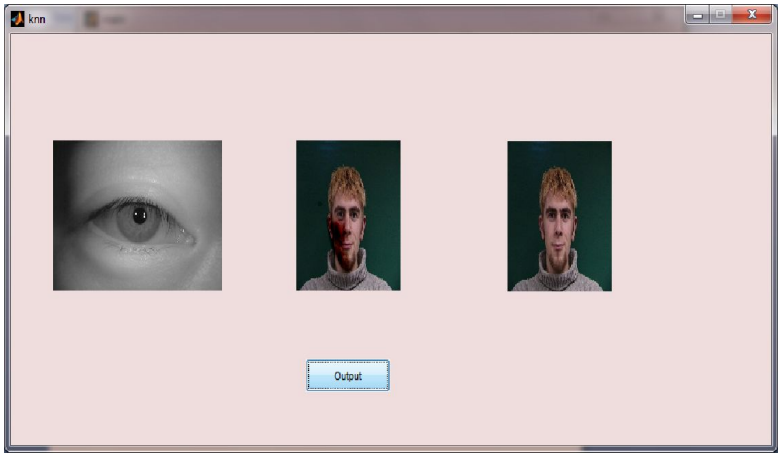

Fig 5.1.3- Output of burn face recognition

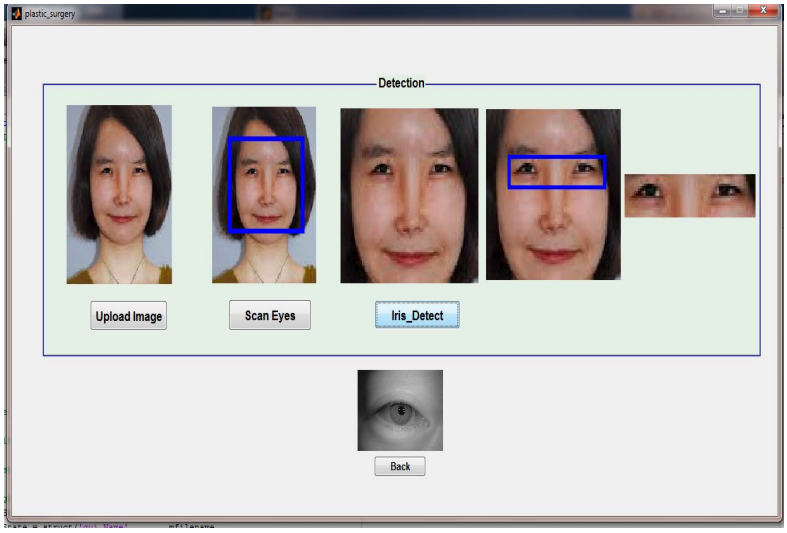

Fig 5.2:Original image

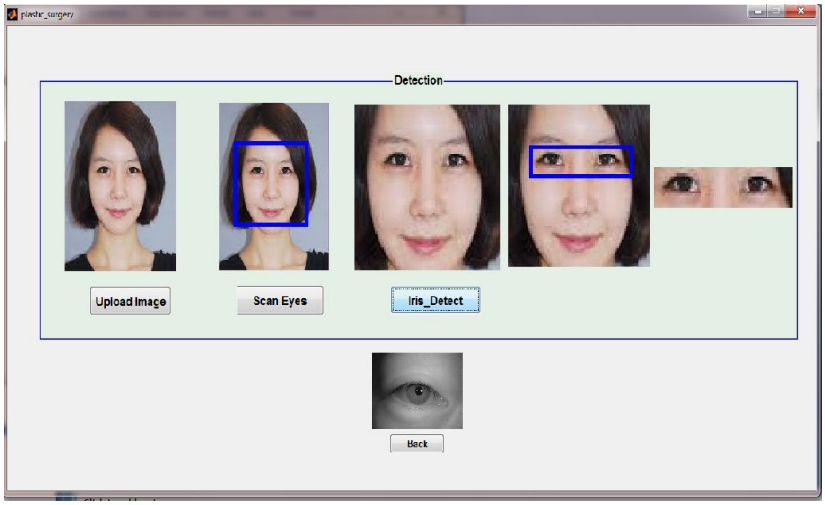

Fig 5.2.1: plastic surgical recognition

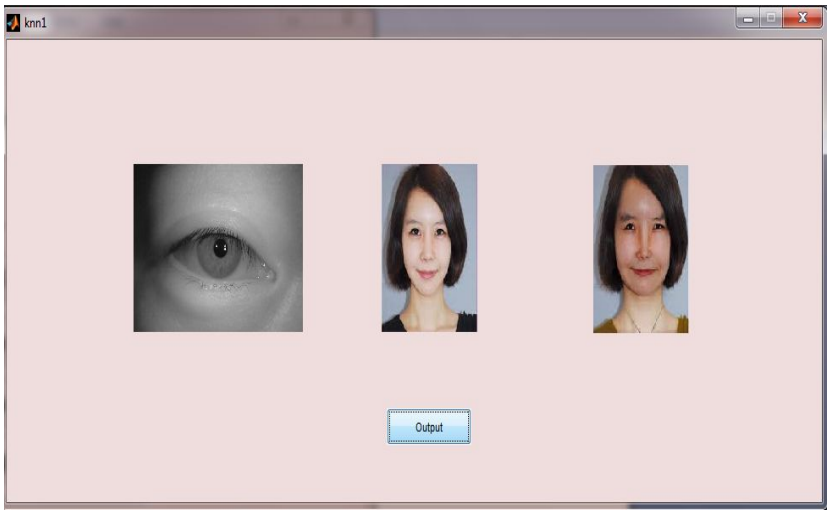

Fig 5.2.2:output of recognise face

VI. CONCLUSION

In this paper, data mining and image processing algorithm suitable for iris recognition has been suggested and analysed. The developed model is reliable and can perform extract features. This model will be useful to detect the features in any iris image.. Biometrics is typically defined as the study of methods of making measurements of physical, biological or behavioural attributes that can be used to identify a person. Within the field of biometrics, fingerprint, face and iris are often thought of as the current major general purpose methods. This perception is reinforced by the fact that the Unique ID, or ―Aadhar, project currently in progress in India aims to acquire face, fingerprint and both irises for all of the approximately 1.2 billion residents of India.

VII. FEATURES SCOPE

We described a method for the feature extraction that takes into account the typical characteristics of the images, namely their noise regions determined by the imaging environment. This document stress that this approach is compatible with different imaging environments, since each recognition system will select a proper sub set of features that are further taken into account in the recognition process, through the comparison with the correspondent enrolled features.

Advantages and drawbacks of various biometric systems:

Biometric system	Advantages	Drawbacks
Finger print verification-based recognition	This approach is a proven and highly accurate one. Hence it is used widely and has the ability to enrol multiple fingers. The system comes with a wide range of deployment environments.	The verification system reminds one of law enforcement in the minds of the users. Impaired or damaged fingerprints can be difficult to verify. Standards for interoperability need to be established.
Iris and retinal scanning-based recognition	Operations are highly reliable and hands free and the characteristic remain stable over a lifetime	This is a highly sophisticated technology that needs proper training. Sometimes glasses with strong lenses can impact the performance of the system.
Hand geometry-based recognition	This can operate in challenging environments. It is perceived as a non-intrusive and highly-established technology	Complications might arise when used with certain populations. There can be a perception of bio-hazard due to potential spread of germs. Possible changes to the shape of the hand can lead to failed authentication.
Facial recognition	This can operate without user compliance, work from a distance, and leverage existing image databases to establish identity	The system is susceptible on error. Non-matching depends on factors such as lighting, camera angle and facial alterations caused by surgery, accidents and the like.

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