AN ADVANCEMENT TO DIVERSE IRIS DETECTION AT CODE – LEVEL

M.Lavanya[1] , P.Nivethika[2], N.M.Shamili[3], R.Rahila[4]

[1,2,3,4] *Dept of IT, Jeppiaar SRR Engineering College, Tamil Nadu, India.*

Abstract - *IRIS codes are acknowledged to be uncorrelated not only between unrelated persons, but also even between identical twins and between the left and right irises of the same person.One may also imagine rotating the sensor upside-down when capturing the iris image, which is a septic kind of spoofing attack, with similar consequences from the biometric security point of view. The goal of this paper is thus to present two methods which classify iris images as L/R, and, independently, as U/D. The first method incorporates a small set of intentionally designed and selected, or "hand-crafted", image features and multidimensional, non-linear classification using a Support Vector Machine. The second method employs a Convolutional Neural Network which learns appropriate features from the data itself. The input is an iris image as typically obtained from current commercial iris sensors using near-infrared illumination. Most subjects have iris images acquired by more than one sensor. Care was taken to make training, evaluation and test subsets subject-disjoint and consistent across the sensors.*

***Key Words**: Spoofing attack, Support Vector Machine*

1. INTRODUCTION

A recent emphasis on security has resulted in increased research attention being offered to the field of individual identification based on "biometrics". A biometric feature is an inherent physical or behavioral trait that is unique among individuals. In addition to these, the human iris can also be considered a valid biometric feature for personal identification. The iris is the colored ring on the human eye between the pupil and the white sclera. Each human iris has a unique "Iris Code" of subtle features that varies greatly from person to person. Iris features remain constant over an individual's lifetime and are not subject to changes produced by the effects of aging as other biometric features may be. For these reasons, the human iris is an ideal feature for highly accurate and efficient identification systems. The uniqueness of iris texture lies in the fact that the processes generating those textures are completely chaotic but stable. Hence in order to use the iris as a biometric, the feature extraction should be able to capture and encode this randomness present in the iris texture.

2. PROBLEM IDENTIFIED

The matching errors can be exploited as security loopholes. AIf a person on a watch list can change the left-right or up-down labelling of their iris image(s), then the false non match result will allow them to evade detection. Due to specific shape of the tear duct and its surroundings, it can be also helpful in upright / upside-down (U/D) classification. However, in this case, the tear duct does not give an obvious and unambiguous anatomical clue for U/D orientation. Rotated and flipped images may occur in a scenario in which a person can alter an original image after acquisition but before it is given to the biometric system. This can be thought of as a natural result of eyelid "droop" being to cover more of the upper part of the iris and less of the lower part of the iris. The features and classifiers were trained using upside-down images created by rotating them 180 degrees. However, upside-down images can also be created by flipping, or mirroring, the upright version along the horizontal axis, or by the sensor being upside-down at the time of acquisition.

3. EXISTING SYSTEM

In this approach the iris images will occupy more memory space the in the database. In early things the eye has to match exactly with the database as if we stored the image. Even a small distraction also will not be allowed.

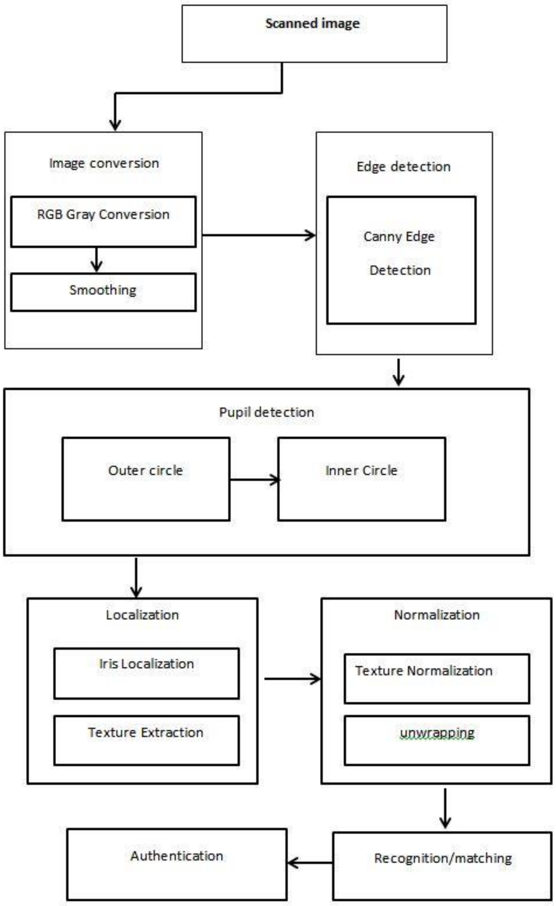
One can take different parts of a face and analyze the presence of the person.

4. PROPOSED MODEL

Iris code Bit Pairs decompression by exploiting Daugman compression algorithm. Gabor filters, which influence the distributions of the bits to identify the bitwise Hamming distance of phase. Decompressed iris images obtained from two public iris image databases are evaluated by visual comparison, two objective image quality assessment metrics, and eight iris recognition methods. Implements and their analyses specifically focused on the intra-relationship of bit pairs in Iris-Codes and local intensity variation-based method proposed by "Spoof" method. Our post-processing techniques are Normalization, Segmentation using phase-based , texture analysis methods.

5. PROPOSED DIAGRAM

The proposed model block diagram is represented as follows:



6. MODULE DESCRIPTION

6.1 Image Conversion

Grayscale images are distinct from one-bit black-and-white images, which in the context of computer imaging are images with only the two colors, black, and white (also called bi-level or binary images). Grayscale images have many shades of gray in between. Grayscale images are also called monochromatic, denoting the absence of any chromatic variation.Grayscale images are often the result of measuring the intensity of light at each pixel in a single band of the electromagnetic spectrum (e.g. infrared, visible light, ultraviolet, etc.), and in such cases they are monochromatic proper when only a given frequency is captured. But also they can be synthesized from a full color image; see the section about converting to grayscale.

6.2 Edge Detection

It is a fundamental tool in image processing and computer vision, particularly in the areas of feature detection and feature extraction, which aim at identifying points in a digital image at which the image brightness changes sharply or, more formally, has discontinuities. The edges extracted from a two-dimensional image of a three-dimensional scene can be classified as

- Viewpoint dependent
- Viewpoint independent.

A viewpoint independent edge typically reflects inherent properties of the three-dimensional objects, such as surface markings and surface shape.

A viewpoint dependent edge may change as the viewpoint changes, and typically reflects the geometry of the scene, such as objects occluding one another.

6.3 Pupil Detection

The acquired iris image has to be preprocessed to detect the iris, which is an annular portion between the pupil (inner boundary) and the sclera (outer boundary). The first step in iris localization is to detect pupil which is the black circular part surrounded by iris tissues. The center of pupil can be used to detect the outer radius of iris patterns. The important steps involved Circular Hough Transformation for pupil detection can be used. The basic idea of this technique is to find curves that can be parameterized like straight lines, polynomials, circles, etc., in a suitable parameter space.

6.4 Normalization

Must remove blurred images before feature extraction. Localizing iris from an image delineates the annular portion from the rest of the image. The concept of rubber sheet modal suggested by Daugman takes into consideration the possibility of pupil dilation and appearing of different size in different images. For this purpose, the coordinate system is changed by unwrapping the iris and mapping all the points within the boundary of the iris into their polar equivalent. The mapped image has 80 × 360 pixels. It means that the step size is same at every angle. This normalization slightly reduces the elastic distortions of the iris.

6.5 Feature extraction

Corners in the normalized iris image can be used to extract features for distinguishing two iris images. The normalized iris image is used to detect corners using covariance matrix. The detected corners between the database and query image are used to find cross correlation coefficient. If the number of correlation coefficients between the detected corners of the two images is greater than a threshold value then the candidate is accepted by the system

6.6 Matching

Two irises are determined to be of the same class by a comparison of the feature vectors, using a Daugman like X-OR operation. Finally matching would be done of the iris. The matching would be done with the trained images. So

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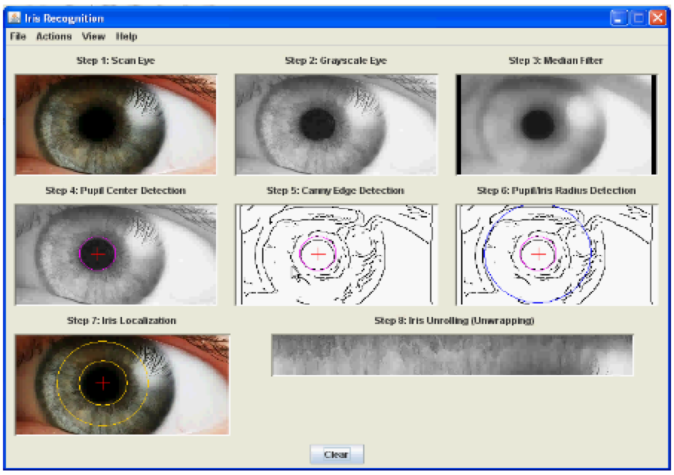
that, if the images are matched and present in our database it shows the details of that person. Details such as his personal details, health details. If he is not matched with the database, then his details will be collected for further investigation, if it is needed.

7. CODING LANGUAGES

JAVA

A platform is the hardware or software environment in which a program runs. The Java platform differs from other platforms that it is a software-only platform that runs on top of hardware-basedplatforms. Normally most of the other platforms are described as a combination of hardware and operating system. The Java platform has two components they are the Java Virtual Machine and Java Application Programming Interface .It's the base for the Java platform and is ported onto various hardware-based platforms. The Java API has a large collection of ready-made software components that provide many useful capabilities, such as graphical user interface widgets, bufferedimage. The Java API is grouped into libraries of related components

8. RESULT AND DISCUSSION



9. CONCLUSIONS

We have explored a method of creating iris textures for a given person embedded in their natural iris texture (or someone else's if desired) using just the iris code of the person. If these textures are used in an iris recognition system, they will give a response similar to the original iris texture. There are some papers that discuss the creation of artificial iris textures using cues from anatomy, or by modeling iris textures using various mathematical models from a pure synthesis point of view. To the best of our knowledge, no work currently exists that starts modeling the iris from the iris code which is generally considered to be unidentifiable data. In our work, we create the iris texture starting from just the iris bit code of the individual and we embed the necessary texture to create a iris code. Our results show natural looking iris images that give a similar recognition (verification) performance as a genuine iris of the same person. As mentioned in the offset of this section, the advantage of this is that we can now create alternate iris textures that will give a very similar iris code when compared to the original iris. As future work, we will explore countermeasures for detecting such attempts.

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