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EXACT AND FAST IRIS SEGMENTATION FOR IRIS BIOMETRICS

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ABSTRACT

Experimental results show that biometric templates containing irises and user attributes generated by different recognition methods can match the central ray of a convex polyhedron cone, and the template protected by the iris template extension method can be broken. is showing. These experimental results show that convex polyhedral cone templates are not considered safe without a thorough safety analysis. This white paper uses performance evaluations within and between datasets to evaluate the effectiveness of this framework for the three published Iris databases. Many types and colors of lenses are available from different manufacturers. Analysis of the effect of these parameters on iris recognition. The proposed approach is superior to other lens detection algorithms in terms of improving iris detection performance. Detecting the presence of contact lenses is the first step in improving the ease and reliability of contact lens wearer's iris detection. Iris templates extraordinary market success relies heavily on its computational advantages, such as very fast matching speeds for large-scale identification and automatic threshold adjustment based on image quality. Many methods modified by the iris template have been proposed for recognising irises and user attributes. The results show that the statistical dependencies form a graph with sparse and structured adjacency matrices. If you compare this graph to a graph whose edges are defined by the dot product of the Gabor filter that produces the iris code, you can see that the partial statistical dependencies are guided by the filter and propagated throughout the graph.

Introduction

A method of applying pattern recognition techniques to recognize an individual's identity based on the iris has been proposed. It also describes how to overcome limited data by transforming an iris image from 2D space to 1D space and generating a composite image. Due to the recent importance of security, attention is focused on the field of personal identification based on "biometrics". Biometric traits are unique physical or behavioral traits that are unique to an individual. In addition, the human iris can be seen as a valid biometric feature for personal identification. The iris is the colored ring of the human eye between the pupil and the white sclera. Each human iris has its own "iris code" with subtle characteristics that vary greatly from person to person. The characteristics of iris are constant throughout life and are not affected by age-related changes like other biometric characteristics. For these reasons, the human iris is an ideal feature for a very accurate and efficient identification system. The uniqueness of iris textures lies in the fact that the process of creating these textures is completely chaotic but stable. Therefore, in order to use the iris as a biometric, feature extraction must be able to capture and encode this randomness present in the iris texture. Based on extensive literature reviews, we classify iris recognition systems into three categories, depending on the method used to extract features from the texture for matching purposes. Due to the recent importance of security, attention is focused on the field of personal identification based on “biometrics".

Literature Survey

[1] Daniel P. Benalcazar1 and Jorge E. Zambrano1 has proposed a 3D model of the human iris provides an additional degree of freedom in iris recognition, which could help identify people in larger databases, even when only a piece of the iris is available. Previously, we reported developing a 3D iris scanner that uses 2D images of the iris from multiple perspectives to reconstruct a 3D model of the iris. This paper focuses on the development of a 3D iris scanner from a single image by means of a Convolutional Neural Network (CNN). The method is based on a depth estimation CNN for the 3D iris model. A dataset of 26,520 real iris images from 120 subjects, and a dataset of 72,000 synthetic iris images with their aligned depth maps were created. With these datasets, we trained and compared the depth estimation capabilities of available CNN architectures. We analysed the performance of our method to estimate the iris depth in multiple ways: using real step pyramid printed 3D models, comparing the results to those of a test set of synthetic images, comparing the results to those of the OCT scans from both eyes of one subject, and generating the 3D rubber sheet from the 3D iris model proving the correspondence with the resulting 2D rubber sheet and binary codes. On a preliminary test the proposed 3D rubber sheet model increased iris recognition performance by 48% with respect to the standard 2D iris code. Other contributions include assessing the scanning resolution, reducing the acquisition and processing time to produce the 3D iris model, and reducing the complexity of the image acquisition system**.**

[2] iu Shuai1,2, Liu Yuanning1,2, Zhu Xiaodong1,2 , Huo Guang3 , Cui Jingwei2,4, Zhang Qixian2,4, Wu Zukang1,2, Dong Zhiyi1,2 has proposed that the research focuses on the constrained iris under different acquisition states, and trains the mixed data without manual label division. A multi-state iris multi-classification recognition method based on convolutional neural network fusion statistical cognitive learning is proposed. The recognition process is divided into an image processing module, a classification module and a result output module. The image processing module converts iris images into recognition tags through convolutional neural network. By combining the characteristics of cognitive learning and statistical learning, the classification module converts iris features of the same category to the convolutional neural network label parameters by data statistical, and forms a single iris cognitive concept, thereby designing a single-category recognizer. Multiple single recognizers are combined in parallel to perform multi-classification recognition by the code less fusion recognition mode, the results are further encrypted by external encryption. The final classification result is exported through the result output module, which can improve the security of data transmission. After confirming stealing attacks, the result output security protocol is activated, and legitimate users who pass the reliable third-party authentication can still get correct results after changing the decryption key and the result output mapping path. In the multi-state iris recognition, the experimental results of JLU iris library demonstrate that the proposed method can ensure the correct rate of the single classifier certification.

[3] Soma Biswas, Member, IEEE, Kevin W. Bowyer, Fellow, IEEE, and J. Flynn, Senior Member, IEEE has proposed that iris recognition has achieved big successes on biometric identification in recent years, difficulties in the collection of iris images with high resolution and in the segmentation of valid regions prevent it from applying to large-scale practical applications. In this paper, we present an eye recognition framework based on deep learning, which relaxes the data collection procedure, improves the anti-fake quality, and promotes the performance of biometric identification. Specifically, we propose and train a mixed convolutional and residual network (MiCoReNet) for the eye recognition task. Such an architecture inserts a convolutional layer between every two residual layers and takes the advantages from both of convolutional networks and residual networks. Experiment results show that the proposed approach achieves accuracies of 99.08% and 96.12% on the CASIA-Iris-IntervalV4 and the UBIRIS. v 2 datasets, respectively, which outperforms other classical classifiers and deep neural networks with other architectures.

Limitations of existing system:

- Biometrics are basically used to identify a person's face, fingerprints, handprints, voice, etc.
- Attempting to identify an image of a person by face requires some serious and tedious parts.
- As the skin can contract over time, the unique identification changes and false positives can occur.
- Any can take different parts of the face and analyze the person's presence. Looking at the fingerprints, each person is unique, but they are still similar. Basically, the fingerprint cannot believe whether it is genuine or fake.
- Finally, speech recognition is also considered to be one of the biometrics for recognizing people, but it also creates bottleneck problems and cannot be guaranteed.
- The iris code generation technique also has a cons of error false report . Analysis of such iris templates also shows significant degradation and reduction of the area of interest. Iris recognition can benefit from similar distances that can explain the importance of different binary bits, instead of using the Hamming distance directly in the literature.

Proposed system

A Fourier transform to detect periodic fake iris patterns commonly found in structured lenses manufactured at the time. IRIS is one of the most promising biometric modalities and is regularly used in large applications such as the UAE port of entry and the UIDAI (Aadhar) project in India. A median filter that affects the distribution of bits to identify the Hamming distance phase. Wearing contact lenses, both soft and textured "cosmetic" soft lenses, reduces the accuracy of iris recognition. Our approach used better matching around the eye and sought to introduce a similarity score for more accurate iris recognition. Our post-processing technique is normalization, segmentation using phase-based texture analysis methods.

Advantages:

- With this technology, users receive a unique ID for their personal iris data.
- Two different contact lens iris image datasets were collected independently from different person , using different iris sensors and scanning different brands of contact lenses.
- We can improve the efficiency and security of your application and consume less memory when saving iris data to the database.
- Instead of saving the iris image, the iris code is saved in the database for quick comparison of the iris data.

Architecture design

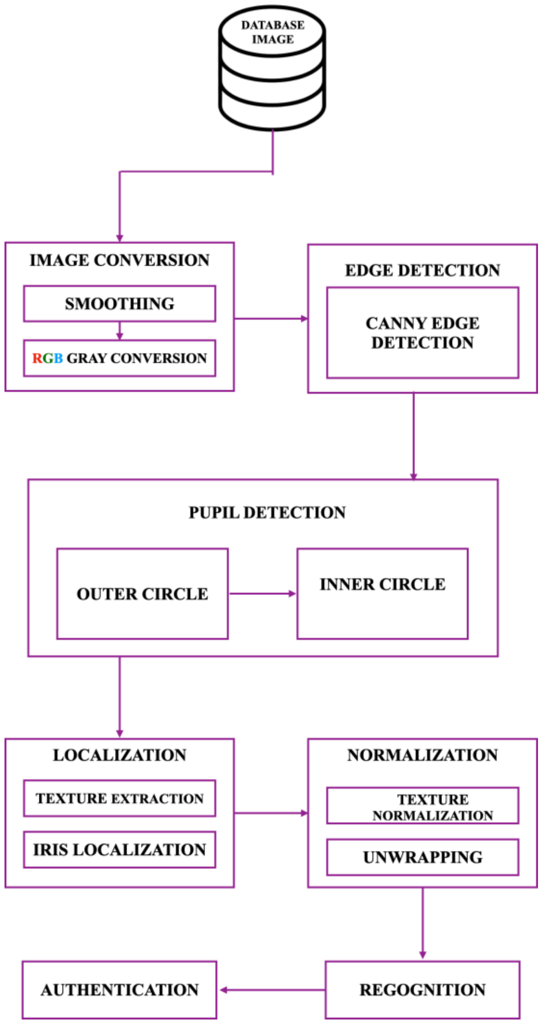

Figure 1 Architecture Design The

Usage of Case Diagram:

An UML use case diagram show the functional units provided by the system. The main purpose of the use case diagram is to allow the development team to visualize the functional requirements of the system. This includes relationships between "actors" (people who interact with the system) and important processes, as well as relationships

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between different use cases. There are two use cases, user and server actors. The user provides the image as input and the server performs the operation.

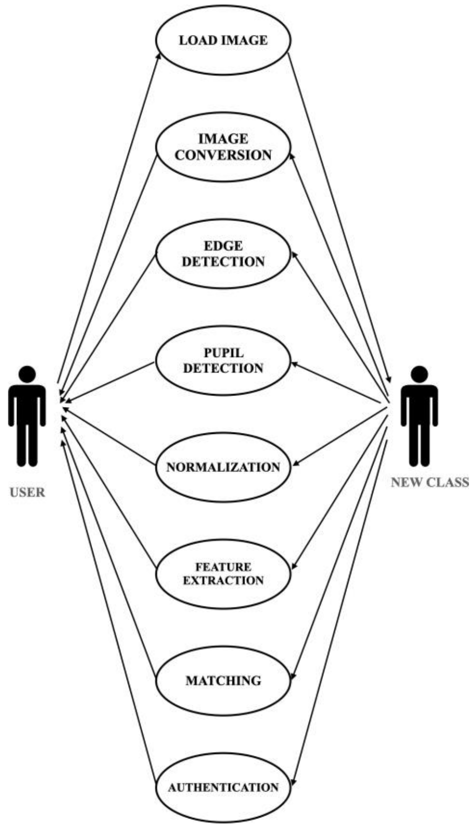

Figure 2: Use Case Diagram

Modules:

There are six modules in our proposed system

1. Image conversion
2. Edge detection
3. Pupil detection
4. Normalization
5. Feature Extraction
6. Matching

Image conversion

Grayscale images are different from 1-bit black and white images. A 1-bit black-and-white image is an image with only two colors, black and white (also known as bi-level or binary image), in the context of computer imaging. Grayscale images have many shades of gray in between. Grayscale images, also known as monochromatic, indicate that there is no color change. Grayscale images are often the result of measuring the light intensity of each pixel in a single band of electromagnetic spectrum (eg, infrared, visible, ultraviolet, etc.), in which case only certain ones. If it is a single color. Frequency captive. However, you can also combine from a full-color image. See the section on converting to grayscale.

Edge detection

Edge detection is a basic tool in image processing and computer vision, especially in the areas of feature detection and feature extraction, where digital images show sharp changes in image brightness or show formal discontinuities. The purpose is to identify the points within. Edges extracted from a 2D image of a 3D scene can be categorised as follows

- Viewpoint dependent
- Viewpoint independent.

Perspective-independent edges usually reflect the unique properties of 3D objects, such as surface markings and surface shapes.

Viewpoint-dependent edges can change as the viewpoint changes and typically reflect the geometry of the scene, such as objects obscure each other.

Pupil detection

The captured iris image must be preprocessed to recognize the iris, which is the annular section between the pupil (inner border) and the sclera (outer border). The first step in the location of the iris is to detect the pupil, which is the black circular area surrounded by the iris tissue. The center of the pupil can be used to detect the outer radius of the iris pattern. The important steps are:

- Pupil detection (inner circle)
- External iris localization

You can use the circular Hough transform for pupil detection. The basic idea of this technique is to find parameterizable curves such as straight lines, polynomials, circles, etc. in the appropriate parameter space. Intensity Removes external noise by blurring the image. However, too much blur can widen the border of the rim and obscure the border of the outer iris that separates the eye and sclera. Therefore, a special smoothing filter, such as the median filter, is applied to the original intensity image. This type of filtering removes a small amount of noise while preserving the boundaries of the image. After filtering, histogram equalization is used to improve the contrast of the image and provide sharp changes at the boundaries of the image.

Normalization

Blurred images should be removed before feature extraction. When you find the iris in the image, a ring is drawn from the rest of the image. The blanket modal concept proposed by Dougman takes into account the possibility of dilation of the pupil and the appearance of different sizes in different images. To do this, change the coordinate system by unwrapping the iris and mapping all points within the boundaries of the iris to their pole equivalents. The mapped image is 80x360 pixels. This means that the step size is the same at all angles. This normalization slightly reduces the elastic strain of the iris.

Feature extraction

You can use the corners of the normalized iris image to extract the features that distinguish the two iris images. The steps for the corner detection algorithm are as follows:

- The normalized iris image is used to detect corners using the covariance matrix
- The corners found between the database and the query image are used to find the intercorrelation coefficient.
- Candidates are accepted by the system if the number of correlation coefficients between the detected corners of the two images is greater than the threshold.

Matching

By comparing feature vectors using an X-OR operation like Dougman algorithm, it is determined that the two irises belong to the same class. Finally, the iris is adjusted. Comparisons are made with trained images. Therefore, if the images match and exist in the database, the details of that person will be displayed. Details such as his personal data, health data, etc. If he is not checked against the database, his data will be collected for further investigation as needed.

SCREENSHOTS

Figure 3 UserHome Page

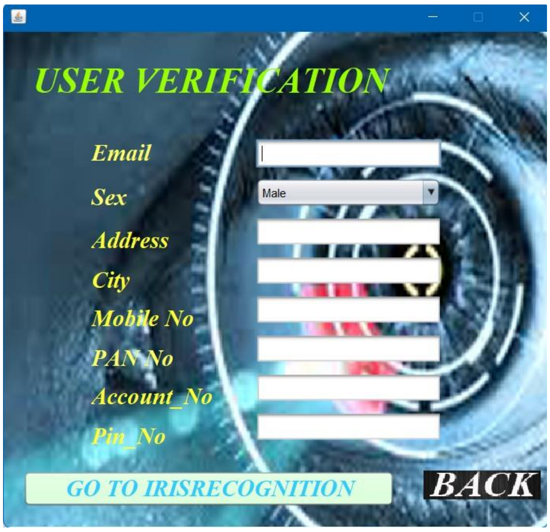

Figure 4 User register Page

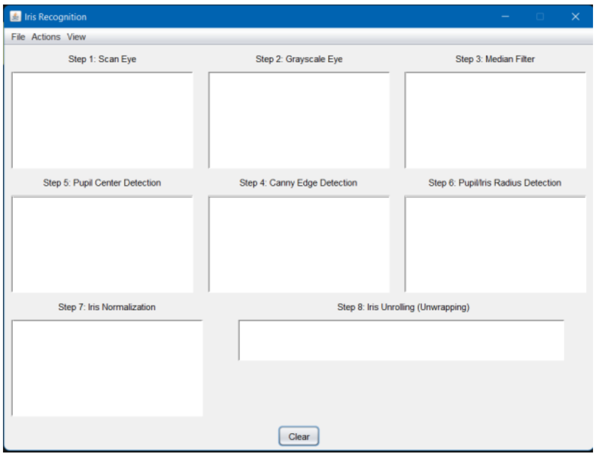

Figure 5 Iris data entry page

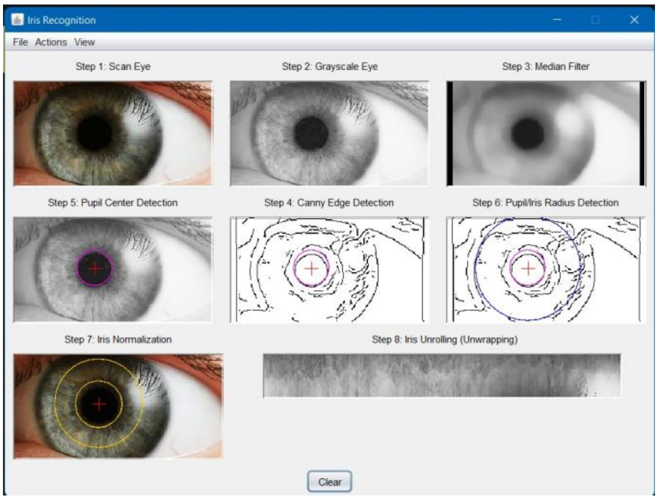

Figure 6 Iris recognition

Conclusion and future scope

In this project explores how to create a particular individual's iris texture embedded in a particular individual's iris texture (or, if necessary, another person's iris texture), using only that person's iris code. Did. When used in an iris recognition system, these textures respond similarly to the original iris texture. There are several articles describing the creation of artificial iris textures by modeling iris textures using anatomical clues or using various mathematical models from a purely synthetic point of view. As far as we know, there is currently no work to start modeling an iris from an iris code. This is generally considered unidentifiable data. In our job, we start with just the personal iris bitcode to create the iris texture and embed the textures needed to create the iris code. Our results show a naturally-looking iris image that provides recognition (verification) performance similar to the actual iris of the same person. As mentioned in the offset in this section, the advantage is that you can create an alternative iris texture that gives a very similar iris code compared to the original iris. As a future effort, we will consider measures to detect such attempts.

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