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IMPROVED SECURITY SYSTEM WITH IRISUSING IMAGE PROCESSING

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ABSTRACT

Iris recognition has been paid more attentions due to its high reliability in personal identification recently. In this project, an iris recognition system has been proposed. The steps of the proposed methodinclude iris recognition, feature extraction and matching of the iris pattern. To describe the iris data DWTbased features are used and for analyze purpose feature matching is employed. The method gives correctclassification rate. The iris image passes through several stages before extracting features stage; first, preprocessing stage which includes image resizing that unifies all images' size, second, segmentation stage which determines the iris region in eye image, finally, normalization stage which converts the iris region to suitable shape with specific dimensions. However, the proposed system achieved recognition rate of 100%.

Keywords: Image acquisition, pre-processing, DWT feature extraction, iris localization, feature matching.

I. INTRODUCTION

Now a days biometric become the crucialpart in every one's day to day life. In a biometric system most commonly use input as face or finger prints or in some other cases voice may use. But these biometric things are not giving accurate result or any other spoofing things are doing. In-order to get a good accurate result we have be taken iris as the biometric part.

In our project we have presented the design and implementation of iris recognition system for security purposed using image processing techniques. To describe the iris DWT (Discrete Wavelet Transformation) base feature extraction and Feature matching techniques are used.

II. LITERATURE SURVEY

A. Robustness: in robustness deep learning is applied to iris recognition and deep neural network for recognition to get the accurate and improve its performances. The method achieves the accurate than the traditional method [1].

B. Chengqiang and Mei: in this study DLDA (Direct Linear Discriminant Analysis) algorithm to extract iris features. For iris recognition the ED (Euclidean distance) classifier is used. This method achieves the accurate result.[2].

C. Kaushik and Prabir: in their improvement of iris recognition the chain code and zigzag collarette area is used. The idea of using zigzag collarette is used to capture the important part of iris in the eye. For recognition and feature matching they has used Gabor Wavelet technique and SVM (support vector mechanism) respectively. This method achieves 99.36% accuracy result.[3].

D. Ahmed M Sarhan has used DCT (Discrete Cosine Transformation) algorithm forfeature extraction of iris and ANN (Artificial Neural Network) classifier is used to classify these features. This method gives the efficient result for iris recognition.[4].

E. Tallapragada and Rajan used combination of GLCM (Gray-Level Co-Occurrence Matrix) and HWT (Haar Wavelet Transform) to increase the high efficiency of iris recognition system. These techniques are used to extract features from iris. For feature extraction of iris an ANN (Artificial Neural Network) classifier is used.[5].

F. Rashad, Shams and El-Awady proposed LBP (Local Binary Pattern) algorithm for extracting the features and for feature matching they combined the ANN (Artificial Neural Networks) and LVQ (Learning Vector Quantization)

is used. The combination of both produced a hybrid pattern depending on the features. To separate the iris from the eye localization and segmentation Hough Circular Transform and Canny edge detection areapplied.[6].

G. Sarmah and Kumar has suggested a system for verification of iris. A new mechanism system was proposed to verify theuniqueness of the iris. In this system there are two stages consists, iris pre-processing and iris authentication. To extract the features of iris LMI (Legendre Moment Invariants algorithm) is used. On other hand, KNN classifier is used for feature classification.[7].

III. EXISTING SYSTEM

In existing system, we are used two types of techniques to approach the results. One is to extract the features of the image using DCT (Discrete Wavelet Transform) and for theclassification of images we are using (SVM) Support Vector Machine algorithm. But with these types of techniques, we are not capable toachieve the best results. That's way we areproposing one new technology to get the performance accuracy.

IV. PROPOSED SYSTEM

In proposed method we are going to use DWT (Discrete Wavelet Transform) and feature matching algorithms to implement the results. The techniques which we are using in proposed method is advance than our existing techniques. In this project entire results, we are going to achieve with a step-by-step process. The flow will start from the acquiring iris imageand to the recognition of iris to the database images. The hamming distance calculation alsowe are showing in the results.

V. METHODOLOGY

In our project which is IMPROVED SECURITY SYSTEM WITH IRIS USING

IMAGE PROCESSING the main aim is to detect the iris form the eye and then process the iris using image processing techniques then after matching with local database. On other hand firstly creating the data base. To load the data base the algorithm is use. The block diagram shown below gives the moreinformation about the detail expiation about theproject.

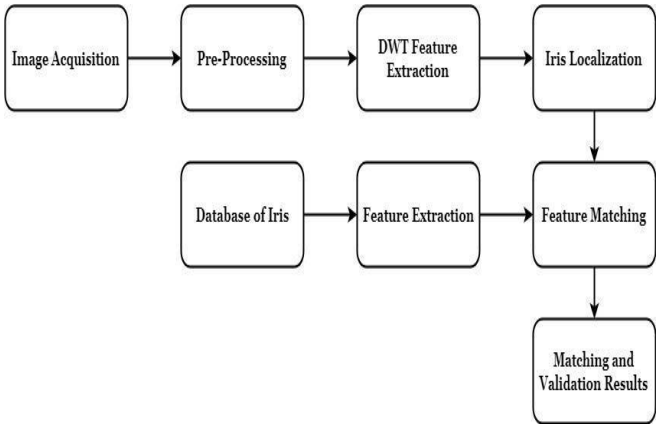

Figure:1 BLOCK DIAGRAM

Iris recognition is a biometric identification technology that uses the unique pattern of the iris to verify an individual's identity. The iris is the colored portion of the eye that surrounds the pupil, and it has a complex and distinctive pattern of furrows, ridges, and striations. Iris recognition technology has become increasingly popular in recent years, as it offers a high level of accuracy, security, and convenience in a variety of applications, including border control, access control, and financial transactions

In this project was improved as the one-by- one process to get the ultimate result. The firststep is the acquisition, pre-processing, DWT feature extraction, iris localization, feature matching and Matching with the local database

IMAGE ACQUISITION:

The image acquisition is the first step involves in the project. The processing of acquiring the image from outer source which means the camara or any sensor the used for the image capturing. Image acquisition is the main processing in the digital imageprocessing algorithm. In this process the continuous form of image is taken for the further process.

PRE-PROSSING:

The captured image may involves the various types of noise or distortion, this may leads not get the accurate result. To get the accurate result of iris recognition firstly the noise and distortion is removed and then the remaining processing is done.

In pre-processing technique there are several methods are involved. Firstly, the continuous form of image

is converted into the digital form. In this the image is completely converted into digital form. In any methodology of image processing the image should convert into digital image. Next the image is resizing. In this the size of the image is sized into 225*225 pixels. If the digital image is more then the or less then the size of 225*225 pixel, in this process converts into exactly 225*225 pixels.

In the pre-processing step the further is colouring. The processing of adding or changing the colour of image in image processing is called colouring. In colouring technique, the image is processed as gray colouror RGB colour. Mostly changes into gray colour.

The next thing is segmentation. The segmentation is the process of dividing an image into multiple segments or regions based on various characteristics, such as color, texture, intensity, and boundaries. The aim is to group together pixels with similar properties while separating them from the surroundingpixels with different properties.

DWT FEATURE EXTRACTION:

DWT (Discrete Wavelet Transform) technique is used in the digital image process to extract the features from the image using wavelets. The DWT transform image into set offour coefficients. Which are approximate coefficient, vertical coefficient, horizontal coefficient and diagonal coefficient patterns, which can be used to extract features of the image.

The DWT technique involves the performing a wavelet decomposition of image into multiple levels each with different frequencies. The wavelet decomposes the high frequency images into low frequency. This technique involves the feature extraction and feature matching for iris recognition

IRIS LOCALIZATION:

Iris localization is the crucial step in the entire process of iris recognition. In iris localization several steps are works internally to get the accurate result of recognition.

In this step the single part of the iris is detected from the eye for that some techniques are used. Those are pupil detection, iris edge detection and iris normalization. To detect the pupil which means the center of the eye, to detect the Hough circle transform is used in this project.

The further iris boundaries detection, to detect the iris boundaries some image processing techniques are used which are canny edge detection technique. Lastly iris normalization, in this step the fixed size and position of iris region is recognized. Then to ensure the iris to feature matching.

FEATURE MATCHING:

The agenda of feature matching is to detect the corresponding regions between the two iris images. In feature matching technique the image features are taken the path to recognize the each and every segment of the iris part and then compares the iris with local data base using Hamming distance. In the feature matching the hamming distance playasa major role to recognize the input iris with local data base iris.

VI. SOFTWARE

This project runs with the help of programming language MATLAB and code editor. In MATLAB editor we write the iris recognition code and run it. MATLAB stands for matrix laboratory. MATLAB is known for its excellent features and best suitable for imageprocessing. MATLAB is a licensed platform. MATLAB is widely used in various applications like numerical computation, visualization, signal processing, image processing, programming. It is also used inengineering, mathematics and physics.

MATLAB provides various environments and tools for developing various applications. It provides graphics and visualization for 2D and 3D animations. It alsoprovides development applications using Graphical User Interface (GUI) development interface.

To interact with MATLAB a high-level-programming language like C or C++ are used.It is integrated with C, C++ and java as well as databases. Simulink: MATLAB also includes Simulink, a graphical modeling and simulation tool that allows users to model and simulate complex systems using block diagrams.

ADVANTAGES

- Calculating the hamming distance is easy
- No physical contact when scanning
- Accurate matching performance.

- The iris is protected by the cornea so it doesn't change much as people age.
- Difficult to spoof.

APPLICATIONS

- National border controls
- Secure access to bank accounts at cashmachines.
- Forensics; birth certificates; tracing missingor wanted persons.
- Anti-terrorism.

VII. EXPERIMENTAL RESULTS

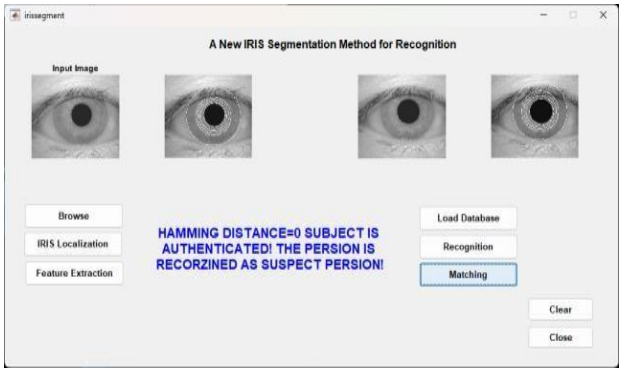

Figure.2: Result for suspect person

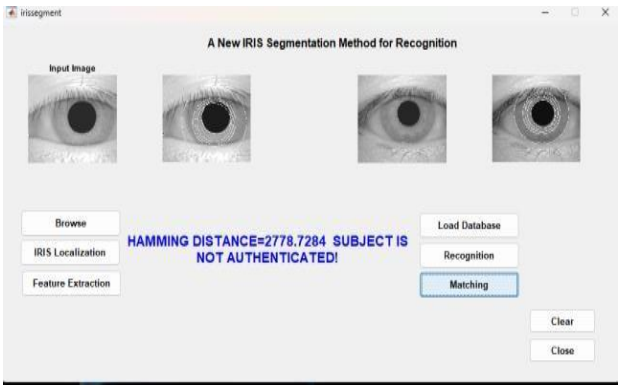

Figure.3: Result for non-suspect person

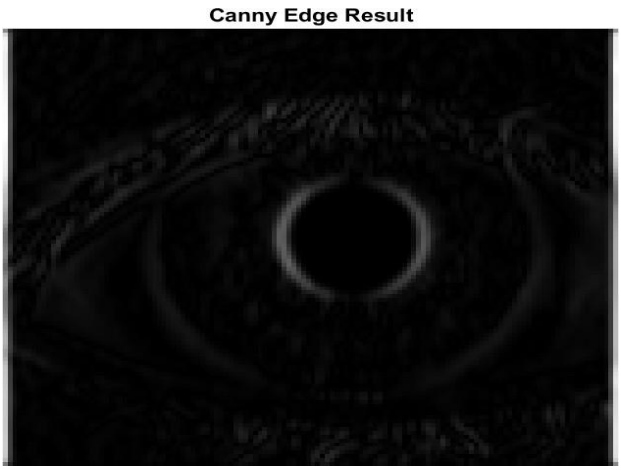

Figure.4: Canny Edge Result

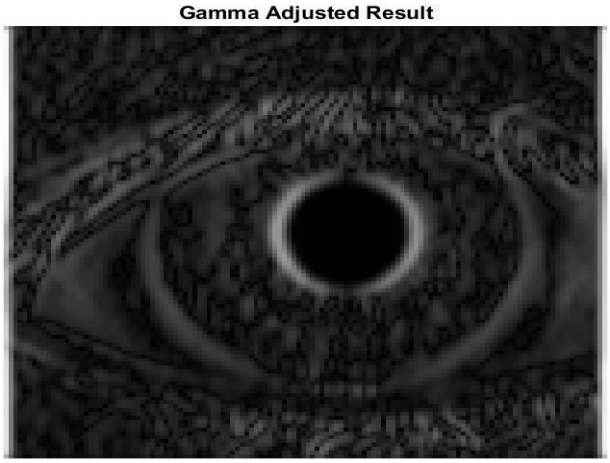

Figure.5: Gamma Adjusted Result

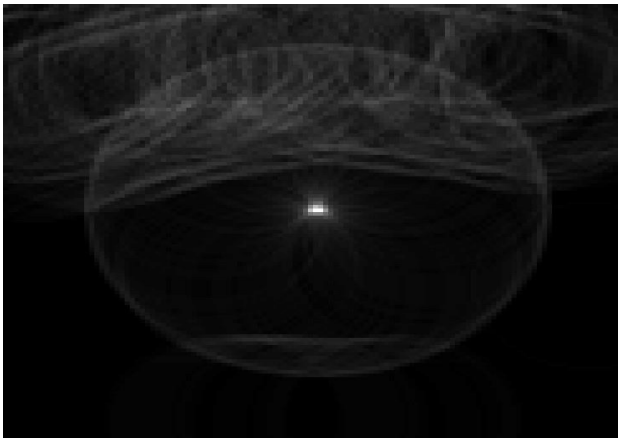

Figure.6: Hough Circle Result

VIII. CONCLUSION

In conclusion, iris recognition is a biometric technology that uses the unique pattern of the iris in the human eye to identify individuals. It is a reliable and accurate method of identification, with a low error rate and high level of security. The process of iris recognition involves capturing an image of the iris using a specialized camera, and then using software algorithms DWT feature extraction and feature matching and analyze the unique patterns of the iris. Finally it achieves the accurate result of recognizing iris.

IX. FUTURE SCOPE

• Improvements in accuracy and speed: There is a continued focus on developing more accurate and faster iris recognition algorithms. This will lead to more reliable identification and faster processing times, enabling iris recognition to beused in a broader range of applications.

• Improved hardware: The development of specialized iris cameras with higher resolution and better image quality will improve the accuracy and reliability of iris recognition. This will lead to wider adoption of the technology across various industries.

• Multi-factor authentication: Iris recognition is expected to be used in combination with other biometric technologies, such as facial recognition and fingerprint scanning, to provide multi-factor authentication. This will enhancethe security of various applications, such as online banking and e-commerce.

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