IRIS RECOGNITION SYSTEM

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Abstract: With the need for security systems going up, Iris recognition is emerging as one of the important methods of biometrics-based identification systems. This project basically explains the Iris recognition system attempts to implement this algorithm in Matlab. Firstly, image preprocessing is performed followed by extracting the iris portion of the eye image. The extracted iris part is then normalized, and Iris Code is constructed using 1D gabor filters. Finally two Iris Codes are compared to find the Hamming Distance, which is a fractional measure of the dissimilarity. Experimental image results show that unique codes can be generated for every eye image.

Keywords: iris normalization, aliasing, iris recognition, biometric.

1. INTRODUCTION

Security of computer systems plays a crucial role nowadays. Computer systems require remembering passwords that may be forgotten or stolen. Thus biometrical systems, based on physiological or behavioral characteristics of a person, are taken into consideration for a growing number of applications. These characteristics are unique for each person, and are more tightly bound to a person than a token object or a secret, which can be lost or transferred. Therefore, touch-less automated real-time biometric systems for user authentication, such as iris recognition, became a very attractive solution. It has been successfully deployed; in several large- scale public applications, increasing reliability for users and reducing identity fraud. This method of identification depends on relatively unchangeable features and thus it is more accurately defined as authentication.

2. LITERATURE SURVEY

[1] "Performance Analysis on Iris Recognition Based on Half Polar Iris Localization and Normalization Method using Modified Low Cost Camera", KalamullahRamli, Rudy Nurhadi, Yohan Suryanto, Alfan Presekal Center FAIRNESS, Computer Engineering

We conclude that implementation of Half Polar Iris Localization improves accuracy of detection. By using modified camera and implementing proposed method, better accuracy for Iris Localization could be obtained, and hence suitable for [Iris recognition.

[2] "Efficient Iris Spoof Detection Via Boosted Local Binary Pattern", Z. He, Z. Sun, T. Tan, and Z. Wei Year: 2009

Iris textures are commonly thought to be highly discriminative between eyes, they (including the contact lens wearing iris textures) still present several desirable common properties, such as: The radial distribution: Even within an iris, the scale of the iris micro-structures varies a lot along the radius

[3] "A Novel Approach for Iris Recognition", Rocky Yefrenes Dillak Electrical Engineering Department

Biometrics system basically relies on a form that varies randomly in humans. Unlike other security systems, biometrics does not require a password that is made or given by person otherwise it works by individual physics such as fingerprints, hand geometry or iris.

[4] "Multi-spectral Iris Segmentation in visible Wavelengths", T. Schlett, C.Rathgeb and C.Busch

2018 International Conference on Biometrics This work presents a comprehensive multi-spectral analysis to improve iris segmentation accuracy in visible wavelengths by transforming iris images before their segmentation, which is done by extracting spectral components in form of RGB color channels.

[5] "Predicting Eye Color from Near Infrared Iris Images", Denton Bobeldyk1,2 Arun Ross1 2018 International Conference on Biometrics

In this work, we develop a method to predict the color of the iris from NIR images. In particular, we demonstrate that it is possible to distinguish between light-coloredirides (blue, green, hazel) and dark-coloredirides.

3. BLOCK DIAGRAM



Block Diagram Description

[1] Image Acquisition: Acquisition basically means getting the information from the source. Image of iris of the person is acquired by using optical lens, illuminators, image sensors etc which take care of various aspects like resolution, sensitivity, intensity of image etc.

[2] Image Segmentation: It is the process of obtaining all the different segments of the eye like pupil diameter, eyelashes, and eyelid etc. so that all the relevant and irrelevant information can be sorted out for future processing. It will increase the efficiency and thus save time. Segmentation includes applying edge detection method also that finds the pixels denoting the edges etc by fixing a threshold value. If the gradient is above the threshold value then it is accepted as an edge, if it is below the gradient then it is rejected and if it is between the two threshold values then it is accepted if it touches an accepted pixel. Canny edge detection method is used for the pixels.

[3] Iris Localization: Iris localization by definition means to isolate the actual iris region in a digital eye image by detecting the inner and outer boundary of the iris. Figure 1 shows the Iris Localization. The eyelids and eyelashes normally occlude the upper and lower parts of the iris region.

[4] Iris Normalization: Once the iris region is segmented, the next stage is to normalize this part so as to enable the generation of the iris-code and their comparisons. Since the variations in the eye, like optical size of the iris, position of pupil in the iris, and the iris orientation change from person to person, it is required to normalize the iris image so that the representation is common to all, with similar dimensions. The normalization process involves un-wrapping the iris and converting it into its polar equivalent.

[5] Image Encoding: Encoding deals with encoding of unique iris patterns obtained in form of bits code by various means like filters wavelets etc.

[6] Image matching: Matching deals with matching of the iris pattern code encoded with previously stored patterns in the database in the form of biometric template

SOFTWARE

MATLAB® is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Typical uses include

- Math and computation
- Algorithm development
- Data acquisition
- Modeling, simulation, and prototyping
- Data analysis, exploration, and visualization
- Scientific and engineering graphics
- Application development, including graphical user interface building.

MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. This allows you to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of the time it would take to write a program in a scalar non interactive language such as C or FORTRAN The name MATLAB stands for matrix laboratory. MATLAB was originally written to provide easy access to matrix software developed by the LINPACK and EISPACK projects. Today, MATLAB engines incorporate the LAPACK and BLAS libraries, embedding the state of the art in software for matrix computation

4. FLOWCHART



Fig.2- Flowchart for of IRIS recognition

5. RESULT: Iris recognition system is highly accurate, positive personal identification, is feasible today using the iris of the human eye. This unique organ, which has more discriminators than any other biometric feature currently in use, remains stable throughout a lifetime. iris, digitize the features, which is then compared against an entire database in less than two seconds. Identifications can then be used to control access and entry, or to provide identification information to an existing entry control system.



Fig.5- Authentication Result



Fig.6: Not Authentication Result

6. FUTURE WORK: To make the study more useful and effective the following suggestion have been proposed for further improvements in this area. To develop improved algorithms and data capturing sensors to reduce the level of failure to enrol and failure to acquire rate. To work on optimization of the code, so that the segmentation software can run in real time applications.

7. ACKNOWLEDGEMENT: We would like to thank our guide Dr.A.A.Patil of E&TC department for the valuable guidance and constructive suggestions, this helps us in making our project.

8. CONCLUSION: The proposed system recognizes the iris of the persons in the dataset based on the features extracted using DWT. The extracted features are based on the DWT which is statistical features extracted from the image. The extracted features were optimized using Genetic algorithm. The recognition of the iris is done using the distance metrics. The proposed system gives accuracy which is higher than the existing algorithms which identifies that the misclassifications are reduced to a greater extend. The input iris images were taken form CASIA database. Basic preprocessing steps like resizing and noise removal process were employed. For noise removal process median filter is employed. Canny edge detection process is employed to the enhanced iris image. Image gradient is employed for the enhanced iris image. Hysteresis thresholding is employed for the iris and the pupil regions. Circular Hough transform is applied for the iris images in order to identify the iris and pupil regions. The features were extracted from the images based on the DWT process. The extracted features were then optimized based on Genetic algorithm.

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