IRIS RECOGNITION USING MACHINE LEARNING TECHNIQUES

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Abstract :

One of the main results of the validation system is based on the iris recognition system and respective technology. The entire biometric process is very much authentic and unique than the other types of recognition system and validation process. This has provided innovative ideas in the daily lives of human beings. Iris recognition using CNNs has gained attention due to its high accuracy, robustness, and efficiency. In this project, we present an overview of iris recognition using CNNs, including its advantages over traditional methods, the architecture of CNNs for iris recognition, and the steps involved in the iris recognition process using CNN. The entire process has been generally included with the proper sensitivity of noise, the population coverage areas, variability cases of the inter class and intra class issues, vulnerability cases of possible hacking and the non universality criteria.

INTRODUCTION :

The biometric process has been mainly used to recognize individual types of physical aspects and features. For this purpose, a tremendous amount of acknowledgement technologies have been generally provided with the actual fingerprint, iris procedures and voiceacknowledgement. The biometric mainly deals with the proper technical and technological fields for the body controls and body dimensions. The authentication system is based on the appropriate biometric security system that has increased the actual importance within all countries. The used system has been shown the proper valid and best impressive performance based on all these procedures and aspects. For this purpose, the fingerprint is the only procedurefor providing the proper security techniques to provide the true uniqueness and the strong privacy properties of the entire system. The exceptional fingerprint assurance or the proper kindof imprint approval has been mainly insinuating the automated methods and procedures to ensure similarity between the two people fingerprints. The entire chapter has been generally provided with the actual purpose of the fundamental research that is overall dependent on the research objectives and respective research questions. In this chapter, the research framework of the

entire study has also been provided. The fundamental research has described all the factorsthat are responsible for this recognition process. Biometrics is related to human unique characteristics. The most promising methods for authenticating a user are biometric systems. Biometric authentication can be favoured over many conventional strategies, such as smart Cards and passwords since information is hard to steal here in biometrics. A biometric recognition device is used to recognize a person under surveillance and access control. Physiological characteristics and behavioral characteristics are commonly classified as biometric identifiers. Physiological characteristics are associated with the physical properties of the body, such as fingerprint, palm veins, DNA, facial recognition, iris, and so on. The other category referred to an individual's model behaviour, such as voice, gait, etc. Biometrics offers an important protection platform in both physiological andbehavioural ways. Biometrics has been fully integrated into our everyday lives. Many studies have shown that other biometrics such as the ears, fingerprint, the iris have severaladvantages. Iris is also approved for precise and accurate biometric systems. It is considered tobe one of the correct biometric identification. Iris is the annular eye region between the white sclera and the black pupil, which makes it entirely shielded against environmental conditions. The texture of the iris provides a high degree of randomness and individuality, which is very unlikely to be unique in any of the two iris patterns, either for identical twins or from a person's left and right eyes. This consistency in iris patterns is primarily due to the richness and differentiation within the iris texture features, including circles, ridges, crypts, freckles, furrows, zigzag patterns. This property makes it a reliable way of recognizing people. Also, the iris pattern remains constant until he died for an individual. This recognition approach is therefore considered safer and less vulnerable to spoo
fing attacks.

OBJECTIVES:

- First, this project manages to eliminate the irissegmentation phase since in conventionalIRS, its' failure can indirectly affect the recognition rate.
- Second, transferability of pre-trained ConvNet model can be tested using support vectormachine (SVM) classifier with transfer learning technique.
- Third, a high-performance ConvNet model that able to run IRS task is developed usingtransfer learning technique.

• To get high performance, High efficiency and Accuracy of Recognition

Implementation of Counterfeit Iris Detection Based on Texture Analysis

• This paper addresses the issue of counterfeit iris detection, which is a liveness detectionproblem in biometrics.

• Fake iris mentioned here refers to iris wearing color contact lens with textures printed onto them.

• We propose three measures to detect fake iris: measuring iris edge sharpness, applying Iris-Texton feature for characterizing the visual primitives of iris textures and using selected features based on co-occurrence matrix (CM).

• Extensive testing is carried out on two datasets containing different types of contact lens with totally 640 fake iris images, which demonstrates that IrisTexton and CM features are effective and robust in anticounterfeit iris.

•Detailed comparisons with two state of-the-art methods in literatures are also presented,showing that the proposed iris edge sharpness measure acquires a comparable performance with these two methods, while Iris-Texton and CM features outperform thestate-of-the-art.

• The two data sets used in this Analysis are CASIA and BATH

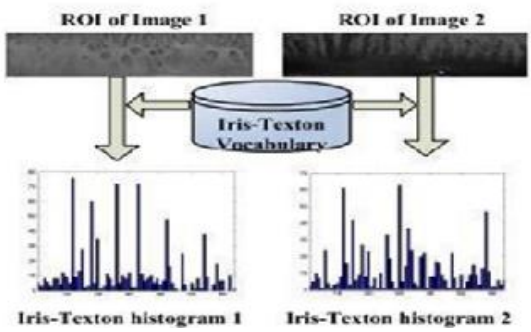

Fig:-1 Obtaining Iris-Texton Histogram

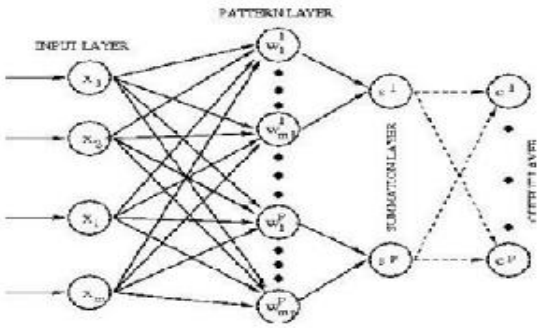

Fig:-2 Flow Process of Counterfeit

PROPOSED SYSTEM

Objective Of Proposed System Our proposed system is iris recognition s using machine learning. In this system we are going to to use the Convolutional neural network(CNN) for feature extraction and classification to increase the efficiency of the recognition. The proposed technique has been successfully applied and also clearly demonstrates theperformance of the experimental evaluation on iris images from the CASIA database. In this project there are few step to implement the system 1. Image Acquisition 2. Segmentation 3. Normalization 4. Feature Extraction 5. Matching 6. Result

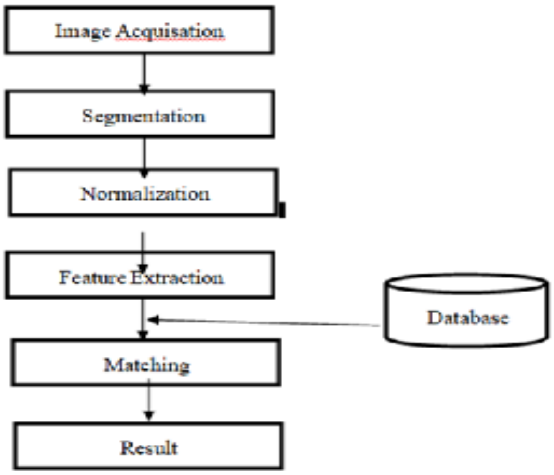

Fig 3 Flow Chart

Algorithms Used Iris Segmentation:

• The next step of iris recognition is iris segmentation, is a process to isolate the actualiris region in a digital eye image.

• We use hough transform algorithm for this irs segmentation

• Segmentation using hough Transforms

Fig:-4 Iris Segmentation

• The system looks for the Iris-pupil boundary within that circle after determining the Iris-sclera boundary. The Eq.(1) is the generalized expression for Circular Hough Transform,whereas the expansion for Eq.(1) is stated in Eq.(2) having the circle information

• H (a, b, r) = h (xi, yi , a, b, r) n i=1 --(1)

• Here ($x\,i$, $y\,i$) is an edge pixel and i is the index of the edge pixel • Where h (xi , yi , a, b, r) = (xi − a) 2 + (yi −b) --(2)

• The Circular Hough transformation is used to determine the iris and pupil's center and radius. The radius is denoted by r and the center of the iris is represented by (a, b) and the coordinates of the circle are(xi , yi). The pair of equations at Eq.(3) results in the expression of the circle equation in parametric polar form.

• a = x + rcos θ b = y+ rsin(θ) ---(3)

• The edge image in Hough space is used to cast votes for the parameters, with the central coordinates (xc, yc,) and the radius 'r' of circles passing through each edge point. They are capable of describing any circle by such criteria. In general, it is difficult for edge detectors to adapt to various situations.

• The quality of edge detection is heavily dependent on the lighting conditions, the presence of similar intensity objects, the density of the edges in the scene, and also the noise.

• To minimize the search space, the eye image must be improved both before and after theedge map is created. A 2D median filter is used in this work to smooth the eye image and reduce noise.

RESULTS:

In above graph red line represents CNN model loss value and we can see at first iteration loss was more than 4% and when epoch increases then LOSS value reduce to 0 and green line represents accuracy and at

first iteration accuracy was 0% and when epoch/iterations of model increases then accuracy reached to 98.9% and in above graph x-axis represents EPOCHand y-axis represents accuracy and loss values. Now click on 'Upload Iris Test Image & Recognize' button and upload any test image and then CNN will recognize person ID from that IRIS image. If you want you can upload test image from CASIA folder also and you will see prediction will be correct

Performance Matrix

Sl. No	Name of project	Accuracy
1	Face detection using violajones algorithm	94.8%
2	Counterfeit iris detection based on texture analysis	96.2%
3	Iris recognition using machinelearning technique	98.9%

Table 1 Performance Metrics

In the existing solutions we found that the human identity recognition is not accurate and the segmentation and normalization is also not perfect. So we have come up with the new solutionand with that we have got higher accuracy and greater performance and efficiency

CONCLUSION:

Iris recognition is a promising field of security concern that uses human iris to identify. Each individual in a population is possible to identify by calculating the iris feature. The reason why iris recognition is an attractive field is due to the fact that iris feature cannot be forgotten or lost, they are difficult to copy, share and distribute and they require the person to be present at the time of authentication. However, the enhancement of accuracy mostly depends on feature extraction and classification techniques. So that feature extraction and classification are emphasized in this study. CNN and SVM are relatively new and good performing machine learning techniques for feature extraction and classification. We have choose this technique and our experimental results have demonstrated that the proposed technique achieved good performance in accuracy. This confirms that the proposed strategy of feature extraction and classification is suitable for increasing accuracy of iris recognition

FUTURE SCOPE:

As the future work, we would like to simplify our algorithm for mobile devices (as smartphones) or embedded systems (e.g., based on ARM microcontrollers). On the other hand, we would like to precisely test some other classification algorithms as deep convolutional recursive neural networks. However, to deal with such task we have to enlarge our database. The authors are working under collection of much more samples—at least 1000 of additional images have to be added to the database. In the future, we will also try to implement multimodal biometrics system

with our iris algorithm. This experiment will provide us an evidence whetherthe multimodal solution can guarantee better recognition in short time (or comparable to the time needed in the case of iris).

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