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Research Article

EFFICIENT IRIS RECOGINITION USING GLCM AND SVM CLASSIFIER

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ABSTRACT

The precise solution for the authentication of the personal information and also for the betterment of the security there comes the Biometrics. The issues in protecting the real time information can be defined as, misappropriation of the password either intentionally or by mistake. Thus it results to the poor security and may lead to loss of crucial information. The savior of these problems comes in the form of biometric where human intervention is used in each and every step, but with the zero duplicity. The IRIS analysis is such method which can be used for efficient security. The objective of this system is to analyse the detailed information of the IRIS method. The approach method of IRIS includes the shape, strength and point of placement. The region of the pupil will be unwrapped into one region to other, the data extraction from the pupil will be performed by GLCM (GrayScale Co-occurrence Matrix). The differention will be done further by a classifier called Support Vector Machine (SVM). It will filter out the original from the imposting adversary. This results in the enhanced performance from the present methods.

INTRODUCTION

The data safety is the priority for every single person in every single business as we live in the data age. The validation of the security level is still under constant research and the result lies somewhere in the near future. The types of the validation such as traditional password, user tokens to generate one time-password. At present the talk for the biometric as the next level of the security as it uses human as its code (Dey and Samanta, 2008). It can be classified as two such as physical and behavioral analysis. The current level of the bio-metric uses finger print, retainal analysis, facial analysis and voice array recognition.

The need for the data protection in the sectors like banking, insurance, medical is constantly arising but the level of the data security is alarmingly low. To remind again that biometrics are the additional level of the security which only protects in the second level, the first level data protection will be made in the traditional methods only. The personal credentials can be verified by IRIS, which cannot be duplicated or manipulated. Which makes it harder to steal the access. Similarly key striking, personal signing, voice array will come in behavioural analysis. A biometric system works on collecting and storing information which can be compared with the already stored information which is in the depository. Compare to all the other biometric methods the IRIS is the best, easiest and safest method. Support Vector Machine filters out the genuine user from the imposting adversary.

EXISTING SYSTEM

In existing system, the design and development of

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the two approaches is examined for theIRiS cross domain finding problem. The First approach Naïve Bayes Nearest Neighbor (NBNN) framework to enhance the routine of the IRIS Domain recognition. Due to its accuracy lack it was never used further, but the method can be further probed and developed to improve the accuracy(Duda and Hart, 1972; Ferretti and GraziaAlbanesi, 1996). The another drawback of this system other than low accuracy is, it uses only segmentation and computation time is large.

PROPOSED SYSTEM

The identification of the information about a person using the physical and behavioral characteristics. As these are unique and cannot be impersonified. Some of the behavorial characteristics can be duplicated such as signatures and voice pattern (Handberg, 2006; Zhaofeng, *et al*., 2006). But the physiological methods are highly secure and it is nearly imposible to break the code. Out of the four systems where in the IRIS is confined to circular forms but in other the open up of the IRIS as flat platform (Hough, 1962). The evaluated results of the data set is compared against the result set of the algorithms projected by Dr. Ajay Kumar (Kumar and Passi, 2010). Among all methods, IRIS is gaining the global recognition due to its simplicity and reliability. In most of the system the algorithm used are common, mostly it will create a multiple template and stores it. When the number of users increases, there increase the requirement for the storage that creates unneccesary overheads. To reduce these complexities, instead of creating numerous templates it is enough to create a single dependable specimen. This paper presents the constructive method for performance enhancement. (Fig. 1) Shows the architecture of proposed system

Input image

The first and foremost stage is capturing Iris Image into the system. So the extra care must be taken while capturing the image because the efficiency of the system is based on the quality of the same.

In this paper, PolyU_Cross_Iris database (Peihua and Hongwei, 2012) is used for iris recognition. In this stage, 200 subjects are involved in capturing the images. Images of both eyes are captured with 10 instance for each subject. So total of 200*2*10 (4000) instance has been captured with the picel rate of 480*640.

Pre-processing

The preprocessing stages are resizing, RGB corrections, noise removing (Peihua and Hongwei, 2012). The reduction of unwanted noise in the

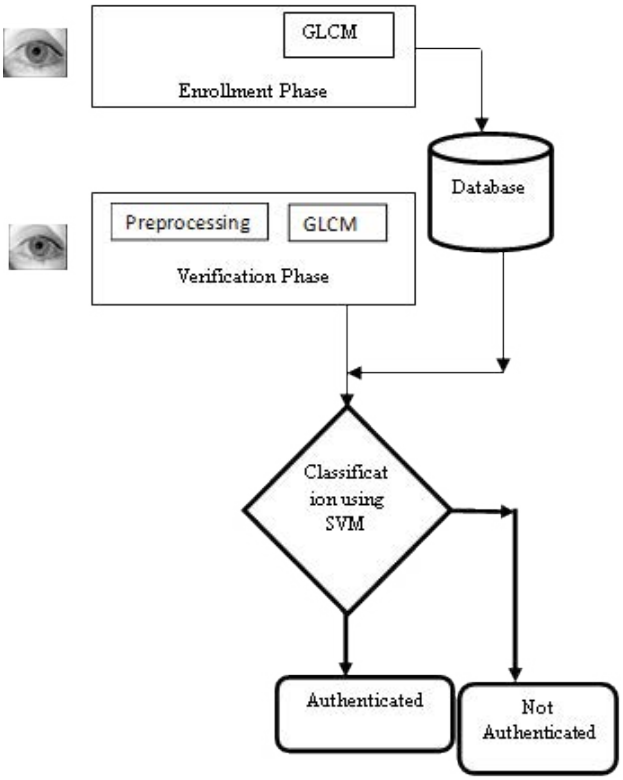


Fig.1 Block diagram of proposed iris recognition system.

images and stailizing the intensity like, reflection removals etc..., Before working out the images computationally the pre processing has to be made to enhance the outcome. The median filter is usually helps to reduce the unwanted noise. (Fig. 2) shows the results of Preprocessing.

Segmentation

In IRIS, the major role was played by the method called segmentation (Lili and Mei, 2005). The success level of the whole project is based on the segmentation. The segmentation stage is nothing but segregating the boundries of the IRIS. The inner and outer boundaries namely pupil and sclera respectively. The final stage is normalizing the eye lids (Fig. 3) Sudivision has three steps:

1. Limiting the inner boundary between pupil and iris.
2. Confining the outer boundary between sclera and iris
3. Restricting boundaries of eyelid and iris.

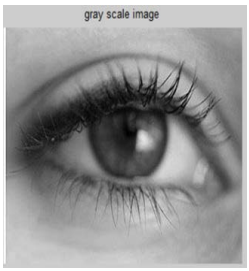
Feature extraction

A systematic form of calculating grain that decides the various dimensional association of pixels is the gray-level co-occurrence matrix (GLCM) (Ma, *et* al. 2002; Miyazawa and Ito, 2005). The functionality of GLCM based on the matrix calculation between

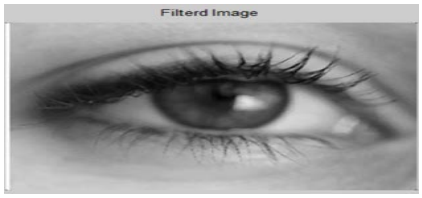
two pixels during various dimensional association. The various data from various dimensions are put together as a matrix to extract a statistical matrix. So that we can extract the features like divergence, association, dynamics and uniformity as shown in the (Fig. 4).

- Contrast- Process the local alternatives in the gray matrix.
- Correlation - Processes the combined possibility event of the itemized pair of pixels.

a) Resized image



b) Grey scale image



C) Filtered image

Fig. 2 Results of pre-processing.

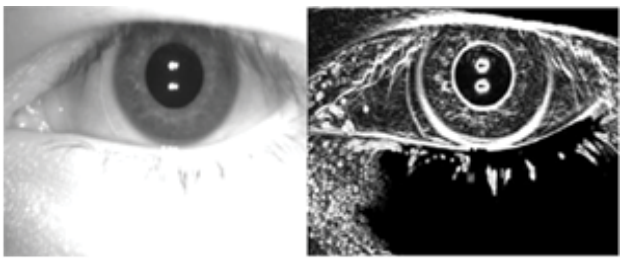


Fig. 3 Results of segmentation.

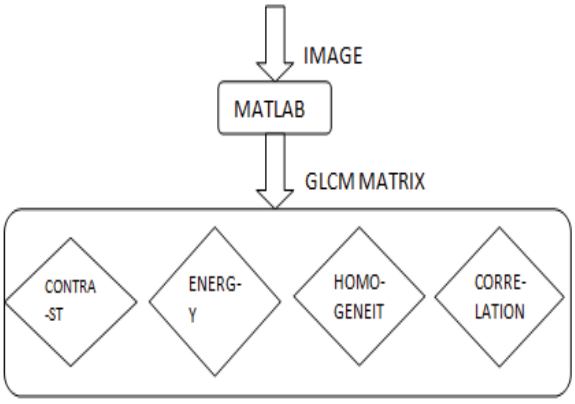


Fig.4 Extraction of image features.

- Energy -gives the value of total sharpened features in the GME.
- Homogeneity -Calculates the familiarity of the distribution of features in the GLCM.

Extraction Using Gray Level Co-occurrence Matrix (GLCM)

In arithmetical matrix analysis, the matrix features are computed from arithmetical values of the various combinations positioned to each other image. According to pixel in every combination it is differentiated as first, second and higher order.

The Gray Level Co-occurrence Matrix (GLCM) (Mohammadi and AbolghasemRaie, 2013; Dey, *et al*., 2013) method is a way of mining second level arithmetical consistency structures. This tactic has been used in various applications, Third level and higher level consistencies reflect the interactions among three pixels. They are hypothetically probable but not frequently applied due to time calculation and understanding difficulty.

A Gray Level Co-occurrence Matrix (GLCM) is a matrix which has number of rows and columns with equal to the number of gray echelons, G. The matrix value P (x, y | Δa, Δb) is the comparative frequency with which two pixels, separated by a pixel distance (Δa, Δb), happen within a locality, the intensities are 'x' and "y'. The matrix component P (x, y | d, θ) has the second level arithmetical prospect values for variations between gray echelons 'x' and 'y' at a certain shift distance d at an certain angle (θ). With a highest number of intensity G denotes loading lot of provisional values, i.e. a G{gray value} × G{gray value} matrix for every combination of (Δa, Δb) or (d, θ). Owing to their huge dimensional values, the Gray Level Co-occurrence Matrix (GLCM) are actual delicate to the dimensions of the sample texture where they are appraised.

Classification

To ease the single problem into multi binary level problem an indirect classification of kernel technique is followed. SVM training finds minimum but still it provides the great ground for the further investigation.

SVM is applied for data member classification. They might be the actual users to the imposting adversaries. The sub space is used to classify the data set. The maximum distance occurs in the sub space. The sub space classifiers are used to differentiate the divergent among the class. Support trajectory mechanism aredesigned to perform these action types. Sub spaces can separate few data sets, if

not possible then the soft margin is used (Kavitha and Kannan, 2016; Tamilman and Rajathi, 2016; Srinivasan and Kannan, 2017). SVM provides an iterative algorithm which helps in constructing the optimal sub space which results in low fault recievers.

SVM provides sorting, reversion and also it can manage definite variable and numerous variables. For definite variables several mock variables are created with 0 and 1. (Fig. 5) shows the SVM model.

IMPLEMENTATION

The tested image features of GLCM are observed and compared with the parameters of trained images. The image which is matched with these criteria is defined as Authenticated and the rest of the images are defined as Not Authenticated, which is shown in (Fig. 6).

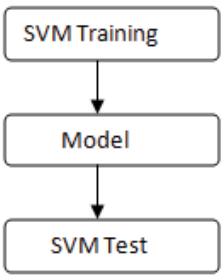
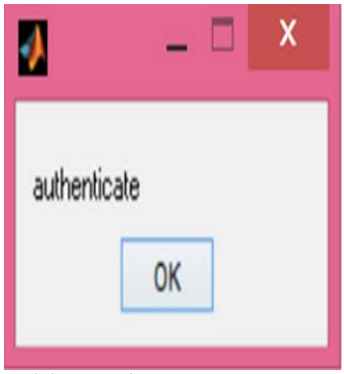


Fig. 5 Classification using SVM.



(a) Authenticate

(b) Non authenticated

Fig. 6 (a) and (b) Result of authentication.

CONCLUSION

The proposed method extracts the biometrics details by using the technique GLCM (Gray Scale Co-occurrence Matrix). From GLCM texture features like energy, contrast, entropy, Correlation Coefficient, homogeneity are extracted. Finally, Support Vector Machine (SVM) is used to classify whether the person is authorized or unauthorized. In future work this limitation can be addressed by multi-model biometrics system to combine both the biometric characteristics derived from one or modalities such as Palm print and iris which give high level of security and different secure applications.

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