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Analysis of Iris Recognition using Normalized and Un-normalized Iris images

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Biometric authentication has become increasingly popular in security system. Here an iris recognition is analyzed based on normalized iris image and un-normalized iris image such that the preprocessing step is reduced and the accuracy is increased. In this iris features are extracted by using Gray Level Co-Occurrence Matrix (GLCM) and Gray Level Run Length Matrix (GLRLM) from the normalized iris region and also un-normalized iris region. Support vector machine is used for classification. Results of False Rejection Ratio (FRR) and Accuracy of both the methods are compared. Experimental results show that the features extracted using un-normalized iris image is having better accuracy as compared to normalized image.

Keywords : GLCM, GLRLM, ROI, SVM.

1. INTRODUCTION

Biometric recognition is the automated recognition of individual based on the physiological and behavioural characteristics. The human iris is an annular part between the pupil and the white sclera. Iris based recognition system can be non-invasive to the users since the iris is an internal organ as well as externally visible, which are of great importance for real-time approach [1]. Iris has the following features such as stablity, uniqueness, flexible, reliable. In this paper efficient segmentation and normalization methods are used. The Gray Level Co-occurrence Matrix and Gray Level Run Length Matrix features are extracted from the iris and based on the 1-against-all support vector machine classification is done. The parameter selection of support vector machine plays a very important role to improve the overall performance.

2. RELATED WORK

John Daugman [2], [3] in 1988 developed a recognition system. The algorithm is based on iris codes generated using 2D Gabor wavelet. Hamming distance was used for matching. Wildes [4] in 1997 applied a laplacian of Gaussian filter at multiple scales to produce template and normalized correlation for matching. Boles [1] in 1998 presented a new algorithm based on zero crossing. In this algorithm the zero crossing of the wavelet transform are calculated at various resolution levels over concentric circles on the iris. Resulting one dimensional signal are then compared with the model features using different dissimilarity function. Nawal Alioua *et al.*, [5] in 2011 presented a method for eye state analysis using iris detection based on Circular Hough Transform.

A T Zaim and M K Quweider [6] in 2006 present a new method for iris texture recognition for the purpose of human identification. Iris features are extracted using Gray Level Co-Occurrence Matrix. The GLCM of each iris is

5. CONCLUSIONS

Experiment is conducted using GLCM and GLRLM. Technique is invariant to iris rotation. Classification accuracy is better in GLCM features with zero degree direction and fusion of both GLCM and GLRLM features in the same direction. Accuracy increases, either by increase in number of samples per class in the training phases or with the fusion of GLCM and GLRLM features. Accuracy of GLCM is 75 %, GLRLM is 57.14 % and fusion of GLCM and GLRLM is 88.89 % is observed with K-fold 5-2 on normalized iris image. Whereas Accuracy of GLCM is 82.35 %, GLRLM is 57.14 % and fusion of GLCM and GLRLM is 94.73 % is observed with K-fold 5-4 on Un-normalized iris image. Hence there is an improvement of 12 % in the accuracy by using unnormalized iris image. It is observed that the FRR is also improved to 25.81 % as compared to normalized iris.

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