CHAPTER - VII

Conclusion
CHAPTER 7

7. Conclusion

Biometric identification has become an important recognition in the modern era. Particularly Iris image recognition for the personal identification is the superior biometric authentication system. In our proposed work an automatic authentication and recognition of human via the human iris traits is designed. It shows promising results for secure recognition. Our method is developed to deal with various applications in biometrics. The iris features were obtained and stored in the form of template. Iris recognition is carried out by using support vector machine learning algorithm. However, the results are evaluated with the statistical approach of hamming distance, and Feed forward neural network. The three different kernels linear, polynomial and quadratic are used in support vector machine. These kernels are verified with the following methods Sequential minimal optimization, quadratic programing and least square. The least square quadratic kernel Support Vector Machine result is much better performance than the other two methods such as hamming distance and feedforward neural network.

In our research work the iris preprocessing methods and template generations are common for all the three methods. In a preprocessing stage, the accurate data is obtained. The grey scaled images from Chinese Academy of Sciences – Institute of Automation (CASIA) dataset is used. The images are jpeg format with proper illumination and supports type conversion for further
process. The difference of pupil boundary and limbic boundary algorithm provides the iris boundaries which consist of required spectral features. The Canny edge detection algorithm is applied to obtain the clear and accurate circles. Daughman’s rubbersheet model is approached to get the wrapping of image in fixed size. To enhance the speed and accuracy, the feature dimensions are minimized by obtaining the required minimal traits of iris. The template consists of adequate unique features of iris such as collarette, crypts, certain degree of furrows and ridges in 1 to 10 rows. Each row consists of 240 columns. Totally the values of 2400 cells with less occlusion of eyelashes as noises in the template help to reduce the storage space and to classify rapidly.

The recognition is made using Hamming distance, Feed forward neural network and support vector machine. Hamming distance works based on XOR operation on iris image is comparing the given input with the iris images in the database. When the match is found the user is authenticated; otherwise authentication is rejected. The accuracy obtained through this method is 79 percentage. The advantage of the hamming distance approach is that it is very simple and effective for minimum dataset. Since it works based on threshold, it fails to recognize the authorized persons, whose values are above the threshold. As a result, the false accept rate and false reject rate are also high. This is a major drawback of this method. So, our next proposed method is feed forward neural network algorithm.
In the feedforward neural network approach neurons are trained to find the match of the user iris image with the help of Levenberg Marquardt learning rule is applied, it gives better result of 87.5 percentage. The advantage of this approach is used to classify the difficult to complex problems which are linearly separable. But it takes long computation time. In addition to that the feature selection values are not automatically chosen by this approach. So, our next method the support vector machine is considered.

Three types of support vector machine kernels have been implemented in our research work namely linear, polynomial and quadratic. Each type of support vector machine kernel has undergone three methods – sequential minimal optimization (SMO), quadratic programming (QP) and least square (LS). After the implementation, the quadratic kernel with least square method gives accuracy of 94.5 percentage. The advantage of this method is that it automatically selects the best features and supports for nonlinear problem using multi class. It is a best binary classifier. The binary vales are passed as input in our research work it computes accurately and as a result of this best feature selection, the performance is high with true accept and true reject rate. The quadratic kernel with least square method of SVM result is much better than other two methods such as hamming distance and feed forward neural network.
7.1 Future Work

The iris recognition system may be applied and equipped in situations complicated by medical condition or disability of the group of people. The iris features varies due to cataract surgery and some disease like glaucoma, nystagmus, strabismus and albinism. In multimodal biometrics the proposed algorithm can be extended to fulfill by adapting parallel algorithm and by using multiple processors. The efficiency of matching algorithms will also become more important as iris biometric is deployed in recognition applications for large population. Still, there is a chance to improve the efficiency on the part of segmentation of iris and code generation.