VISVESWARAYA TECHNOLOGICAL UNIVERSITY

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PROJECT REPORT

ON

"HUMAN IRIS PATTERN RECOGNITION FOR BIOMETRICS"

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ABSTRACT

In this project, we describe the novel techniques we developed to create an Iris Recognition System, in addition to an analysis of our results. We used a fusion mechanism that amalgamates both, a Canny Edge Detection scheme and a circular Hough Transform, to detect the iris boundaries in the eye's digital image. We then applied the Gabor filter in order to extract the deterministic patterns in a person's iris in the form of a feature vector. By comparing the quantized vectors using the Hamming Distance operator, we determine finally whether two irises are similar. Our results show that our system is quite effective.

The iris recognition system mainly involved the following steps:

1) Segmentation: Includes Image acquisition, Image manipulation, Iris localization, Image Normalization
2) Feature extraction
3) Code matching

First an imaging structure consisting of a high quality CCD camera, LED lights, should be implemented to capture a clear and high quality image. Then the images are converted from RGB to grayscale and from eight-bit to double precision. After selecting the eye image, with image processing operators, the Canny edge detector and the Hough transform, the edge of pupil is determined with its center and radius well. Preprocessing on iris region is the next step that includes iris normalization, iris image enhancement and de-noising. The next step is feature extraction where phase data of the preprocessed iris image was extracted using 2D Log-Gabor filters and quantized to four levels to encode the unique pattern of the iris into a bit-wise biometric template. The Hamming distance is the matching metric employed to match iris templates and two templates were found to match if a test of statistical independence was failed. A certain threshold value is set to determine if the templates are perfect match or not. The software to perform iris recognition is developed using the MATLAB 7.4 and to test the software a data set of grey scale eye images from the Chinese Academy of Sciences – Institute of Automation (CASIA) is used.