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Survey Paper on Phase Based Iris Recognition

Surbhi Garg [*], Harmeet Kaur
M.tech (ECE)&Punjab Technical University
India

Abstract— The iris recognition is a kind of the biometrics technologies based on the physiological characteristics of human body, compared with the feature recognition based on the fingerprint, palm-print, face and sound etc, the iris has some advantages such as uniqueness, stability, high recognition rate, and non-infringing etc. The iris recognition consists of iris localization, normalization, encoding and comparison. In this paper phase based iris recognition mechanism is analyzed.

Keywords— Biometric recognition system, Phase based method,

I. INTRODUCTION

A. Biometric identification system

A biometric system provides automatic recognition of an individual based on some sort of unique feature or characteristic possessed by the individual. Biometric systems have been developed based on fingerprints, facial features, voice, hand geometry, handwriting, the retina and the one presented in this thesis, the iris Biometric systems work by first capturing a sample of the feature, such as recording a digital sound signal for voice recognition, or taking a digital color image for face recognition. The sample is then transformed using some sort of mathematical function into a biometric template. The biometric template will provide a normalized, efficient and highly discriminating representation of the feature, which can then be objectively compared with other templates in order to determine identity. Most biometric systems allow two modes of operation.

B. Iris recognition

We are living in the age, in which the demand on security is increasing greatly. Consequently, biometric recognition, which is a safe, reliable and convenient technology for personal recognition, appears. This technology makes use of physiological or behavioral characteristics to identify individual.. A biometric system is a pattern recognition system including acquiring the biometric feature from individual, extracting the feature vector from the raw data and comparing this feature vector to another person's feature vector. Fingerprint, palm-prints, face, iris, gait, speech and signature are widely used biometric features. Biometric recognition can be used in computer network login, internet access, ATM, credit card, national ID card, driver's license and so on. Nowadays, fingerprint recognition is used widely and successfully. Face recognition is studied by many scholars and experts. Iris recognition is a relatively new branch of biometric recognition. The human iris is the annular part between pupil and sclera. It has distinct feature such as freckles, coronas, stripes, furrows and so on.

II. Comparison Of Iris Recognition With Other Biometric Techniques

Comparing iris recognition with other biometric techniques iris having following merits:

1) **Uniqueness**: Dissector F. H. Adler suggested the uniqueness of iris originally in 1965. The visible features in an iris include the trabecular meshwork of connective tissue, collagenous stromal fibers, ciliary processes, contraction, and freckle. These textures ensure that different persons have distinct iris. The probability of two persons' irises being the same is lower than 10^{-35}. Even though they are twins, their irises are quite different. This fact is the reason why we use iris to recognize personal identity.
2) **Reliability:** iris is an inner organ in our eyes and protected by eyelid, lash and cornea. Unlike finger and palm, it is seldom hurt and the error of recognition caused by scar will never happen. In this sense, iris recognition is much better than fingerprint and palm-print recognition. Furthermore, our irises matured when we were one year old and would not change in our life.
3) **Against artifice**: a living eye's pupillary diameter relative to iris diameter in a normal eye is constantly changing, even under stead illumination. The pupillomotor response could provide a test against artifice.

III. Steps of iris recognition

Major steps of iris recognition are given following:

1) Segmentation: A technique is required to isolate and exclude the artifacts as well as locating the circular iris region. The inner and the outer boundaries of the iris are calculated.

2) Normalization: Iris of different people may be captured in different size, for the same person also size may vary because of the variation in illumination and other factors. The normalization process will produce iris regions, which have the same constant dimensions, so that two photographs of the same iris under different conditions will have Characteristic features at the same spatial location.

IV. Related Work

A novel approach for an accurate human recognition us identification through iris recognition using bit plane slicing and normalization SRINIVASA KUMAR DEVIREDDY, G.RAMASWAMY, Iris boundaries are recognized by using simple methods and the less complex and faster algorithms than previous algorithms and it eliminates pupilary noises and reflections .Homogenization removes specularities of the pupil. Bit plane slicing, morphological operations and standard deviations windows helps to recognize pupilary radius and pupilary mid-point. By solving these parameters in circle equation, we can recognize pupilary boundary (inner boundary) accurately. An adaptive threshoulded method can find the limbic radius and limbic mid-point. By solving these parameters in circle equation, we can recognize limbic boundary (outer boundary) accurately. The region between inner and outer boundary is iris, it is in the polar form and converted into linear form by converting the polar coordinate system to Cartesian coordinate system, then converting the iris region from Cartesian coordinates to the normalized non concentric polar representation we get normalized image.

*An Emerging biometric technology" RICHARD P.WILDES,*For at least a century, it has been suggested that the iris can serve biometrically based recognition of human individuals. Recent efforts in machine vision have yielded automated systems that take strides toward realizing this potential. As currently instantiated, these systems are relatively compact and efficient and have shown promising performance in preliminary testing. Extant systems require a fair amount of operator participation and work at rather close range. Therefore, they are best suited to controlled assessment scenarios (e.g., portal entry and the like). The notion that the iris is a useful biometric for recognition stems largely from anecdotal clinical and indirect developmental evidence. This body of evidence suggests that the structure of individual irises is highly distinctive and stable with age. Empirical testing of documented iris recognition systems provides additional support for these claims; however, these tests were limited in scope. An important direction for future efforts is the design and execution of controlled, large-scale, longitudinal studies.

A review on advance in iris recognition method" Fuad. M. Alkot, member IEEE, This paper presented an overview of the latest research on iris recognition by categorizing the research in four groups outlined as localization, segmentation, iris coding and recognition. Paper present the latest developments explaining advances to solve problems associated with image acquisition such as non-frontal face images and off angle iris. We also discuss advances that lead to improvement in iris recognition system performance, improvement in iris coding methods, and improvement in recognition methods. We also present a review on a comparative
study of different iris methods to find the effect of different parameters on the recognition rate, and to find an answer to the question of which approach is most suitable for iris recognition.

Computational imaging system for iris recognition" Robert P lemons, Michal Horvath, Paul pauca, This paper shows various biometric iris recognition systems and has described some new computational imaging approaches to iris recognition using phase encoding. These new approaches can greatly increase the depth-of-field over that possible with traditional optics, while keeping sufficient recognition accuracy. The combination of optics, detectors, and image processing all contribute to the iris recognition accuracy and efficiency.

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V. Conclusion

It is improved that binarization maximizes the separability between iris and remaining ones. Binarization provides suitable results and contrast adjustment. It provides better contrast with PSNR and low MSE value. It advantagble in badly illuminated document image and uneven background. There are many methods which are used for the boundary detection of the iris images to improving the contrast at the iris regions but phase based method is the one of the best method which provides better separability results with binarization. The main purposes of the presented algorithms are enhancing accuracy and reducing computational time. The main idea was to extract more proper region among image regions. Clearly, working with a fewer number of regions or generally an image with fewer details causes reduction in computational time. In the other hand, the segmentation accuracy would be increased especially when some rough regions are removed. Binarization is an empirical method, specifically for iris images.

VI. Future Work:

The clustering algorithm can be extended to localize precisely the iris region. Besides, analyzing other image characteristics such as intensity distribution or the luminance component in YUV color space could also improve the results. As a matter of fact, more robust analysis yields more adaptive algorithms in natural environment.

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