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ROBUST SCLERA AND IRIS RECOGNITION TECHNIQUE FOR SECURITY SYSTEMS

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Abstract — *The vein structure in sclera, a white and opaque outer protective covering of eye, is anecdotally stable over time and unique to each person. As a result, it is well be suited for use as a biometric for human identification. The few researchers have performed sclera vein pattern recognition and have reported promising, but the low accuracy, and the initial results. Sclera recognition poses several challenges: the vein structure moves and then deforms with the movement of the eye and its surrounding tissues; images of sclera patterns are often defocused and/or saturated; and, most importantly, a vein structure in the sclera is multi-layered and has complex non-linear deformation. The previous approaches in the sclera recognition have treated the sclera patterns as a one-layered vein structure, and, as a result, their sclera recognition accuracy is not high. In this, we propose a new method for sclera recognition with the following contributions: First, we developed a color-based sclera region estimation scheme for the sclera segmentation. Second, we designed a Gabor wavelet based sclera pattern enhancement method, and an adaptive thresholding method to emphasize and binarize a sclera vein patterns. Third, we proposed a line descriptor based feature extraction, registration, and matching method that is scale-, orientation-, and deformation-invariant, and can mitigate the multi-layered deformation effects and tolerate the segmentation error. It is empirically verified using UBIRIS and IUPUI multi-wavelength databases that the proposed method can perform accurate sclera recognition. In addition, the recognition results are compared to the iris recognition algorithms, with the very comparable results.*

Keywords *- Sclera vein recognition, Feature extraction, sclera feature matching, sclera matching*

I. INTRODUCTION

To prevent terrorist attacks, our government should be ready to properly secure its borders, strategic assets, and sensitive info whereas still abidance the rights of its population this is often been a tough and the complex task .

1.1. Biometrics

Biometrics the identification of humans exploitation intrinsic physiological, the biological, or behavioral characteristics, traits, or habits. Statistics have a potential to produce this desired ability to unambiguously and discretely establish a person's identity a lot of accurately and handily than alternative choices.
Examples of the biometric modalities embrace face, iris, hand, fingerprint, gait, typing, speech, and others. In general, the statistics will be divided into 2 broad categories:

1.1.1. Physiological Statistics - the people who establish a personal from Associate in Nursing intrinsic physiological or biological attribute (ex. face, iris, fingerprint, etc)

1.1.2. Behavioral Statistics - people who establish the personal from a behavioral attribute (ex. gait, typing, etc)

In general concept, physiological statistics are a lot of stable. In the past decade, advances in computing power have created machine-controlled biometric systems realistic alternatives or the supplements to ancient security systems. For users, biometric systems will cut back or eliminate a necessity to retain a key or bear in mind the countersign, will speed up user outturn, and it might be less intrusive. For instance, at the border or security stop, a biometric system might offer the high-confidence identification of a user whereas they practice a stop instead of requiring them to prevent, manufacture some identification, and interviewed by security personnel. From a system position, biometric systems will check the lot of larger databases than are realistic with the ancient security systems, are a lot of consistent, don't have racial or the personal biases, and might be cheaper to control.

II. LITERATURE REVIEW

2.1) Ridhika Chopra, Prof. Minal Puranik, Prof. Vidya Gogate

The important task is identification of an individual on some distinct set of options. The human identification is workable with any biometric system. The vein pattern seen in sclerotic coat is absolute to every person. Thus, the sclerotic coat vein pattern is similar changeable for human identification. Many searches have performed sclerotic coat recognition and reportable a hopeful one, however with low accuracy, initial results.

2.2) C. Hema, T. Viveka.
The main aim of this project is sclera vein recognition. Sclera vein recognition is used for human identification. It poses a challenge as a result of sclera vessel pattern area unit usally dense or saturated and most significantly, the vessel pattern within sclera is complicated. The vain pattern of sclera how wealthy and distinct details. Here, a new sclera vein recognition methodology using a two-stage approach for registering and matching plan.The sclera vein recognition system includes sclera segmentation, feature improvement, feature extraction.

3) S.Suba, Dr.S.Babu.
Sclera vein recognition is merged in Nursing evolving technology for the pattern recognition system that acknowledge an individual for authentication. Sclera vein recognition presents a difficult drawback within the field of image analysis has received an excellent deal of attention over the previous couple of years owing to its several applications in varied domains. This paper has many contributions.

4) S. Athira, Shilpa Gopal, G. H. Gowri Krishna and Shriram K. Vasudevan
Providing security to systems is one in every of the most important challenges faced in day-to-day life. Biometrics plays a important role in guaranteeing security. Out of the various existing recognition systems accessible - particularly face, finger, gait, tissue layer so on, sclera recognition system offers out higher performance. Sclera is that the white a part of the attention, which is unique and consistent in nature attributable to that it's chosen for recognition. During this paper, we have a tendency to analyzed the prevailing sclera recognition system with each human and animal eye pictures.

5) Pallavi Yadkikar, Dishant Mehta, Mayuri Naykodi, Sheetal Pareira.
Identification of an individual supported some distinct set of feature is a vital task. Human identification is feasible with many biometric systems and sclera recognition is that the correct and bestest biometry. The sclera is the white portion of eye. The vein pattern seen within the sclera region is unique to every person. The prevailing ways used for sclera recognition have some drawbacks as if solely frontal wanting pictures area unit most popular for matching process. Sclera recognition is shown to be a promising method however it's slow matching speed therefore we have used neural network approach to classify the pictures. This paper represents an inspiration known as sclera recognition, it includes the concepts as: preprocessing technique, feature extraction then classification technique like neural network for sclera biometric.

III. EXISTING SYSTEM

Localizing and detecting objects in images are among the most widely studied computer vision problems. They are quite challenging due to intra-class variation, inter-class diversity, and noisy annotations, especially in wild images. Thus, a large body of fully/strongly annotated data is crucial to train detectors to achieve satisfactory performance.Early approaches to image captioning can be roughly divided into two families. The first one is based on template matching. These approaches start from detecting objects, actions, scenes, and attributes in images and then fill them into a hand-designed and rigid sentence template. The captions generated by these approaches are not always fluent and expressive. The second family is grounded on retrieval based approaches, which first select a set of the visually similar images from a large database and then transfer the captions of retrieved images to fit the query image. There is little flexibility to modify words based on the content of the query image, since they directly rely on captions of training images and cannot generate new captions.

IV. SURVEY OF PROPOSED SYSTEM

Eye is an important part of human body by which we can identify a human being. We can manipulate the sclera portion of human eye to recognize a human being. This case the pattern of the sclera vein is matched. As sclera vein thickness changes with the age of a human, vessel thickness cannot be recognized as a good feature for manipulation. By making an automated system we can use a sclera vein pattern as a feature to recognize the particular human being.
The sclera is a white and opaque outer protective covering of the eye. Sclera completely surrounds the eye, and it is made up of four layers of tissue—the episclera, stroma, lamina fusca, and endothelium. The conjunctiva is the clear mucous membrane, made up of epithelial tissue, and consists of the cells and underlying basement membrane that covers the sclera and lines the inside of the eyelids. In general, the conjunctive vascular is hard to see with a naked eye. For sclera segmentation system, the system is developed that may accurately phase the sclera region victimization color pictures and doesn't need coaching. The planned system estimates the sclera victimization the color data within a image, detects a iris and lid boundaries, and refines them victimization a vigorous contour technique. The goal of this technique is to spot and to extract the relevant parts of the sclera from the first image of the attention region for more process and identification. The first difficulties during this section square measure correct segmentation of a lid boundaries, particularly a lower lid boundary close to the duct, and segmentation of pictures with the little or no visible sclera region.

IV. ADVANTAGES OF PROPOSED SYSTEM:

4.1. Very high accuracy.
4.2. There is no known way.
4.3. The eye from a dead person would deteriorate too fast to be useful, so no extra precautions have to been taken.
4.4 . Ease of use.

V. SYSTEM ARCHITECTURE

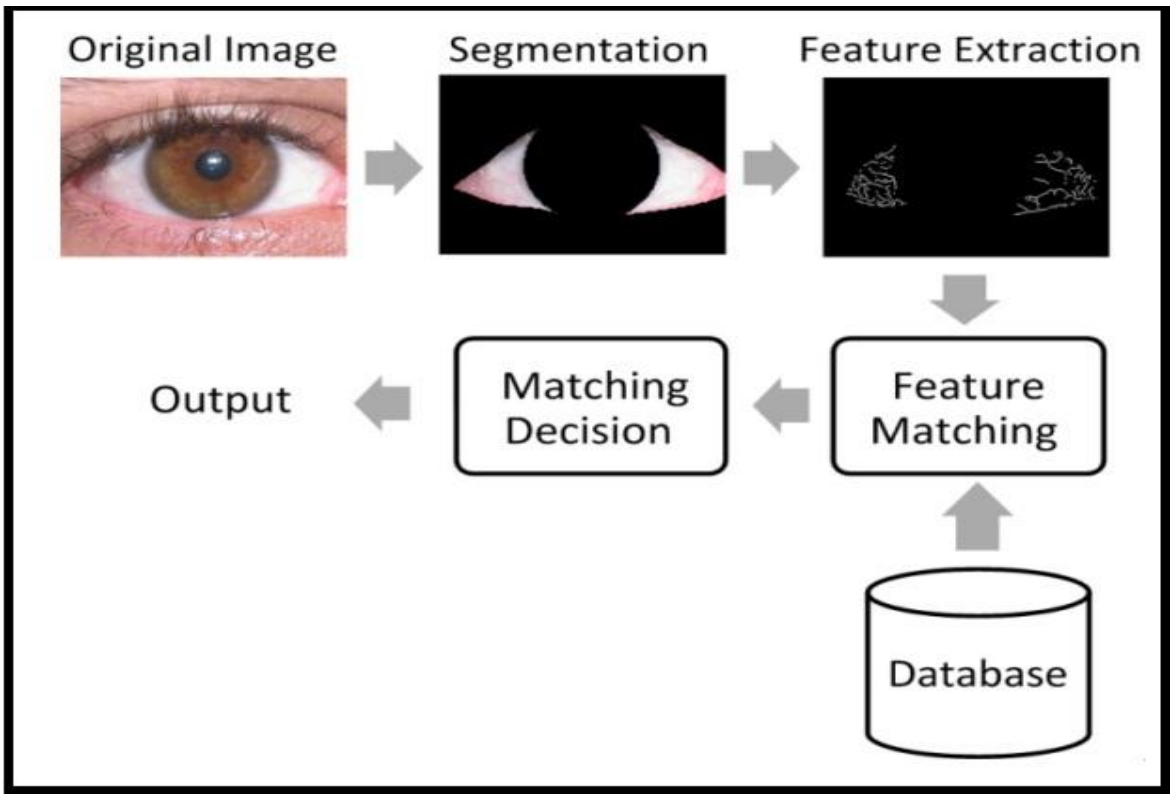

Fig. 5.1: System Architecture

5.1 Working

Figure 5.1 shows an easy diagram of the system that consists of four major components are as: sclera segmentation, feature extraction and improvement, feature matching, and also the matching process. For the sclera segmentation system, a system developed that may accurately phase the sclera region victimization color pictures and doesn't need coaching. The planned system states the sclera victimization the color data within the image, detects the iris and Eye-lid boundaries, and refines them victimization a vigorous contour technique. The aim of this technique is to spot and extract the relevant parts of the sclera from the first image of the attention region for more process and identification. The difficulties during this section square measure correct segmentation of the eye-lid boundaries, particularly the lower eye-lid boundary close to the duct, and segmentation of pictures with little or no visible sclera region.

VI. CONCLUSION AND FUTURE WORK

This project presents a literature survey on the varied techniques concerned with the face to face identification. The survey emphasizes on the biometric recognition system and the sclerotic coat primarily based recognition system. Biometry is the reliable manner of human identification as a result of its supported behavioral or physiological characteristics of someone. Sclerotic coat primarily based system provides the recognition at a way distance and the supply smart leads to low resolution pictures wherever the alternative biometry square measure failing. The current methodology tries to spot solely a frontal trying pictures. These will be utterly corrected during this arrangement, and therefore a person may be known once there's simply a minor portion of sclerotic coat region visible. Sclerotic coat recognition methodology provides the correct results.

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