www.ijecs.in
International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 3 Issue 4 April, 2014 Page No. 5396-5399

Disease Identification in Iris Using Gabor Filter

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ABSTRACT- Biometric features such as facial shape, hand shape, fingerprint, sound and iris have been proposed for human identification. Iris recognition systems are used in world wide applications and more effective compared with other recent biometric technologies. This paper is mainly concentrated on eye pathology and specifies whether eye disease will cause the iris recognition process to fail. Iris images were taken before and after the treatment of eye disease and the output shows the mathematical difference obtained from treatment. Gabor filter is used to extract the features. This iris recognition was effectively withstood with most ophthalmic disease like corneal oedema, iridotomies and conjunctivitis. This proposed iris recognition should be used to solve the potential problems that could cause in key biometric technology and medical diagnosis.

Keywords - eye pathology, ophthalmic disease, corneal

Oedema, iridotomies, conjunctivitis

I. INTRODUCTION

Iris recognition is a biometric technology for identifying humans by capturing and analyzing the unique patterns of the iris [1] in the human eye. Iris recognition [2] can be used in a wide range of applications in which a person's identity must be established or confirmed. passport control, border control, frequent flyer service, premises entry, access to privileged information, computer login and r transaction in which personal identification[3] and authentication are the key elements. Most dangerous security threats in today's world are impersonation, in which somebody claims to be someone else. Through impersonation, a high-risk security area can be vulnerable. An unauthorized person may get access to confidential data or important documents can be stolen. Normally, impersonation is tackled by identification and secure authentication. Traditional knowledge-based (password) or possession-based (ID, Smart card) methods are not sufficient since they can be easily hacked or compromised. Hence, there is an essential need for personal characteristics-based (biometric) identification [4]due to the fact that it can provide the highest protection against impersonation. Among other biometric approaches, the new Iris recognition technology promises higher prospects of security. Due to eye diseases Iris recognition sometimes failed. In this proposed method diseases affected parts of the iris are identified and remedial actions are taken. So this method used for medical diagnosis and person identification. Commonly occurring diseases are Burning Eye, Bloody Eye (Subconjunctival Hemorrhage), Contact Lens Problem, Cataract, Discharge eye drainage, Eyelid twitching, Glaucoma.

Eye burning is mainly induced due to eye strain, eye allergies and strain. Blood eye is caused when the blood vessels get broken in the sclera part. A very small blood vessel gets rupture from the eye surface. Contact lens problem is created when wearing the poor contact lens, in taking bad hygiene. There are many types in contact lens problem which consists of burning sensation, dry eyes, blurred vision, photophobia and redness. It will be easily cured when wearing fresh contact lens, washing hands before wearing the contact lens.

Cataract problem was mostly found at the age of 80 in the United States or they had a cataract surgery over that period. Double vision, glare, faded colours and double vision are symptoms for cataract problem. Eye drainage is the moisture that leaks out from the eye. Discharge eye drainage is mainly caused by bacteria or virus, parasites and other organisms. Eyelid twitching is the nerve problem and it persists for a weeks or months. It usually caused because of eye stress or fatigue.

Background of the work is given in the section II. Proposed Gabor filter algorithm is explained in section III. Experimental results are given in the section IV. Conclusion in given in the section V.

II. BACKGROUND

This section explains the related work done already done regarding iris recognition and disease diagnosis.

Glaucoma is an optic nerve problem that reduces the vision. Intraocular pressure mainly creates glaucoma. Open angle glaucoma and closed angle glaucoma are the two common types of glaucoma. Glaucoma type is predicted in the iridocorneal angle images between the iris and cornea. It is a more time consuming process. Machine learning built the association between the focal edge and angle grades. The experimental result shows 87.3% open angle and 88.4% closed angle. Iridology technique is used to for the identification examination. It not only examines the disease and also found the unhealthy conditions, toxin precipitation and other degeneration of organic functions. It is actually an iris test which identifies and predicts the disease. This system contains four processes that include image capture, pre-processing, template generation, feature extraction and pattern matching. The iris input image is get from the camera and pre-processing will be done. Noise, occlusion is detected and gets removed in the pre-processing step. Then template generation provides template of the iris image after that feature extraction process is made. Gabor filter algorithm is used in the feature extraction technique. Now the processed data gets stored in the database then the query input is compared with the iris input image using pattern matching technique. After this process disease will be identified. Eye disorders are mainly due to the advancing age because eye tissue gets decreases and there is a increased ocular pathology. The age related eye problem and visual impairment are cataracts, iridocyclitis and corneal haze. Iridocyclitis is the inflammation of the iris and corneal haze is the complication of refractive surgery. Computer based classification is used for the classification eye disease. There are three kinds of classifiers they are artificial neural network, fuzzy classifier and neuro fuzzy classifier. These classifiers extract features from the raw images and run with a database 135 subjects by means of cross validation strategy. The images are depicted with a sensitivity of 85% for classifier with 100% specificity and the results are more accurate. Health status is determined using iris image analysis method which is more efficient method for diagnosis. Normally more accurate disease prediction and diagnosis is critical and time consuming. Considering the areas of diagnosis from different perspectives are made. In the modern technology Iridiagnosis approach is commonly used. This approach is mainly used for diagnostic purpose. In this approach a database is created using eye images get from the clinical history on diabetic history disease in pathological laboratory. The iris images are sent for various processing which include segmentation, image quality assessment, feature classification and normalization. Training and classification is done using artificial neural network. The accuracy of overall classification is 90 to 92% for diabetic and non diabetic subjects. This approach is faster user friendly and less time consuming process in the field of diagnosis.

III. PROPOSED ALOGRITHM

This section explains the steps involved in the proposed algorithm are Pre-processing, Template Generation, Feature Extraction, Pattern Matching, Disease Identification. Gabor Filter is used for feature extraction. Pre-processing is used to improve the image such that it increases the chances for success of other processes and it is used for enhancing the contrast of the image, removal of noise and isolating the objects of interest in the image.[13] The next step, is to encode the iris image from two dimensional brightness data down to a two dimensional binary signature, referred to as the template. This, the input date are passed into two directional filters to determine the existence of ridges and their orientation. The RED iris recognition algorithm uses directional filtering to generate the iris template, a set of bits that meaningfully represents a person's iris. Feature Extraction[14] takes the input data will be transformed into reduced representation set of features(also named feature vector).Transforming the input data into the set of features is called feature extraction.[15] Matching between the newly acquired and database representations is pattern matching. To calculate the similarity of two iris codes, Hamming Distance (HD) method is used. Lower Hamming Distance means the higher similarity similarity Disease Identification is performed after pattern matching in both iris. Iris features are matched then there is no disease, otherwise disease can be indentified from the features.

3.2 SYSTEM DESIGN

System design gives the details of the over all design of the proposed work. Figure 1 shows the design steps of the work proposed

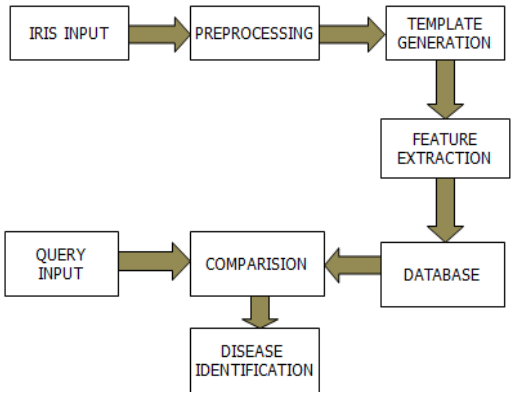

Fig.1.System design

IV EXPERIMENTAL RESULTS

This work has been implemented using Matlab R2009b.Before and after the treatment the iris can be compared. Gabor filter is used to extract the features and it can be matched to find the disease affected area of the iris. Figure2 shows the results obtained from the two iris images can be matched.

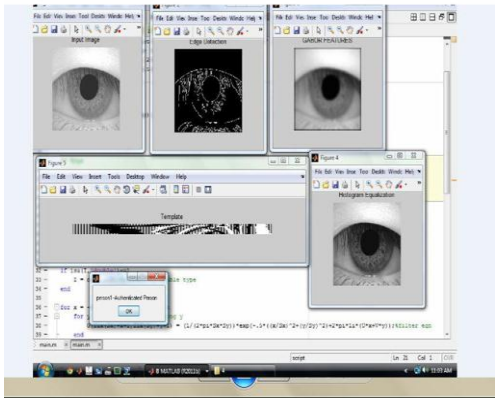

Fig.2.Iris Matched

Figure3 shows the results obtained from the two iris images can be unmatched.

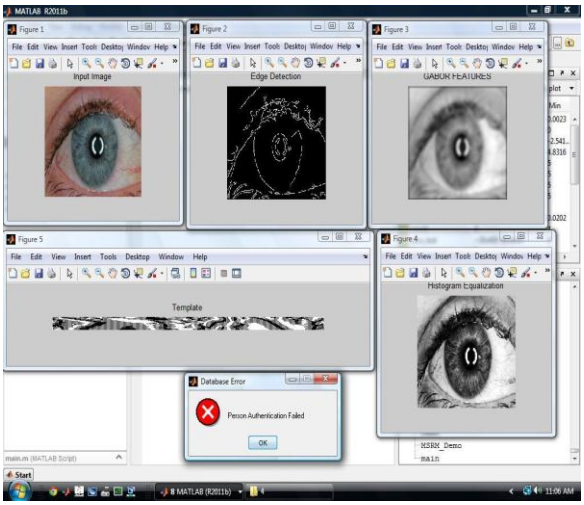

Fig.3.Iris Matched

IV. Conclusion

Biometric technique utilizes physiological characteristics such as face, finger print, palm print, iris, voice etc. The iris is very suitable for the verification and identification of humans due to its distinctive and stable spatial patterns. The acquired iris image is the normalized and features are extracted. Gabor filter can provide adequate texture information for different frequency bands which can be effectively represented and offer a good performance. The principal outcome measure was that of mathematical difference in the iris recognition templates obtained from patients' eyes before and after treatment of the eye disease. Templates of the before and after diseases can be compared and affected parts are identified and person identification also done. This effective iris recognition is used recognition for person identification and check whether iris is affected or not and to identify the disease affected part of the human eye. This proposed method is robust and effective and to perform the task of suggesting diagnosis of iris and authentication.. This enhances and brings more confidence to the diagnosing process.

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