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VARIOUS CATARACT DETECTION METHODS-A SURVEY

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Abstract - *Eye is an important part of our body. It reacts towards light.Cataract is a disease that affects our eyes badly. Cataract is the clouding of the eye lens ,which leads to the decrease in vision. It can single or both eyes. The symptoms may include cloudy or blurred vision, colors that may not appear as bright as they once did, glare, poor night vision. The treatment options are wearing glasses, surgery, better lighting upto an extend we can escape from cataract by eating a healthy diet,wearing sunglasses and a brimmed hat when go for outing, don't smoke. A majority of the eye problems occurs due to diabetes.Diabetic Retinopathy is a major cause for vision loss and blindness.people with diabetes are at greater risk.A number of methods have been proposed for cataract detection. Most cataracts are related to aging. Cataracts are very common in older people. Certain nutrients and nutritional supplements may reduce your risk of cataracts.*

KeyWords:Cataract,BlurredVision,Diabetes,Glare,Diabetic Retinopathy

1.INTRODUCTION

The lens inside our eyes works like a camera lens, focusing the light onto the retina for clear vision. It also adjusts the focus of the eye, allowing us to see things clearly both close and far away.The lens is mostly made up of water and proteins. The protein is arranged in an accurate way that makes the lens clear and lets light pass through it.But as increase in age, some of the protein may clump together and start to cloud a small area of the lens. This is known as cataract, and it may grow larger and cloud more of the lens, making it harder to see clearly.There are many types of cataract.some of them as follows. A **subcapsular cataract** occurs at the back of the lens in eyes. People with diabetes or those taking high doses of steroid medications are affected by this type of cataract.A **nuclear cataract** forms deep in the central zone (nucleus) of the lens in eyes. Nucleas usually are associated with the aging.A **cortical cataract** is another type of cataract. This type of cataract occurs in cortex of lens, which surrounds the central nucleus.

2 LITERATURE SURVEY

2.1 Mobile Cataract Detection System

Yunendah, Agung, Mengko, and Budiman has proposed a system which uses statistical texture analysis feature extraction to detect cataracts and k-NN as classification method.The proposed system uses 160 eyes images. They divided them into two categories: cataract (80 images) and normal (80 images). The training data set consist of 40 normal image and 40 cataract images. K-Nearest Neighbor (K-NN) is one of classification methods for learning a set of data based on the data that has been classified previously. K-NN is a very popular classification method introduced by Fix and Hodges (1951) due to simplicity and has low computation. The optimal k value for k-NN is 1. The system accuracy is 97.5%. Their results show that the proposed methods are sufficient to classify the eye conditions: normal or cataract. To make it portable and easy to use, they implement the system on mobile smartphone, based on Android.

2.2 Fundus Image Processing

This paper proposes a method to resize the fundus image as 3048*2432. We should erase the patients personal details such as name and age on the fundus images to protect the patients privacy. Since the green component image can enhances the contrast between the background and subject the original fundus images are converted from RGB color space to the green channel. Then, the histogram equalization is conducted on the green channel image to increases further the global contrast.

2.3 Tre-Training Method

Z.H. Zhou and Li proposed tri-training algorithm in 2005, which generates three classifiers from the original data sets. Tritraining does not require the use of supervised learning algorithm .This utilize two different classifiers. Tri-training uses three classifiers. It utilizes ensemble learning to improve the generation ability. Firstly, the initial classifiers are trained from data sets . An example is labeled for a classifier . Labeling each other in an iterative method can reduce error rate and break up the error accumulation.

2.4 Analysis of Automatic Cataract Detection

The proposed paper suggests two automatic classification systems for Nuclear Cataract and Cortical Cataract. The proposed approach for Nuclear Cataract consists of extraction of feature and prediction of grade. Fundus images are used for classification. Automatic Cataract detection helps to identify whether Cataract disease is present in an optical eye image and grade them. The efficiency of an automatic Cataract detection and classification system depends on each and every stage like preprocessing, feature extraction and selection of classifier. In the paper, several approaches are used for automatic cataract detection and classification. Finally the new technology based on fundus images classifies the optical images based on severity into Normal, Mild, Medium and Severe.

2.5 Enhanced Texture Feature This paper proposes a method to classify cataract lens from the non-cataract lens is introduced. The enhanced texture feature is based on the graders expertise of cataract and the characteristics of the retroillumination lens images. Here anterior image and posterior image of the eye is used to extract the features.

3 CONCLUSION

This paper deals with some cataract concepts and also various techniques in cataract detection. Although there exists various challenges in detecting different types of cataract. we have discussed some among them in this paper .Latest application also mentioned in this paper. This survey is basically done to study about the system that is able to detect the early stage of cataract and classify normal cataract and post-cataract eye images.

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REFERENCES

[1]Li, Huiqi, Joo Hwee Lim, Jiang Liu, Paul Mitchell, Ava Grace Tan, Jie Jin Wang, and Tien Yin Wong. 2010. A computer-aided diagnosis system of nuclear cataract. IEEE Transactions on Biomedical Engineering.

[2] AJ, Kanellopoulos, and Asimellis G. 2014. Clear-cornea cataract surgery: Pupil size and shape changes, along with anterior chamber volume and depth changes. A scheimpflug imaging study.

[3] Chow, Yew Chung, Xinting Gao, Huiqi Li, Joo Hwee Lim, Ying Sun, and Tien Yin Wong. 2011. Automatic detection of cortical and PSC cataracts using texture and intensity analysis on retroillumination lens images. 2011 Annual International Conference of the IEEE Engineering in Medicine and Biology Society 2011.

[4] Gao, Xinting, Huiqi Li, Joo Hwee Lim, and Tien Yin Wong. 2011.Computer-aided cataract detection using enhanced texture features on retro-illumination lens images. 2011 18th IEEE International Conference on Image Processing.

[5] Niya, c.p., Jayakumar, T.V., "Analysis of Different Automatic Detection and Classification Methods", Advance Computing Conference(IACC), 2015 IEEE International, pp.Year 2015.

[6] Jack, J. K., "Fundus photograph of diabetic retinopathy patients", Clinical Ophthalmology, 6th Edition, Elsevier Publishing Company, 2007.

[7] Hani, A., Izhar, L., and Nugroho, H., "Analysis of Foveal Avascular zone in color fundus image for grading of diabetic retinopathy", International Journal of Recent Trends in Engineering, Vol. 2, No. 6, 2009.

[8] Lowe, D.G., "Distinctive Image Features from Scale-invariant Key points", Int. J.Comput. Vision 60(2), 91110 (2004).

[9] Acharya, U. R., Wong, L. Y., Ng, E. Y. K., and Suri, J. S., "Automatic identification of anterior segment eye abnormallity", 2007, France.

[10] J. M. Sparrow, A. J. Bron, N. A. Brown , W. Ayliffe, A. R. Hill, "The oxford clinical cataract classification and grading system", International Ophthalmology, Vol. 9, No. 4.