

Early detection of Diabetic Retinopathy: A Survey

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ABSTRACT— The massive growth of technology in medical industry created a strong way for analyzing various diseases in the early stages. Diabetic retinopathy is a kind of common disease occur due to prolonged diabetics and their impacts are highly affects the patient health. Diabetes is the chronic disease which slowly damages the organs of the body. Retinal diseases are common with diabetic patients. Diabetic retinopathy is based on chronic diabetic that leads to mellitus. The early detection of diabetic retinopathy is important by considering various feasible parameters collected clinically and through screening images such as Optical coherence tomography (OCT) fundus images, pathology reports etc. The presented study discuss various methodology adopted for early detection of diabetic retinopathy (DR).

Keywords— *Diabetic Retinopathy, chronic diseases, Machine learning, Deep learning, predictive analysis.*

I. INTRODUCTION

Diabetic retinopathy (DR) is a common disorder occurs as a result of diabetic Mellitus (DM). The untreated diabetic mellitus leads to loss of vision, create permanent blindness. The initial stages of the disorders creates blurry vision, sometimes switch off the vision. Diabetic is a chronic syndrome act as a root cause for eye diseases in diabetic patients. It directly weakens the blood vessels in the eye and releases blood from the vessels in severe conditions. Early detection of the diabetic retinopathy disorder reduces the severe hazards occurring in the retina. An initial stage of retinopathy reduces the vision. Various machine learning techniques are used in medical industries, to make predictive analysis. Health care industry with predictive analysis enables accurate predictions, responsible for timely decisions. The challenging part of diagnosis is decision making in treatments that need immediate support. Early detection of disease reduces the major impacts

II. BACKGROUND STUDY

G. Kumar et al., 2020 the author presented a diabetic retinopathy detection using capsule network. Diabetic retinopathy diagnosis network based on neural network framework is implemented in which the model is compared with existing state of art processed. The dataset utilized for experiment contains 1265 images that provides accuracy of 80.59% comparatively with the higher grade of comparisons using DRDNET. S. Prabha et al.,(2020) In terms of image analysis, using Taylor core algorithm is discussed here using STARE and DRIVE dataset the retinal blood vessels are extracted for the using machine learning algorithm the presence of diabetic retinopathy is detected. The proposed approach created as a pipeline architecture to detect the presence of permanent blindness at the early stages also detection of diabetic retinopathy is analyzed. The four most effect of diabetic retinopathy started with the retinal blood vessels damage.

III. DISCUSSIONS

Table 1. shows Various machine learning techniques for implemented to the death diabetic retinopathy presents using clinical images collector from the patience in stock accuracy of 83 percent is achieved using pre diagnosis diabetic retinopathy detection system in which the patient condition need to be monitor for making the clear analysis. The commonly used Machine learning algorithms such as random forest classifier (RF), linear discriminant analysis(LDA), K-nearest neighbor(KNN), support vector machine(SVM) are used to detect the yearly prediction of diabetic retinopathy with Diabetics symptoms. Clinical data are analyze interns of actions to be taken to consider the diabetic written of the presence in the yearly stages using PIDD dataset most of the information collector related to the diabetic retinopathy are considered. In making the decision of pattern occurrence repeatedly for chronic diabetic diseases with Inception B3 model and BGC 19 model using a number of datasets comparatively. When it comes to image processing deep learning algorithm place a major role. The diabetic retinal funders images are large collector information from the patient. These images are trained interested using convolutional neural network architecture in which various different network models are adapted. In case of multiple layer perceptron Inception B3 mobile network and resilient net accuracy of 83.01% is achieved. The commonly used De planning algorithm are convolutional neural network architecture in which the maximum Mercury of 94% is achieved using OCD images and 98.5% is achieved using missed are dataset.

S No	References	Year	Research Description	Dataset	Methodology	Quantitative Measures	Challenges
1	M.M.Dharmana et al.,	2020	Pre-diagnosis of DR	Clinical data, Images (Fundus)	Blob detection	Accuracy= 83%	Patient Condition need to be monitored
2	X.Zeng et al.,	2019	Automated Diabetic Retinopathy detection	Binocular Fundus Images	BSCNN	Kappa Score= 0.829	Multiple dataset need to be tested
3	N.Eladawi et al.,	2019	Early detection of DR	OCTA images	3DCNN+ Random Forest	Accuracy= 98%, Sensitivity= 98%, Specificity= 100%	Computing time is more

Table. 1. Comprehensive study of various existing methodologies on diabetic Retinopathy detection

IV.CONCLUSION

Chronic diseases need to be treated in the early stages to break the chain of severities. Early detection of diabetic retinopathy is an important consideration. Diabetics is chronic disease in which the directly impacts the organs of the body slowly. The presented study consider various existing developments based on diabetic region of the detection in which the methodology and the performance measures achieved in existing works are discussed. The proposed study comes to the conclusion where the enrollment of deep learning algorithms is highly impactful to the early detection of diabetic retinopathy.

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