Retinal Disease Screening Through Local Binary Patterns

S. Nandhini 1, J. Sudhakar 2
1 P.G Student, Dept Of Ice, Thirumalai Engineering Collage, Kanchipuram.
2 Assistant Professor, Dept Of Ice, Thirumalai Engineering Collage, Kanchipuram.


Index Terms: Color Fundus Images, Diabetic Retinopathy, Exudates, Lesions, Random Forest Classifier.

I. Introduction
Diabetes Mellitus Is A Vital Cause Of Visual Morbidity That Affects An Estimated 11.8 Million Diagnosed And 4.9 Million Undiagnosed Persons In The Us [1, 2]. Among Them 40.3% Have Some Degree Of Diabetic Retinopathy And 8.2% Have Vision Threatening Retinopathy. The Rates Of Retinopathy And Vision-Threatening Retinopathy Are Higher In Persons With Type 1 Diabetes, Occurring In 82.3% And 32.2% Of Affected Persons, Respectively [3-6]. Persons With Diabetic Retinopathy (Dr) Are 29 Times More To Become Blind Than Those Without Diabetes And It Is Estimated That Diabetic Retinopathy Is Responsible For 5% Of All The World’s Blindness Cases The Medical Cost Of Dr Has Been Estimated To Be Us$500 Million Per Year In The Us Alone [6-8], Diabetic Retinopathy Is A Microvascular Complication Of Diabetes And The Common Cause Of Damage To The Retina Of The Eye Of The Diabetic Patient. The Prevalence Of Retinopathy Varies With The Age Of Diabetes And The Duration Of Disease. For The Detection Of Diabetic Retinopathy Color Fundus Photographs Of The Retina Is Required.

If The Symptoms Are Identified In Earlier Stage, Then Proper Treatment Can Be Provided. The Effective Treatment Of Diabetic Retinopathy Can Inhibit The Progression Of The Diseases. Many Patients Are Not Aware Of This Disease. It Is Point Out That At Least 90% Of The New Cases Of Diabetic Retinopathy Could Be Reduced By Giving Proper Treatment And Regular Monitoring Of The Eye. Diabetic Retinopathy Can Be Diagnosed By The Defects Of The Retina. The Defects May Include Microaneurysms, Haemorrhages And Exudates. Microaneurysms Are The Primary Abnormality Occurring In The Eye Because Of Diabetes.

Figure 1: Anatomy Of The Eye

These Are Recognized By Tiny, Dark Red Spots Or Haemorrhages That May Occur As Alone Or In Clusters And Light Sensitive To Retina. Haemorrhages Are Round In Shape, Which Are Found In Deep Layer Of The Retina. Exudates Are Two Types: Hard Exudates And Soft Exudates. Hard Exudates Are The Fat And
Protein Leaking Out From The Blood Vessel, Which Prevents Light From Reaching The Retina And Causes Visual Impairment. There Are Some Spots Termed As Soft Exudates Are Seems In The Severe Stages Of Diabetic Retinopathy Called Cotton Wool Spots. These Caused By Nerve Fiber Layer Blocked And The Local Nerve Fiber Axons Get Blown Up. Fig.1 Shows The Features Of Diabetic Retinopathy.

The Aim Of This Paper Is To Review The Existing Method Of Automated Diagnosis Of Diabetic Retinopathy And To Discuss On Future Research Direction Of Automated Diagnosis Of Diabetic Retinopathy. The Rest Of The Paper Is Organized As Follows. Section II Describes The Detection Methods And Section III Discussions On Existing Techniques And Future Research Directions.

II. Diabetic Retinopathy Detection Methods


Sargunar And Sukanesh: Described Classification Of Diabetic Retinopathy Using Fuzzy C-Means Clustering, Fractal Techniques And Morphological Transformations. The System Involves Preprocessing Retinal Images By Local Contrast Enhancement Using Mean And Variance. Then The Preprocessed Image Is Segmented And Textural Features Are Extracted For Classification. The Classification Accuracy Of The System Is 85%.

Figure 2: Normal Fundus Image

Figure 3 Fundus Image Of Retinitis Pigmentosa Disease

### III. Analysis Of Work

A. Critical Comments On Detection Through Exudates Hard And Soft Exudates Detection Described By Kavitha And Duraiswmy Method’s Accuracy Is Low Due To False Detection. However, The Accuracy Of The Authors Method Is Low Due To Artifacts, Additive Noise And Fainted Exudates. Exudates Detection By Color Histogram Thresholding, The Authors Basha And Prasad Algorithm Has Some False Detection Because The Color Of Exudates Are Similar To Optic Disc And Edge Of Blood Vessel.

*International Conference On Progressive Research In Applied Sciences, Engineering And Technology 39 Page (ICPRASET 2K18)*
Application Of Automatic Image Processing Methods To Fundus Has The Problems Of Varying Image Quality Such As Contrast And Brightness, And Characterization Of Color Differences Due To Inhomogeneous Illumination Of The Eye Background.

Sae-Tang Et Al. Describe Exudates Detection Through Non-Uniform Illumination Background Subtraction. But Their Method Has Some Limitations. Their Proposed Method Cannot Detect Some Of The Soft Exudates Because Intensity Is Not Very Distinct From The Intensity Of The Background And Some Soft Exudates Are Not As Bright Lesions.


Critical Comments On Detection Through Optic Disk The System Of The Authors Have To Be Able To Analyze Low Quality Images, But Images Several Megabytes In Size Would Not Be Acceptable Because, It Needs Large Storage Requirements. The Accuracy And Robustness Of Locating The Optical Disk To Be Increased.

IV. Results And Discussion

Critical Comments On Detection Through Neural Network Sivakumar Et Al. Have To Extend To Further Applications In Medicine. Jayanthi Et Al. Described A Survey Of The Classical And The Methods For Classifying And Diagnosing The Type Of Retinal Disease And Detecting Its Features After Diagnosis At An Earlier Stage Of The Disease. Although A Lot Of Work Has Been Done, Automatic Diagnosis Of Retinal Diseases At An Earlier Stage Still Remains An Open Problem.


Gang Luo Et Al. Proposed System Utilized To Extract Abnormalities Of Diabetic Retinopathy Without Over Segmentation Problem. But They Did Not Tell About The Performance Of The System. F. Future Research Directions From This Review, We Found That There Is A Good Number Of Different Approaches For Diabetic Retinopathy. All Have Some Merits And Demerits. Among These Methods Detection By Exudates, Lesions And Detection By Neural Network Are Somehow Somehow Benchmarks In This Research Domain. In Future Researcher Should Concentrate On
1) Developing Improved Camera System For Early Diagnosis Retinopathy.
2) Effectiveness Of The Existing Techniques Are Questionable. For More Accuracy Hybridization Of Methods May Be Effective.
3) In Addition, Researchers May Focus On Developing Novel Approaches Overcoming The Demerits Of Existing Technology.

Critical Comments On Detection Through Other Methods The Classification Of The System Accuracy Requires More Range Images And A Larger Number Of Neighborhood Windows. One Solution Is To Perform A Feature Selection Procedure During The Training Stage To Identify The Most Distinctive Histogram Features. Then The Range Images With Less Distinctive Histogram Features Need Not To Be Calculated.

Gang Luo Et Al. Proposed System Utilized To Extract Abnormalities Of Diabetic Retinopathy Without Over Segmentation Problem. But They Did Not Tell About The Performance Of The System. F. Future Research Directions From This Review, We Found That There Is A Good Number Of Different Approaches For Diabetic Retinopathy. All Have Some Merits And Demerits. Among These Methods Detection By Exudates, Lesions And Detection By Neural Network Are Somehow Somehow Benchmarks In This Research Domain. In Future Researcher Should Concentrate On
1) Developing Improved Camera System For Early Diagnosis Retinopathy.
2) Effectiveness Of The Existing Techniques Are Questionable. For More Accuracy Hybridization Of Methods May Be Effective.
3) In Addition, Researchers May Focus On Developing Novel Approaches Overcoming The Demerits Of Existing Technology.
Retinal Disease Screening Through Local Binary Patterns

Figure 4: Input Image

Figure 5: Preprocessed A, B Type Images

Figure 6: Fussy C Means Clusters Images

Figure 6: Feature Extraction

V. Conclusions

We have presented the current status of automated diagnosis of diabetic retinopathy. The imaging system of the fundus camera needs to be developed in an effective manner with high resolution so...
Retinal Disease Screening Through Local Binary Patterns


References