Detection and Analysis of Diabetic Retinopathy

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Abstract

Diabetic retinopathy (DR) is a retinal disease that is affected by diabetes on the eyes. The main risk of the disease can lead to blindness. Control of the blood glucose levels in the blood system depends on glucose and insulin interaction. Medical image diagnosis plays a major role of research for Health care purposes. DR can be occurred because enough rate of insulin in the body is not secreted properly by the pancreas. If a person has diabetes for 20 years or more, he or she has the more probability to suffer diabetic retinopathy. DR usually shows no symptoms or vision problems at early stage of the disease. However, it can lead blindness eventually. The earliest clinical sign of DR is the detection of microaneurysms (MAs). They are formed due to the leakage of blood from capillary. MAs are small, red dots and spread on the superficial retinal layers. Diabetics risk likely to be developed from a person's daily life style activity such as his/her eating habits, sleeping habits, physical activity and so on. In the proposed work, screening algorithm and KNN algorithm is used for Screening of DR to prevent blindness. In this algorithm lesions of eye including blood vessel exudates and micro aneurysms are detected using morphological operations. The retina images from standard neural network disease diabetic retinopathy database and local database are used as inputs of proposed work. Thus DR can be detected using the proposed work and it will be useful for further treatment.

I. INTRODUCTION

Diabetic retinopathy (DR) could be a one sort diabetic disease which may injury membrane within the eye and causes vision defect. Diabetic retinopathy continues to be one amongst the leading causes of vision loss among individuals within the operating age. It will eventually result in vision defect and affects up to eighty percent of all patients UN agency have had polygenic disorder for ten years or additional. But the world increase within the range of patients diagnosed with diabetes as well as the increasing prices and demands on this screening system means that strategies to semi modify or aid screeners square measure a lot of in demand.

Diabetes are the seventh leading reason behind death by 2030 by the globe Health Organization (WHO) comes. Polygenic disorder will increase the chance of a variety of eye diseases, however the most reason behind vision defect related to polygenic disorder is diabetic retinopathy.

It's the capability to become the leading reason behind vision defect whereas DR isn't presently the first reason behind avertible vision defect, within the next twenty years and it'll have an effect on the poorest individuals the foremost - already eightieth of individuals with polygenic disorder sleep in low level, middle-income countries (World Health Organization, 2014).

presumptuous associate degree annual screening model is employed then supported a fifty four increase within the world diabetic population by 2030 virtually thirty five exams per second are required each second of each day so as to screen the diabetic population of the globe. This prediction is combined by the actual fact that there'll be but aa pair of growth within the range of ophthalmologists by 2030.

Retinal imaging could be a non-invasive method of viewing human vessels. Mistreatment correct techniques, tissue layer is visible from the skin that assists within the imaging of the tissue layer and brain tissue non-invasively.Moreover, because the tissue layer could be a extremely metabolically active tissue with a double blood offer, it permits direct non-invasive observation of the circulation.

II. RELATED WORK

[1] As digital computing increasingly develops in medical field. In the medical science image processing is very help to analyses the medical data. Diabetic retinal image analysis is very hard to identify the retinal diseases. Past years, the automatic diagnostic system for diabetic retinopathy, age related retina degradation and retinopathy. Physician is difficult to find the pre retinopathy system. This proposed work, it have a retinal digital image analysis. It has a tendency to tend to debate current techniques accustomed mechanically sight landmark choices of the structure like the point, fovea centralis and blood vessels. It analyses the utilization of the automatic image identification for diabetic retinopathy. It jointly review its role in shaping and

acting the measurement of tube, however this fields square measure supported 'optimization' principles and also the manner of association general upset of tube changes. In future it combines the fundal image analysis in the telemedicine.

[2] As patient with the diabetic loss their vision because the secretor does not secret enough insulin to the body. This proposed work has to identify the different diabetic retinopathy. Totally 124 fundus images are analyzed to detect the different stages. There are four groups in the DR such as moderate non-proliferative diabetic retinopathy (NPDR), Severe NPDR, Proliferative DR. The feed forward neural network is used to identify the stages in the diabetic retinopathy. A *feed forward neural network* is an artificial neural network wherein connections between the units do not form a cycle. As such, it is different from recurrent neural networks. This classification achieves 100% accuracy to classify the diabetic.

[3] This paper describes the simplest way for investigation hemorrhages and exudates in ocular complicated piece photos. The detection of hemorrhages and exudates is extremely vital thus on diagnose diabetic retinopathy. Diabetic retinopathy is one of the foremost vital factors tributary to vision defect, and early detection and treatment area unit very important. throughout this study, hemorrhages and exudates were automatically detected in complicated piece photos whereas not mistreatment indicator angiograms.

In the initial examination, the incorrect blood vessel regions are detected and eliminated, it is easy to find the length and width relation in the region. Hence the false positive rate was removed by the values extracted from the candidate image. Candidate image contains the number of pixels, contrast in the image, 13 value co-occurrence matrixes, gray levels, and the feature extraction. The sensitivity of investigation hemorrhages at intervals the complicated piece photos was eighty fifth that of investigation exudates was seventy seven. Altogether automatic theme might accurately observe hemorrhages and exudates.

[4] Visual disorder is often comes for every age. From this diabetic retinopathy is the major disorder that affects the blood vessels in the eye. This is can't stopped however pre detection is very complex body part by associate degree oculist will prevent any degrade in the vision. The symptom in the diabetic retinopathy is microaneurysms, hemorrhages, cotton wool spots and exudates. Exudates are large stay on the tissue layer that seems as xanthous regions in complex body part image. Complex body part pictures show sizable intensity that used to detect exudates automatically. This proposed work is overcome the elimination of existing system for preprocessing. It replaces the technique of false positive rate based on the accurate detection. Histogram defines the intensity of colors in the image. The bright yellow regions are called exudates. For every red color gamma correction is performed. The histogram of every inexperienced element was extended. In the bar chart analysis exudates candidates are detected and false positive rate is removed accordingly.

[5] This paper presents new algorithms supported mathematical morphology for the detection of the purpose and thus the tube-shaped structure tree in screaming low distinction color complex body part pictures. every possibility - vessels and optic disk - deliver landmarks for image registration and unit of measurement indispensable to the understanding of retinal complex body part photos. For the detection of the optic disk, we have a tendency to tend to the position roughly. Then we have a tendency to tend to the precise contours by suggests that of the watershed transformation. The formula for vessel detection consists in distinction improvement, application of the morphological top-hat-transform and a post-altering step therefore on distinguish the vessels from various blood containing choices.

[6] The major health problem in the twenty one century is diabetic retinopathy. This is happens for diabetes mellitus and its complications. To detect the DR in the retinal image is very hard. This paper presents a novel method Non Proliferative Diabetic Retinopathy to monitor the diabetes mellitus. There are three characterized that extracted from the images. It is easy to detect the diabetes mellitus in the tongue. The three groups are color, texture and math. In the image acquisition capture the tongue image. A tongue color is identified; it is compared to 12 colors that already represented for tongue. Tongue surface have the texture values of eight blocks. With the extra mean of all eight blocks unit of measurement accustomed characterize the 9 tongue texture choices. Finally, 13 choices extracted from tongue photos supported measurements, distances, areas, and their ratios represent the math choices.

III. PROBLEM IDENTIFICATION

DR can be a standard retinal sickness that happens once fluid is due blood vessels to membrane. The early detection of diabetic retinopathy is a most effective way to control the growth of the disease. The proposed work uses a artificial neural network (ANN) to detect the DR. Neural network is one of the commonly applied machine learning algorithm. It trains the image with vast collection of retinal images. This is a group of nodes that are interconnected. It is simulated by the way human

brain processes information. ANN get the knowledge of patterns and inter connection between each data.

The itinerant collect the membrane images with the help of compression technique to detect the diabetic retinopathy using ANN to make the initial screening. The membrane data measure is examined. Thus this process achieve very effective to detect the diabetic retinopathy.

Disadvantages

- High Complexity
- Time Consuming

IV. PROPOSED MODELING

Based on the Identification of Diabetics. Through the Identification of Retinal disease view/ grade fundus Mild or Severe. Severe patient to prevent diabetics on the basis of Diagnosis Doctor. This leads to save human life and also prevent eye blind.

After the retinal disease identification, check whether the fundus is view or degrade. If the condition is true, is denotes the NPDR is mild, moderate and severe. Otherwise refer the ophthalmologist. Finally the instruction is automatically detected by the computerized system. It can be easily to detect the diabetic retinopathy.

• Gestational DM (GDM)

GDM is an abnormal glucose intolerance first detected during pregnancy. In general, DR screening is not required for GDM. However, if GDM is diagnosed in the first trimester of pregnancy, screening should be as per pre-existing DM.

• Children and Adolescents

Incidence of DR in young children is negligibly small and therefore children younger than 9 years old do not require screening for DR. International Society for Paediatric& Adolescent Diabetes (ISPAD) Clinical Practice Consensus Guidelines 2009 recommends timing of first screening as follows:

After the retinal disease identification, check whether the fundus is view or degrade. If the condition is true, is denotes the NPDR is mild, moderate and severe. Otherwise refer the ophthalmologist. Finally the instruction is automatically detected by the computerized system. It can be easily to detect the diabetic retinopathy.

The machine learning algorithm is used for identifying the blood glucose level of diabetic patient. K Nearest Neighbor (KNN) algorithm is used to classify the blood glucose level according to the type of diabetic. The algorithm is as follows:

Let m be the number of training data samples. Let p be an unknown point.

1. Store the training samples in an array of data points arr[]. This means each element of this array represents a tuple (x, y).
2. for i=0 to m:
   Calculate Euclidean distance d(arr[i], p).
3. Make set S of K smallest distances obtained. Each of these distances correspond to an already classified data point.
4. Return the majority label among S.

Identify the blood glucose level in the patient registered information that already stored in the databases. Compare patient information to the normal blood glucose level range. Nearest Neighbor is used to classify the range based on the nearest level.

A. Proposed Architecture Modeling

DR Architectural Diagram in Proposed System shows Fig 4.1

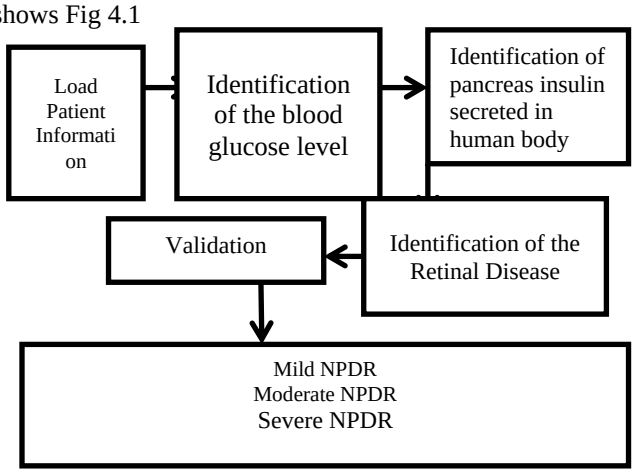


Fig 3.1 Architectural Diagram

i) The Patient Information Stored on the Computerzied System. First Stored the Medical Card Number, Patient Name, DOB, Martial Status, Father/Spouse/GardianName, Place Address, Mobile Number,Address, Diagnosis Name, Description. If the Pancreasesecreatedinsulin it results to confirm the patient having no diabetics. The Pancreases not secreated

in human body it leads to identify the diseases in Diabetics. To identify the Blood glucose level in human body to identify the body having diabetics. The detection of disease on the basis of patient information automatically detected through the system base.

ii) If the pancreasesecreation in human body identified through above mentioned in the patient information. The given pancreasesecreation identified based on computerized system. The pancreasesecreation in human body is automatically detected in the above mentioned description of doctor diagnosis.

iii) In the auomatically detected system diagnosis shows whether the patient having diabetics or non diabetics. The system only mentioned automatically the patient having diabetics.

iv) Based on the pancreasesecreation in human body and diabetics. To prevent whether the patient having severe diabetics, mild diabetics or high level diabetics. The high level diabetics leads to affected diabetic retionopathy. finally it leads to eye blindness. So this flow chart diagram shows only

B. Modules description

1. Identification Of The Blood Glucose Level

Based on the patient information dr in computerezied system.On patient information each and every one diagnosied by doctor. After diagnosis used in the system based. It automtically shows on the computerized. Understanding blood sugar level ranges are often a key a part of polygenic disease self-management. This work states 'normal' glucose ranges and glucose ranges for adults and youngsters with sort one polygenic disease, sort a pair of polygenic disease and glucose ranges to work out folks with polygenic disease. If an individual with polygenic disease automatically detected on the system it is important to understand what the blood sugar level suggests that. Recommended blood sugar levels have a degree of interpretation for each individual and it ought to discuss this together with health care team. In addition, ladies are also set target glucose levels throughout physiological state. The following ranges square measure tips provided by the national institute for clinical excellence (nice) however every individual's firing range ought to be in agreement by their doctor or diabetic authority.

Diabetes is a chronic disease characterized by dangerously high levels of glucose in the blood. Usually, when more carbohydrates are ingested than areneeded to satisfy the body's energy requirements, high blood glucose levels stimulate the production of insulin. The insulin then promotes the removal of excess glucose from the blood by converting it into glycogen that is stored in the liver. A normal blood glucose level is thus restored.

In diabetes, this glucose management system does not work effectively. This is either a consequence of not enough insulin being produced or the body not being able to effectively use the insulin it produces. Levels of glucose in the blood can consequently become dangerously high (hyperglycemia) and lead to a range of life-threatening conditions.

The most common form of the disease, accounting for 90%–95% of cases, is type 2 or non-insulin-dependent diabetes mellitus in which the production of insulin steadily declines. Its development is strongly associated with overeating, and type 2 diabetes was historically considered to be a late-onset disease. However, with the increasing prevalence of childhood obesity it is now being reported in children too.

Patients who are not able to produce any insulin are said to have type 1 diabetes, which usually presents in childhood.

Table 3.1 Blood glucose level ranges

Type of diabetic	Upon Waking	Before Meals	Atleast 90 minutes after meals
Non-diabetic		4.0 to 5.9 mmol/L	under 7.8 mmol/L
Type 2 diabetes		4 to 7 mmol/L	under 8.5 mmol/L
Type 1 diabetes	5 to 7 mmol/L	4 to 7 mmol/L	5 to 9 mmol/L
Children w/ type 1 diabetes	4 to 7 mmol/L	4 to 7 mmol/L	5 to 9 mmol /L

Most common normal blood sugar levels are as follows:

- Fasting the range between 4.0 to 5.4 mmol/L (72 to 99 mg/dL) .
- When eating after 2 hours the range up to 7.8 mmol/L (140 mg/dL) .

Blood sugar level is varied, if the person is diabetics

- 4 to 7 mmol/L for people with type 1 or type 2 diabetes when before take meals.

- under 9 mmol/L for people with type 1 diabetes and under 8.5mmol/L for people with type 2 diabetes when after take the meals.

The liver produce a glucose and it is saved in the cells into a bloodstream. This is the effect of glucagon in a body. This is helps to increasing the blood glucose level. Glucagon also induces the liver (and some other cells such as muscle) to make glucose out of building blocks obtained from other nutrients found in the body (eg, protein).

Patients with type 1 diabetes require regular insulin injections to maintain blood glucose levels within the normal range.

In contrast, type 2 diabetes can be managed initially by reducing carbohydrate intake and then by taking oral medications that promote the effects of insulin. Such medications help control blood sugar levels via a range of mechanisms, including suppression of glucose production in the liver, blocking glucose absorption in to the blood, and stimulation of insulin release from pancreatic cells.

Although effective, medications for type 2 diabetes can have unwanted side effects, most commonly gut disturbances. Natural remedies have consequently been widely used to lower blood glucose levels[2]

The anti-diabetic potential of numerous plants has been investigated in the search for effective, well tolerated treatments for lowering blood glucose levels in patients with diabetes. Indeed, over 400 plants have been reported to have a glucose-lowering effect and herbal remedies have been widely used to lower blood glucose levels.

In some cases, the insulinomimetic and anti-diabetic activity of these remedies has exceeded that achieved with conventional anti-diabetic agents. The mechanisms of action of these remedies are similar to those of mainstream anti-diabetic drugs, i.e., restore insulin production, or inhibit the intestinal absorption of glucose.

Since the side effects of current pharmacological treatments for type 2 diabetes can be unbearable for some patients, there is still considerable research activity focused on identifying new anti-diabetic agents from natural plants. The plant compounds frequently reported to have an anti-diabetic effect include glycosides, alkaloids, flavonoids, and carotenoids.

Using this knowledge, a further 400 plant species with the potential for having anti-hyperglycemic efficacy have been identified. It is hoped that ultimately this continued research into plant-based glucose-lowering agents will lead to the development of an effective drug for types 2 diabetes that has a low risk of adverse effects.

2. Identification of pancreas insulin secreted in human body

Based on the System based Patient Information.Whether it Identified PancresesSecreated Insulin in human body. It Automatically Detected the Inulin Secreation in human body using KNN Algorithm Implementation in this module to prevent DR. The secretor may be a six inch-long planar gland that lies deep inside the abdomen, between the abdomen and also the spine. It's connected to the small intestine that is a component of the little internal organ. These cells square measure clustered in teams inside the exocrine gland and appearance like very little islands of cells once examined underneath a magnifier. These teams of duct gland endocrine cells square measure called duct gland islets or additional specifically, islets of Langerhans (named once the individual UN agency discovered them).

The exocrine gland produces secretions necessary for you to digest food. The enzymes in these secretions enable your body to digest macromolecule, fat and starch from your food. The enzymes ar made within the acinar cells that form up most of the exocrine gland. From the acinar cells the enzymes flow down varied channels into the epithelial duct and so out into the small intestine. The secretions aralkalescent to balance the acidic juices and part digestible food coming back into the small intestine from the abdomen.

The essential in the pancreas are:

- The duct gland maintains the body's glucose (sugar) balance.
- Primary hormones of the duct gland embody hypoglycaemic agent and internal secretion, and each regulate glucose.
- Diabetes is that the most typical disorder related to the duct gland.

Type one polygenic disorder: If you've got kind one diabetes, then your body doesn't manufacture any internal secretion to handle the aldohexose in your body. internal secretion deficiency causes a spread of complications, therefore individuals with kind one polygenic disorder got to take internal secretion to assist their body use aldohexose suitably. To learn a lot of, browse our article regarding kind one polygenic disorder.

Type two polygenic disorder: kind two diabetes is far a lot of prevailing than kind one. Individuals with kind two polygenic disorders is also ready to manufacture internal secretion, however their bodies don't use it properly. They could even be unable to supply enough internal secretion to handle the aldohexose in their body. Style selections, like diet and exercise, play a significant role in managing and preventing kind two polygenic disorder.

3. Identification of the Retinal Disease

Retinal diseases are most common and widely vary and it causes visual affect. This is mainly affecting the part of retina in a eye. Retina is very thin layer tissue inside the black wall of the eye. In Patient Information on the system DR can be identified automatically on the Retinal Disease on the implementation of Screening Algorithm. Using Screening Alorithm Identification of the Retinal Disease can be detected. To Prevent Eye blindness

Non-proliferative DR is the least severe and usually symptomless form of DR in the international clinical classification system. A regular ophthalmic follow-up is usually sufficient for patients with non-proliferative DR. It commonly first presents with microaneurysms appearing as small red spots on the superficial layers of the retina Microaneurysms are focal saccular dilatations often on the venous side of the retinal capillaries; they usually result from weakening of the capillary walls induced by the loss of pericytes. Other non-proliferative DR findings include intraretinalhaemorrhages, resulting largely from ruptured retinal microaneurysms (Shah 2008). Superficially situated microaneurysms give rise to flame shaped haemorrhages due to the distinctive structure of the surrounding nerve fibre layer. Microaneurysms located deeper in the retina, e.g. in the outer plexiform layer, form haemorrhages with 36 darker and rounder blot/dot-shapes. Retinal microinfarctions, also known as cotton-wool spots or soft exudates, originate from occlusions of the precapillary arterioles in the nerve fibre layer (Diabetic retinopathy: Current care guideline 2014, Kanski Jack & Brad 2007). The lesions are white and fluffy in appearance and are often situated near to the vascular arcades. The microinfarction's typical appearance is created by the focal accumulation of axoplasmic debris from retinal ganglion cell axons. Lipid deposits, also referred to as hard exudates, are often associated with retinal oedema. The condition is caused by focal or diffuse vascular hyperpermeability accumulating lipids and proteins in the inner and outer plexiform layers of the retina. Aggregated lipoprotein formations can be seen as well-defined yellowish deposits on the fundus. Lipid deposits can vary from singular small specks to diffuse circinate lesions on the edges of oedematous retinal area.

IRMA are dilated irregular capillaries often situated on the edges of perfused and non-perfused areas of the retina. They function as collateral vessels, bypassing the obliterated capillary bed. IRMA is a significant indicator predicting the progression of DR. Venous beading refers to irregular diameter changes, described as a string of sausages, along the length of affected retinal veins. The beaded configuration results from segmental dilatations and thinning of the venous walls. Loops or reduplication of venous segments may also appear Venopathy can be seen usually near large areas of non-perfused retina. Venous beading is an important indicator of retinal ischemia and according to the Early Treatment Diabetic Retinopathy Study (ETDRS), it is the strongest predictor of progression to PDR Pre-proliferative diabetic retinopathy Pre-proliferative DR is characterised as severe non-proliferative DR. The microvascular fundus changes are more pronounced than in non-proliferative DR but neovascularisation is not present. According to the proposed international 37 clinical classification of DR, any of the following three characteristics, known as the 4-2-1 rule, are indicative of pre-proliferative DR: 1. Over 20 intraretinalhaemorrhages in all four quadrants of the fundus. 2. Definite venopathy in two quadrants. 3. Prominent IRMA in one quadrant. Potential symptoms of pre-proliferative DR depend mainly on the extent of macular involvement. Pre-proliferative DR may rapidly advance to PDR or remain static. ETDRS, utilizing a more detailed classification of DR, detected severe non-proliferative DR and very severe non-proliferative DR to carry 15% and 45% respective risk of progressing into PDR with high-risk characteristics within one year.

Retinal laser photocoagulation may be needed to prevent progression into PDR in advanced cases of preproliferative DR. Proliferative diabetic retinopathy PDR is an advanced form of DR resulting from the accumulation of microvascular damage in the retina. When the metabolic needs of retinal cells are no longer fulfilled, new vascular growth is induced in an attempt to restore the lost balance. The hallmark of PDR is ischemia-induced neovascularisation of the optic disc and/or retina. Neovascularisation often appears near to the vascular arcades on the border of perfused and ischemic retina. In the absence of significant diabetic maculopathy, the first symptom of diabetic ophthalmic pathology noticed by the patient may be blurring of the visual field due to vitreous haemorrhage. Fragile new blood vessels originate from the venous vasculature and may perforate the inner limiting membrane, gaining access to vitreous. The progression of neovascularisation is usually accompanied by surrounding fibrous connective tissue growth. Adhesions are often formed between connective tissue, hyaloid face and retina. The delicate new vessels have a tendency to bleed easily due

to contractive forces within the fibrotic tissue, resulting in vitreous or preretinalhaemorrhage. Vitreous haemorrhage can be inconspicuous or profound, rapidly diminishing visual acuity (VA).

Dense intravitrealhaemorrhage 38 often prevents visualization of retina and administration of laser treatment until spontaneous resorption or vitreoretinal surgery. Strong vitreoretinal adhesions may also pull the neurosensory retina from the underlying retinal pigment epithelium resulting in tractional retinal detachment. Diabetic maculopathy Diabetic maculopathy is caused by microvascular changes accumulating in the central retina and resulting in ischemic, focal, diffuse or mixed macular oedema Ischemic macular oedema can be seen in severely non-perfused fundus with leakage of fluid from the remaining vascular structures. Focal macular oedema is predominantly caused by microaneurysms with high permeability. Diffuse macular oedema results from damaged capillary areas leaking fluid between the retinal layers. Cystoid macular oedema can be seen in conjunction with any of the macular oedema types (Diabetic retinopathy: Current care guideline 2014). It creates a flower petal-pattern in the fovea as vascular leakage forms large fluid filled cystoid spaces in the outer plexiform and inner nuclear layers of the retina. Lipid deposits, consisting of accumulated lipoproteins, may become aggregated in the proximity of any type of diabetic macular oedema. Optical coherence tomography (OCT) has become an important tool in diagnosing diabetic maculopathy and following the treatment efficacy of macular oedema. OCT imaging allows a quick and non-invasive evaluation of macular morphology, although FA can still provide more comprehensive information about the retinal vascular status, including the presence of ischemic areas and the extent of the avascular zone.

People with unwellness will have an eye fixed disease referred to as diabetic retinopathy. This is often once high blood glucose levels cause injury to blood vessels within the tissue layer. These blood vessels will swell and leak. Or they will shut, stopping blood from passing through. Typically abnormal new blood vessels grow on the tissue layer. All of those changes will steal vision.

The main aim for screening of DR is to discover sight threatening DR and to make sure timely treatment so as to stop vision loss. Acceptable referral to the oculist ought to be done.

- Any level of Diabetic Maculopathy
- Severe NPDR
- Any PDR
- visual loss
- If screening examination can't be performed together with ungradable complex body part photograph

Screening is outlined as "the method of examining a gaggle of individuals for the presence of a disease" with its conditions being:

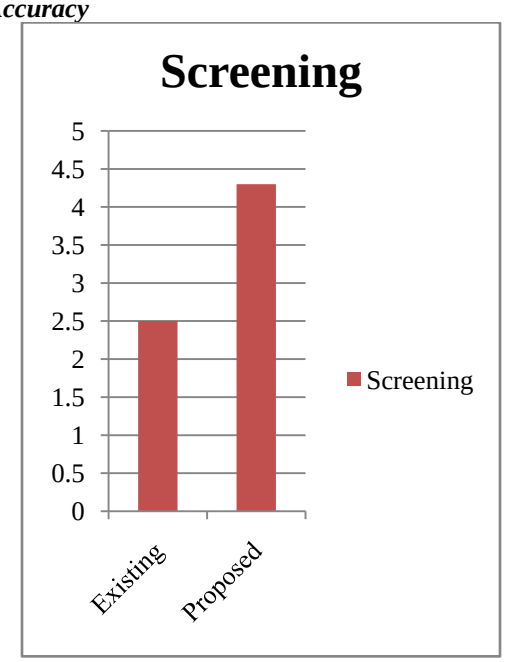
- The malady should seem during a outlined population
- The population should be distinctive
- The malady should gift a ill health
- There should be effective treatment for the malady
- Cost effective and benefits of life

V. RESULT AND DISCUSSION

A. Performance analysis

The performance evaluation is the step to be used in the respective force of which it should be demand. The main objective of the performance usage should be maintained in the system for the best metrics to be designed. Another priority could be performed in the various technical terms. Here the most process of the technical usage of the program can be performed in the best space. Thus this should be compared with the help of the following fields that it could be recommended.

B. Accuracy

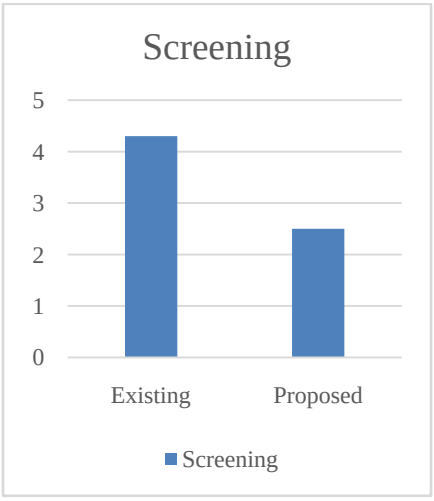


Graph 1: Screening for DR detection

The graph shows the DR detection accuracy is high in the proposed web based application compared to existing system.

C. Save Time

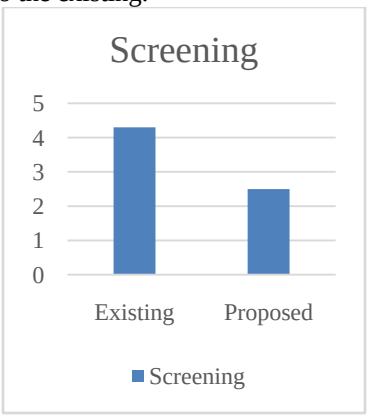
The graph shows the time consuming compared between existing and proposed. The proposed system consist minimum time to process the algorithm very efficient.



Graph 2: Save Time

D. Cost Efficiency

The graph shows the cost effiecient in the system. The proposed system includes less cost compared to the existing.



Graph 3: Cost Efficiency

VI. CONCLUSION

The proposed body of research is an effortless technique that enables ophthalmologists to detect the diabetics in a very short period of inspection. The proposed method intends to help ophthalmologists performing the diabetic retinopathy screening process, to detect symptoms more easily using diabetic patient details. This screening process helps to detect the diabetic with the help of three levels. First is identification of blood glucose level, second analysis the insulin secretion by pancreas in the body, and last is identification of retinal disease. A reliable, fast, precise, cost effective method for the automated assessment of the presence diabetic patient details becomes necessary to assist the ophthalmologists in their screening process. To ensure that appropriate treatment is received on time, effective screening programs are established to monitor the eye fundus of diabetic patients at regular time intervals.

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