JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Research On Detection Of Anemia From The Image Of The Anterior Conjunctiva Of The Eye By Image Processing

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ABSTRACT— The World Health Organization (WHO) identifies anemia, a health hazard condition marked by the deficiency of red blood cells or hemoglobin in the bloodstream, as maligning a quarter of the total world population. An automated, quick and reliable detection of anemia is hence imperative. Preliminary detection of anemia is usually undertaken visually by the physician by examining the colour of the anterior conjunctiva of the eye and confirmed with an invasive blood test. In this study, we designed a mechanism for the automated detection of anemia through a non-invasive visual method. Our process involves the detection of anemia by analyzing the anterior conjunctiva pallor of the eye. We take the images of the eye used in the data set for analysis .. Our study was aimed towards the automation of healthcare facilities in underdeveloped parts of the world lacking proper healthcare facilities like hospitals and healthcare centers. Thus we developed a computerized, non-invasive, simple, cost effective, easy to use and portable primary screening test for anemia which can provide a viable alternative to invasive methods of anemia detection and have a major humanitarian impact in the underdeveloped areas of the world.

KEYWORDS- Anemia detection, image processing, anterior conjunctiva, hemoglobin concentration, non-invasive method.

I. INTRODUCTION

Diabetes is an autoimmune disease in which pancreases no longer produce insulin. Insulin is a hormone that enables people to get energy from food. IW RFFXUV ZKHQ WKH ERG\V immune system attacks and destroys the insulin producing cells in the pancreas called beta cells. Diabetes The goal of diabetes education includes encouraging the patient to do exercises and also to acquire knowledge and skill to manage the hypoglycaemia and hyperglycaemia. The main goal of the National Diabetes Prevention And Control Programme (NDPCP) is to reduce the burden of disease and to increase the awareness and knowledge on diabetes . Diabetic self care management education is the process of providing knowledge and skill to perform self care on a day to day basis of the person with diabetic mellitus, self-management education, teaches the relationship among medical, nutrition therapy, activity level, emotional, physical status on medications, then respond appropriately continually to those factors to achieve and ,maintain optimum glucose control .

Diabetes mellitus is on the rise in Sub-Saharan Africa. On the island of Zanzibar food habits and nutritional status among diabetes type 2 patients is not well described. Rising food prices accompanied by limited health resources, are factors risk for developing diabetes complications.

Definition

Diabetes mellitus, or simply diabetes, is a group of diseases characterized by high blood glucose levels that result from defects in the body's ability to produce and/or use insulin.

It is a condition primarily defined by the level of hyperglycaemia giving rise to risk of micro vascular damage (retinopathy, nephropathy and neuropathy). It is associated with reduced life expectancy, significant morbidity due to specific diabetes related micro vascular complications, increased risk of macro vascular complications (ischaemic heart disease, stroke and peripheral vascular disease), and diminished quality of life.

Several pathogen etic processes are involved in the development of diabetes. These include processes, which destroy the beta cells of the pancreas with consequent insulin deficiency, and others that result in resistance to insulin action. The abnormalities of carbohydrate, fat and protein metabolism are due to deficient action of insulin on target tissues resulting from insensitivity or lack of insulin (Report of a WHO Consultation, 1999).

Diabetes mellitus may present with characteristic symptoms such as thirst, polyuria, blurring of vision, and weight loss.

Often symptoms are not severe, or may be absent.

Diagnosis

The diagnosis of diabetes mellitus is easily established when a patient presents the classic symptoms of hyperglycaemia and has a random blood glucose value of 200 mg/dL (11.1 mmol/L) or higher, and confirmed on another occasion. The following tests are used for the basic diagnosis:

A fasting plasma glucose (FPG) test measures blood glucose in a person who has not eaten anything for at least 8 hours. This test is used to detect diabetes and prediabetes. 10 An oral glucose tolerance test (OGTT) measures blood glucose after a person fasts at least 8 hours and 2 hours after the person drinks a glucose-containing beverage. This test can be used to diagnose diabetes and prediabetes. The FPG test is the preferred test for diagnosing diabetes because of its convenience and low cost. However, it may miss some diabetes or prediabetes that can be found with the OGTT. The FPG test is most reliable when done in the morning. Research has shown that the OGTT is more sensitive than the FPG test for diagnosing prediabetes, but it is less convenient to administer.

A random plasma glucose test, also called a casual plasma glucose test, measures blood glucose without regard to when the person being tested last ate. This test, along with an assessment of symptoms, is used to diagnose diabetes but not prediabetes. Test results indicating that a person has diabetes should be confirmed with a second test on a different day .

The current WHO diagnostic criteria for diabetes should be maintained – fasting plasma glucose ≥ 7.0mmol/l (126 mg/dl) or 2–h plasma glucose ≥ 11.1mmol/l (200 mg/dl) (Report of a WHO Consultation, 1999)

II. LITERATURE REVIEW

1. E. McLean et al [1] Testing procedure botches and their harms and results point by point from family medication practices: Shading estimations obtained from digitized pictures contain projected the same as a fundamental and monetarily clever method to deal with assessing skin shading and the development of prescriptions. The essential obstacle of the system is how it is exceedingly dependent on encompassing light: paying little respect to whether an exact manage of subject lighting up is given, readings remain not proportional among different research offices. The identity of these records and the linearity between document regards and the proportions of Hemoglobin and melanin were directed by using pictures of various assemblies of Hemoglobin and melanin courses of action.

2. J. Hickner [2] Hemoglobin purpose-of-care testing: the HemoCue system. Other than the use of standard research office resources, the investigation of fragility can in like manner be polished by looking over Haemoglobin obsession with reason for consideration testing devices, for instance, the HemoCue test structures. fitting planning use which should be under the obligation of research focus specialists. HemoCue is likely a champion among the most regularly used devices around the globe.

3. J. Hickner et al [3] Quantification of erythema utilizing computerized camera and PC based shading picture investigation: a multicentre consideration. Shading estimations obtained from digitized pictures are projected the same as a fundamental and monetarily clever method to assess skin shading and the development of prescriptions. The essential obstacle of the system is how it is exceedingly dependent on encompassing light: paying little respect to whether an exact manage of subject lighting up is given, readings remain not proportional among different research offices.

4. F. Sanchis-Gomar [4] Derivation and clinical use of one of a kind imaging by techniques for cutting edge cameras plus picture freeware for estimation of erythema and pigmentation important for examination of skin tests and the administrators of skin infections. In any case, reflectance instruments thus experience the evil impacts of various particular and money related insults. Practical necessities for framework configuration can be classifications into two characteristics one is execution characteristics and another is development characteristics. Security and ease of use are execution characteristics noticeable at run time.

5. Sanchez-Carrillo et al. utilized a colorimetric apparatus to contrast diverse shading conceals and the conjunctiva. Henceforth, they accomplished intriguing affectability and specificity levels in screening Hb focuses.

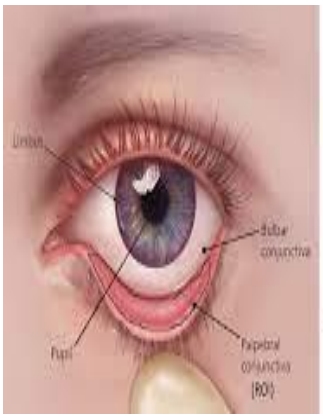
6. Suner et al examined shading highlights of computerized pictures of the conjunctiva. They used a standard dim card with a known RGB incentive to look at pictures procured under various lighting conditions. In their trial, they used assessment programming that ran on a Personal Digital Assistant (PDA), which considered the RGB shading model and found a moderate relationship between the Hb fixation determined in situ and the Hb focus estimated in vitro.

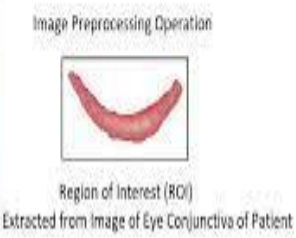
7. Chen and Miaou propose a consolidated methodology that comprises a modified Kalman Filter and punishment relapse for non-invasive Anemia recognition based on the examination of computerized pictures of the palpebral conjunctiva, and they successfully lessen the number of suspect examples.

III. METHODOLOGY

PROPOSED SYSTEM

The given proposed system is carried out by using Python software. We used a GUI system to select the image from the dataset. We used the CNN algorithm for the proposed system. And we used the pycharm platform for running the code of our given proposed system. We detect anemia by image processing. Here we take the image from our dataset and load the image. The resulting output shows that the image input is anemia or nonanemica.



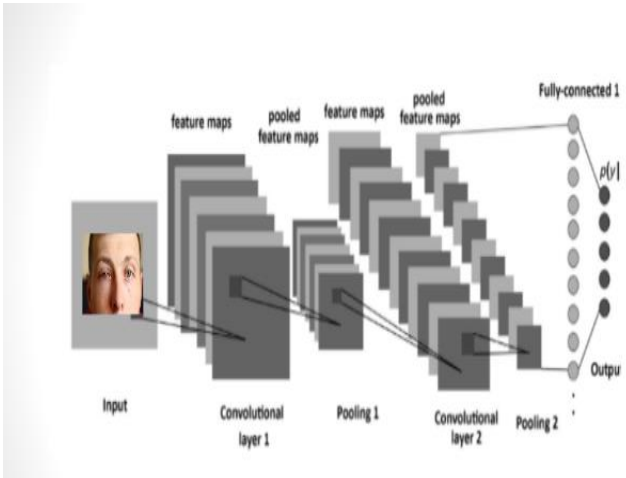


Algorithm used information

Convolutional neural network

A convolutional neural network (CNN) is a type of artificial neural network used in image recognition and processing that is specifically designed to process pixel data.

CNNs are powerful image-processing, and artificial intelligence (AI) that use deep learning to perform both generative and descriptive tasks, often using machine vision that includes image and video recognition, along with recommender systems and natural language processing (NLP).

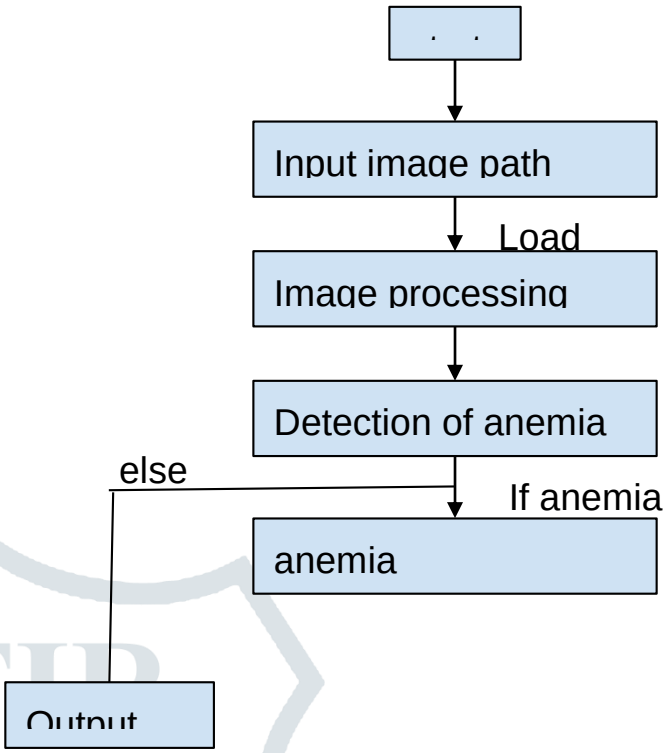


The architecture of Convolutional Neural Network

A neural network is a system of hardware and/or software patterned after the operation of neurons in the human brain. Traditional neural networks are not ideal for image processing and must be fed images in reduced-resolution pieces. CNN have their "neurons" arranged more like those of the frontal lobe, the area responsible for processing visual stimuli in humans and other animals. The layers of neurons are arranged in such a way as to cover the entire visual field avoiding the piecemeal image-processing problem of traditional neural networks.

A CNN uses a system much like a multilayer perceptron that has been designed for reduced processing requirements. The layers of a CNN consist of an input layer, an output layer, and a hidden layer that includes multiple convolutional layers, pooling layers, fully connected layers, and normalization layers. The removal of limitations and increase in efficiency for image processing results in a system that is far more effective, and simpler to trains limited for image processing and natural language processing.

FLOWCHART



WORKING

In this paper we firstly give the path of the input image. After giving input load this image by clicking on load button. Then image processing happens on it by using a module. We can detect anemia. If anemia has occurred then it gives anemia as an output otherwise normal.

IV. SYSTEM REQUIREMENT

SOFTWARE REQUIREMENT

- Python 3.8
- Pycharm

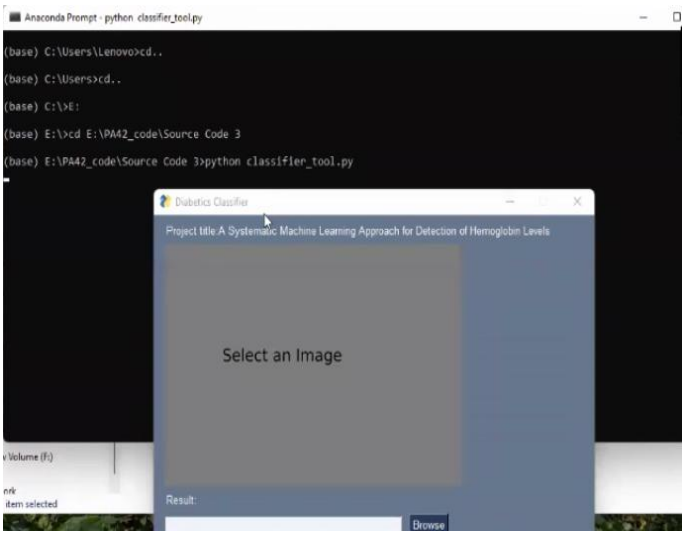
LIBRARY USED

1. Open CV
2. Keras
3. PIL
4. Tk

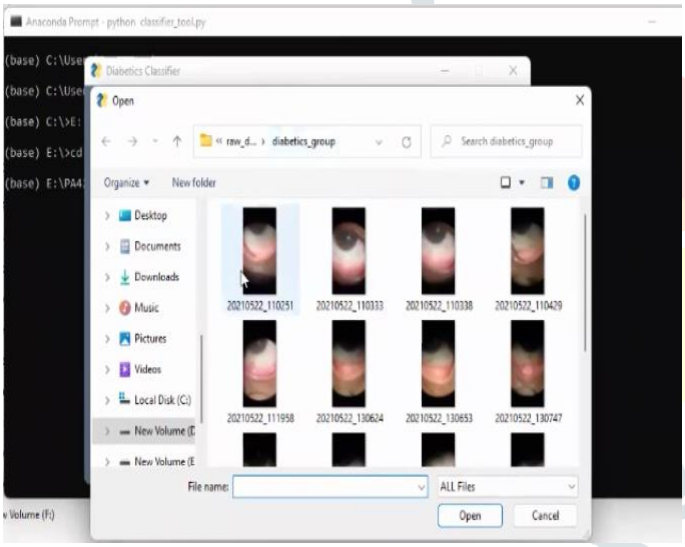
V. IMPLEMENTATION & RESULT

IMPLEMENTATION

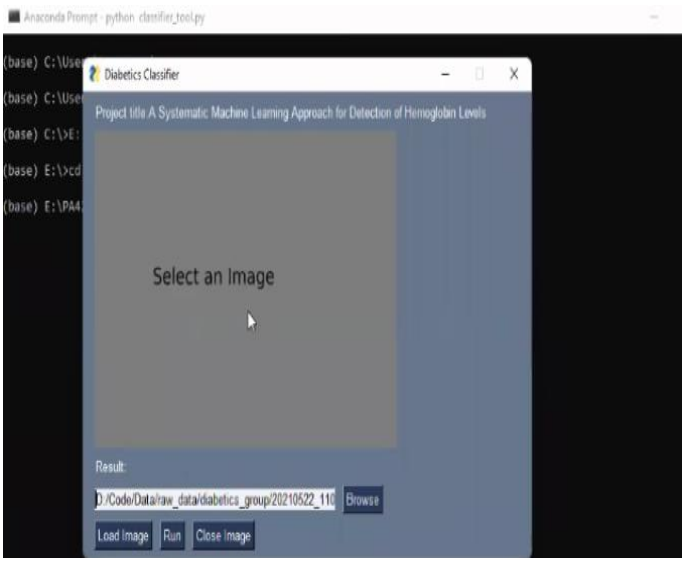
STEP 1: Select the Images



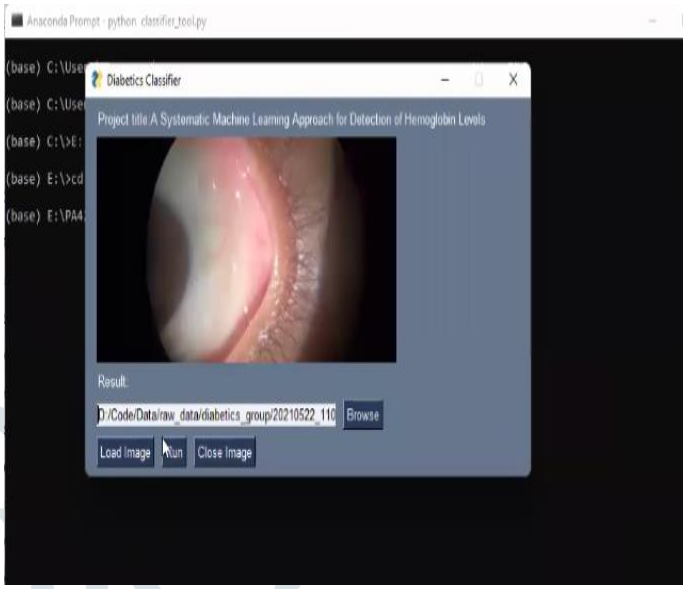
STEP 2 : select Images from dataset



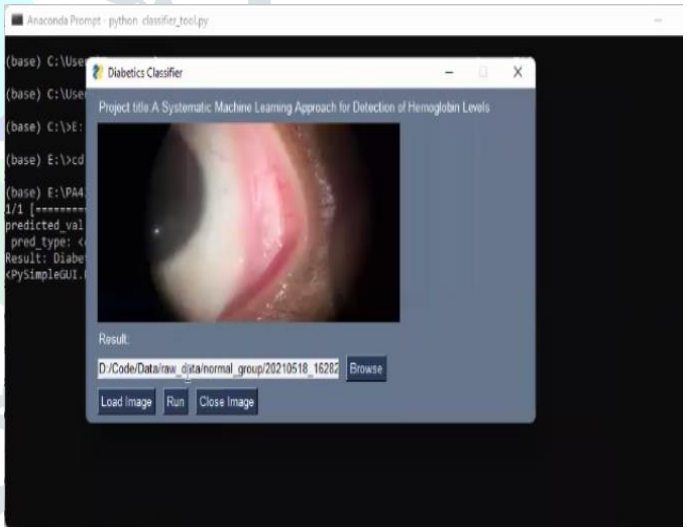
STEP 3: Brows the selected Image



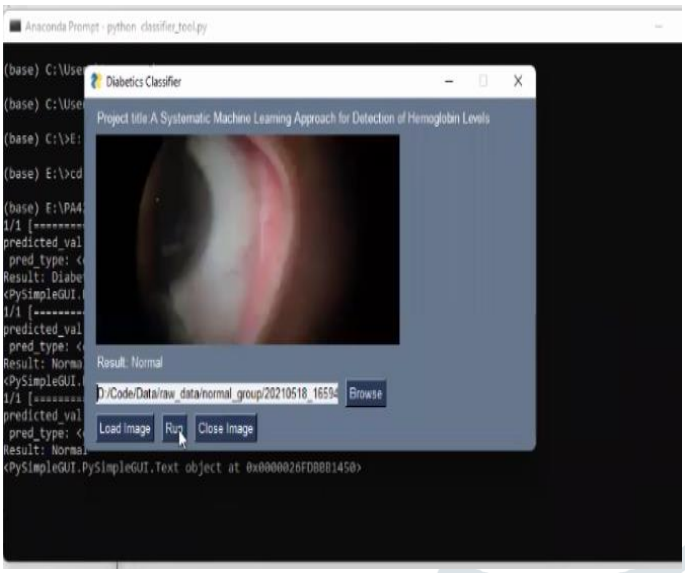
STEP4: Result showing Diabetic of selected Image



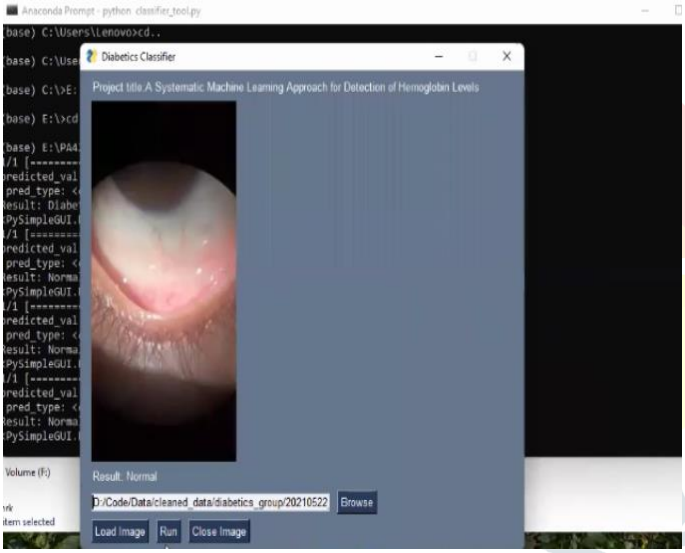
STEP 5: Select another Image and browse it



STEP 6: Showing the Result of the Selected Image Having no diabetic.



STEP 7: Another Selecting image output having Normal Image.



RESULT

The result of the input images showing that the patient is diabetic or not .

Fig : shows That Patient have Diabetic

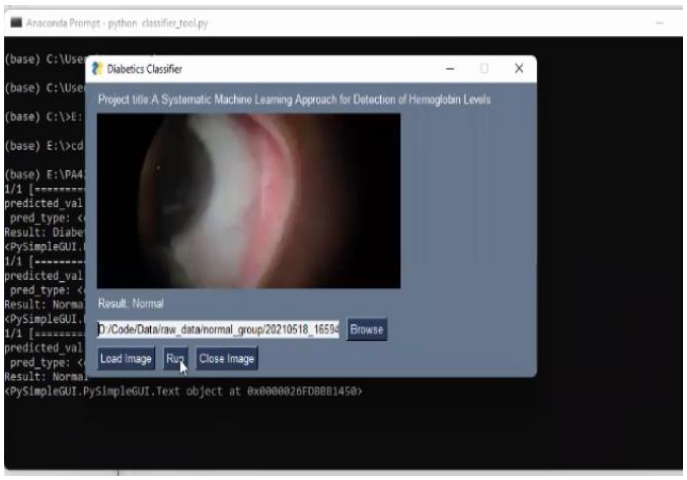


Fig : shows That Patient have no diabetic

VI. CONCLUSION

The short outline of different obtrusive, non-intrusive just as neurotic research center strategies utilized for estimation of anemia by executing systems dependent on different methodologies. The indicative estimation of a specific test depends significantly on the exactness and dependability. Exactness can be evaluated by the correlation of the outcomes acquired by technique with the consequences of a standard strategy. The obtrusive strategies are progressively exact when contrasted with the non-intrusive techniques incentive to finish up whether the subject is frail or not. Anemia is a typical wellbeing illness all inclusive and is influencing billions of individuals around the globe particularly in creating nations. In this venture a calculation is proposed to identify sickness by a solitary picture uncovering conjunctiva as whiteness of conjunctiva is related with weakness nearness.

VII. REFERENCE

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