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Detection of Diabetes using Eye Image

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Abstract: Early Stage of Diabetic Retinopathy is Linked With Pre-Diabetes in human which causes Other Health issues or Gives birth to new disease. To avoid Blindness in early stage detection of retinopathy is essential. There are Various paramater to Detect Like eye viens dilation, white spot, intensity causing complication like Vitreous hemorrhage, Retinal detachment, Glaucoma, Blindness. In this project we focuses on decision about the presence of disease by applying ensemble of machine learning classifying algorithms on features extracted from output of different retinal image processing algorithms, like diameter of optic disk, lesion specific (microaneurysms, exudates), image level (pre-screening, AM/FM, quality assessment). Decision making for predicting the presence of diabetic retinopathy was performed using alternating decision tree, ada Boost, Naive Bayes, Random Forest .

I. INTRODUCTION

HEALTHCARE information systems tend to capture data in databases for research and analysis in order to assist in making medical decisions. As a result, medical information systems in hospitals and medical institutions become larger and larger and the process of extracting useful information becomes more difficult. Traditional manual data analysis has become inefficient and methods for efficient computer based analysis are essential. To this aim, many approaches to computerized data analysis have been considered and examined. Data mining represents a significant advance in the type of analytical tools currently available. It has been shown to be a valid, sensitive, and reliable method to discover patterns and relationships. It has been proven that the benefits of introducing data mining into medical analysis are to increase diagnostic accuracy, to reduce costs and to reduce human resources

In recent times, the number of people suffering from diabetes is increasing day by day. It is a disease in which body does not produce insulin or use it properly. This increase the risks of developing, kidney disease, blindness, nerve damage, blood vessel damage and contribute to heart disease There are two types of diabetes; Type-1 diabetes – also called insulin dependent and type-2 diabetes which is with relative insulin deficiency. Patients with type 2 diabetes do not require insulin cure to remain alive, although up to 20% are treated with insulin to control blood glucose levels To diagnose diabetes disease at an early stage is quite a challenging task due to complex inter dependence on various

factors. There is a critical need to develop medical diagnostic decision support systems which can aid medical practitioners in the diagnostic process. This study deals about the classification of Type II diabetes.

II. EXISTING SYSTEMS

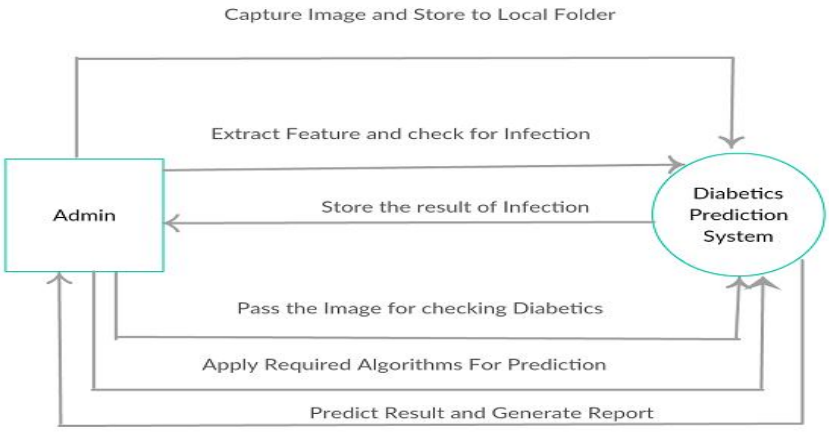


Fig 2.Existing System

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Yasodaet al. classified PIMA diabetes data set with different machine learning algorithms such as Bayes Network classifier, REP tree, Random tree, J48 and appriori [7]. Ming-Yan et al. designed an expert system that can diagnose the diabetes [8].

Han et al. implemented a classifier on PIMA dataset by decision tree that was formed with RapidMiner [9]. Jayalakshmiet al. designed a system that was applied to PIMA dataset for classification aim. The system made us of Artificial Neural Network for classification [2].

Patilet al. produced association rules for PIMA dataset [10]. AlJ arullah designed a system for diagnosis of diabetes by using PIMA dataset and decision tree that was formed with WEKA software [11].

Aroraet al. used UCI database for both classification and comparison of the classification methods they used. They made use of 5 different dataset (including PIMA) from UCI and applied J48 and Multilayer Perceptron (MLP) for classification and comparison aims [12].

III. PROPOSED SYSTEM ARCHITECTURE

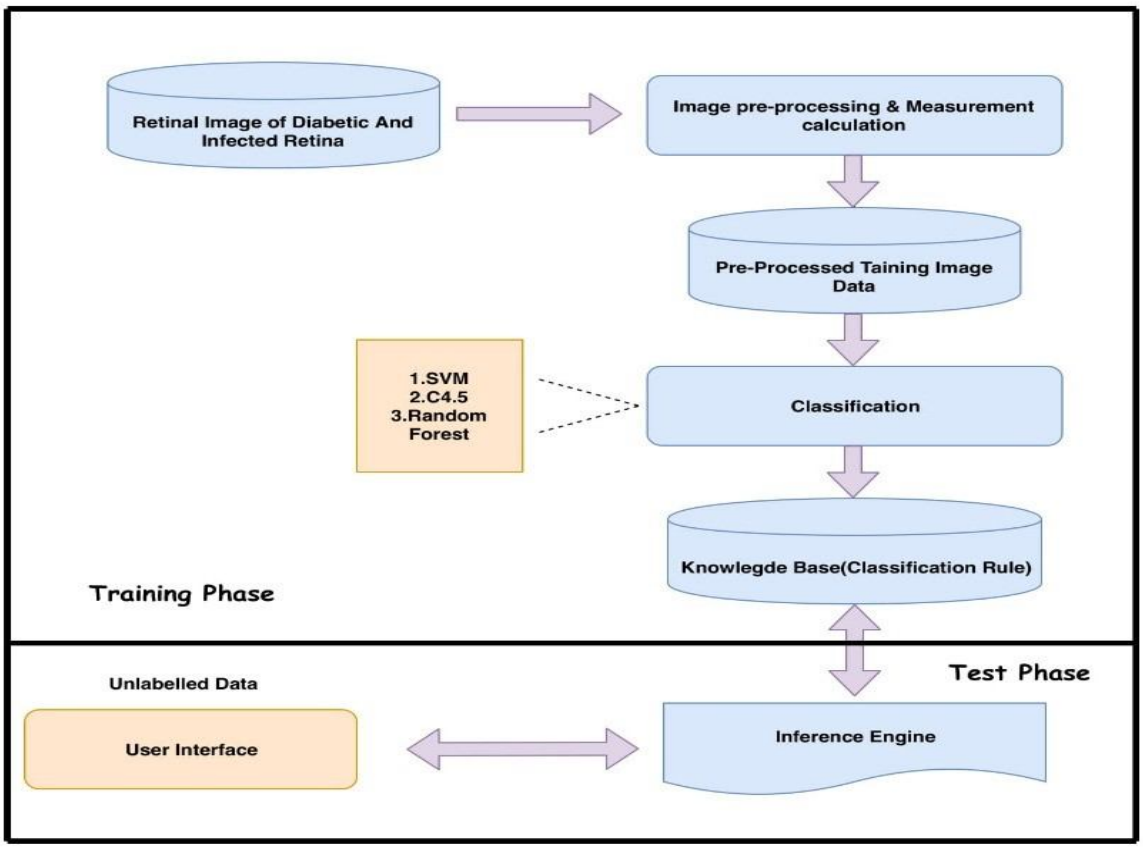


Fig 1.Architecture of System

Steps for implementation

A. Capture Image & Store it into the local DB
B. Predict For Infection
C. Predict For Diabetics
D. Predict Result
E. Generation Report Using Graphical Technique

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IV. METHODS OF IMPLEMENTATION

The main part is to detect the eye from human face from current frame or from image captured by camera. Then the captured images will send for storing purpose. The stored image will be used to detect the face one by one and to compare between stored (in database) face image and face detected from captured image. So, we have discussed method for face detection using Viola-Jones algorithm or use framework openCV. The method follows steps as given below.

1) *Step 1:* Capture the current frame/ image using camera .
2) *Step 2:* Pass the Current Captured Image to Infection System
3) *Step 3:* Result of Infection will be stored into the Database
4) *Step 4:* Pass the Current Captured Image to Diabetics System
5) *Step 5:* Result of Diabetics will be stored into the Database
6) *Step 6:* With the help of Infection and Diabetics Result we predict our final result and generate report

A. Algorithms

Viola-Jones Algorithm OpenCV implements a version of the face-detection technique first developed by Paul Viola and Michael Jones commonly known as the Viola-Jones detector. OpenCV refers to this detector as the “Haar classifier" because it uses Haar features or, more precisely, Haar-like wavelets that consist of adding and subtracting rectangular image regions before thresholding the result. OpenCV ships with a set of pretrained object-recognition, but the code also allows you to train and store new object models for the detector.

1) Steps

a) Load the image.
b) Convert it into gray-scale, so that we can detect faces easily
c) Apply the haar classifier of eye.
d) The eyes are detected and other part of image is discarded.

2) Feature Extraction

a) Describe image by representative vector
b) Image preprocessing – filtering, smoothing

3) *Segmentation:* Segmentation is usually one of the first steps in image analysis The purpose of image segmentation is to subdivide an image into meaningful, non-overlapping regions Single thresholding produces as a result a binary image which Distinguishes between background and foreground

B. Edge detection

An edge is a set of connected pixels that lie on the boundary between two regions To detect an edge we apply a threshold to the magnitude of image gradient is computed by convolving the image with a 3x3 Prewitt mask, and edges are thinned applying non-maximum suppression

Canny edge detection

1) Smooth,
2) Detect, suppress,
3) Threshold

C. Corner detection

Image representation

V. CONCLUSION

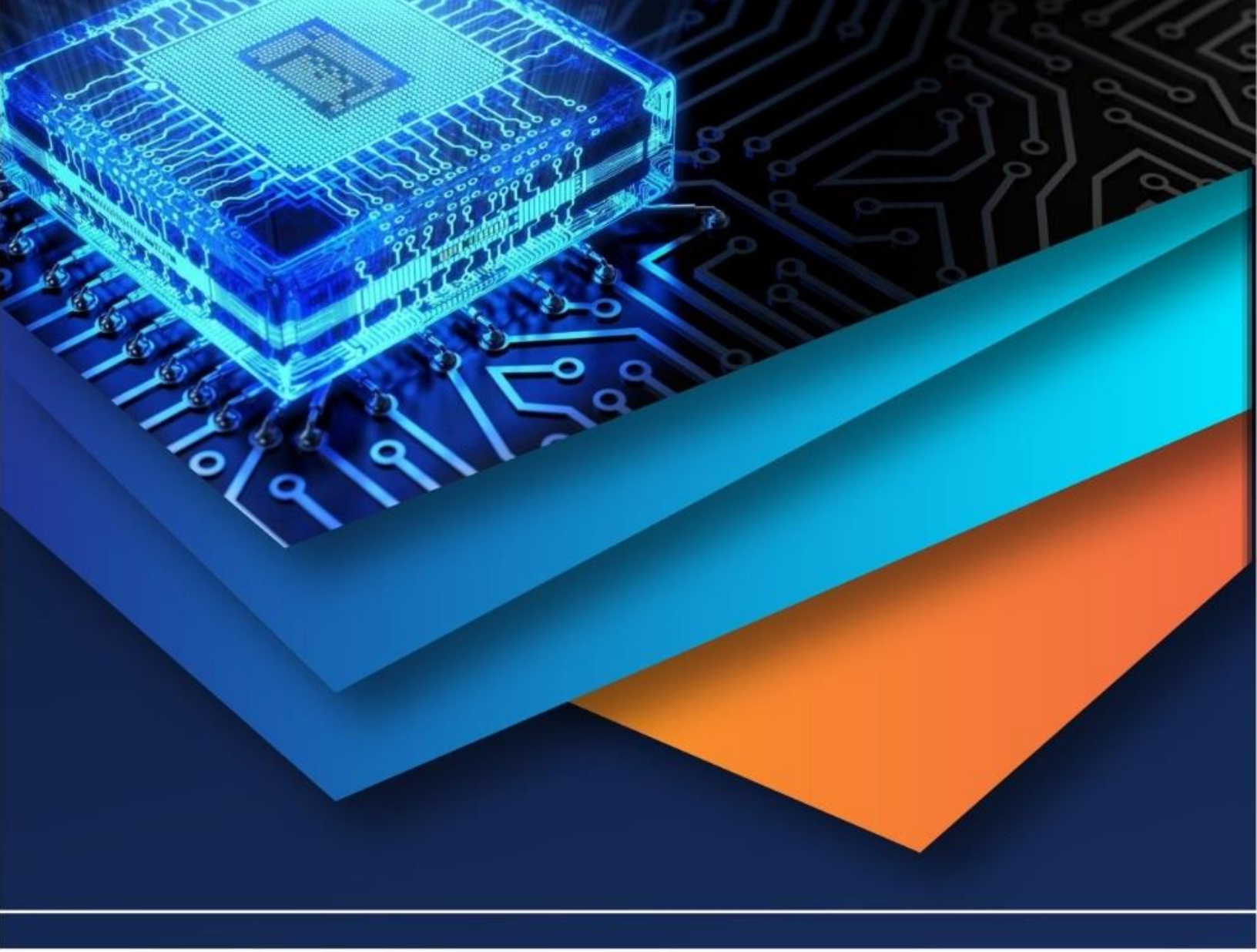
To get the most out of large and complex medical databases, innovative data analysis techniques are needed to extract useful knowledge in a timely fashion. In this data analysis framework based on a multiple-level clustering approach has been proposed to identify patients with a similar examination history in a dataset with a variable data distribution. The TF-IDF method has been exploited to represent patient examination data, thus highlighting the relevance of the different examinations. The proposed methodology has been validated in the diabetic care scenario on a real dataset of diabetic patients. The analysis identified cohesive and well-separated groups of patients with standard or more specific examinations for diabetes, showing a good correlation with medical guidelines for diabetes.

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