

DIABETES DETECTION USING TONGUE IMAGE USING EXTRACTION OF GLOBAL FEATURES AND DECISION TREE

Dr.S.Bhuvaneswari,

Asst.Prof.,Dept.of BCA., Annai College of Arts and Science. Kumbakonam, Tamil Nadu.

E-mail:drbhuvanamagesh@gmail.com

(Affiliated to Bharathidasan University, Tiruchirappalli)

Abstract:

In the day to day working of people, the tongue plays a significant role. The tongue is an organ connected to each other parts. Diabetics classification using tongue images are described in this study. Diabetes detection using tongue image using extraction of texture and random forest is described in this study. Initially, the input tongue images are given to global feature for feature extraction and finally, the decision tree classifier is used for classification. Experimental results show the performance of proposed system using texture and RFC.

Keywords: *Diabetes detection, Tongue images, Decision tree Classifier, Global feature*

Introduction:

Tongue images for feature extraction and diagnostic statistical analysis [1]. A relationship between tongue color and different tongue color distributions can be obtained with various typological tongue characteristics, such as red points or petechial points. Color distributions. Diabetes identification diabetic retinopathy with tongue tone, texture and geometry characteristics [2]. Eight blocks' texture values strategically placed on the tongue surface are used to describe the nine language texture characteristics by an extra mean of all eight blocks.

System of tongue therapies for successful area extraction and tongue coating classification [3]. Local minimum over tongue shading, local miniatures or color difference detection edges, and smoothing edges where downsampling is done to decrease calculation time, histogram balancing and edge enhancement, which produces the segmented area, and then color components of the region are saturated into hues. Medical optical tongue image analysis with a new ColorChecker language [4]. A color gamut is defined on the basis of a broad image tongue dataset.

Colorimetric functional research in language diagnostic teaching [5]. The cluster analysis approach was used to obtain various forms of tongue color from the cluster centers. Tongue contours automated selection and monitoring [6]. In an established location without disturbing speech to stabilize the head and assist the transducer under the chin.

In this study, diabetes detection using tongue image using extraction of global feature and decision tree classifier is discussed. The rest of the paper is organized as follows; Section 2 describes the materials and methods. Experimental results and discussion are described in section 3. The last section concludes the proposed system.

Methods and Materials:

The input tongue images are given to global feature for extraction of features and for the prediction of normal and abnormal tongue images for diabetes detection using decision tree classifier.

Global feature extraction:

A feature is a piece of information on the quality of an image in computer vision and image processing; usually if any aspect of the image has certain properties. Unique image structures like dots, edges or artefacts can be features. Texture provides information on the colors or intensity of an image in the spatial arrangement. Texture is defined by the spatial intensity distribution in a district. The extraction of features improves the accuracy of learned models by eliminating features from input data. The general system process reduces data dimensionality by deleting the redundant information. Naturally, preparation and speed of inference are improved.

Texture analysis refers to the texture content characterization of the regions in an image. Texture analysis aims to measure intuitive consistency defined as a function of spatial variations in pixel intensities, in terms of such as rough, smooth, silky or bumpy.

Decision Tree Classification:

Decision Tree is one of the most understandable and common classification algorithms. It can be used for classification as well as regression problems. Decision trees are splitting a node by several algorithms into two or more subnodes. The formation of subnodes increases their homogeneity. The decision tree divides the nodes into all variables and selects the division which results in most homogenous subnodes.

Usually, a decision tree begins with one node that branches into potential outcomes. Each of these results leads to more nodes that link to other possibilities. There was a mistake. A decision node, represented by a square, shows an option and the final result of a decision path shows an end node.

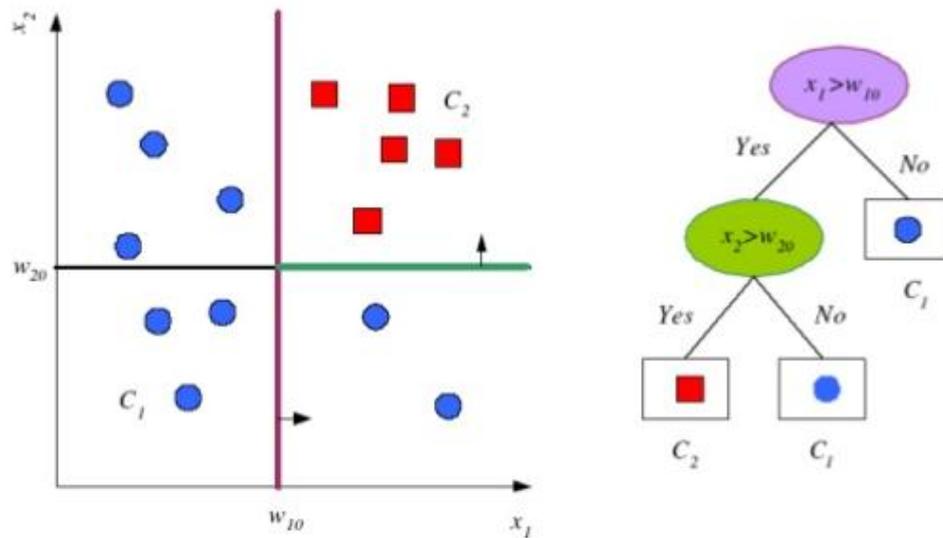


Figure 1 Workflow of Decision tree classifier

Results and Discussion:

The performance of diabetes detection is made by using tongue images. The sample tongue images in the database are shown in figure 2.



(a) Normal Tongue images



(b) Abnormal Tongue images

Figure 2 Sample tongue images

Initially, the tongue images are given to global feature extraction method for the detection of diabetes. The colour of different tongue images predicts the presence of diabetes in patients. Figure 3 shows the performance of diabetic detection using tongue images.

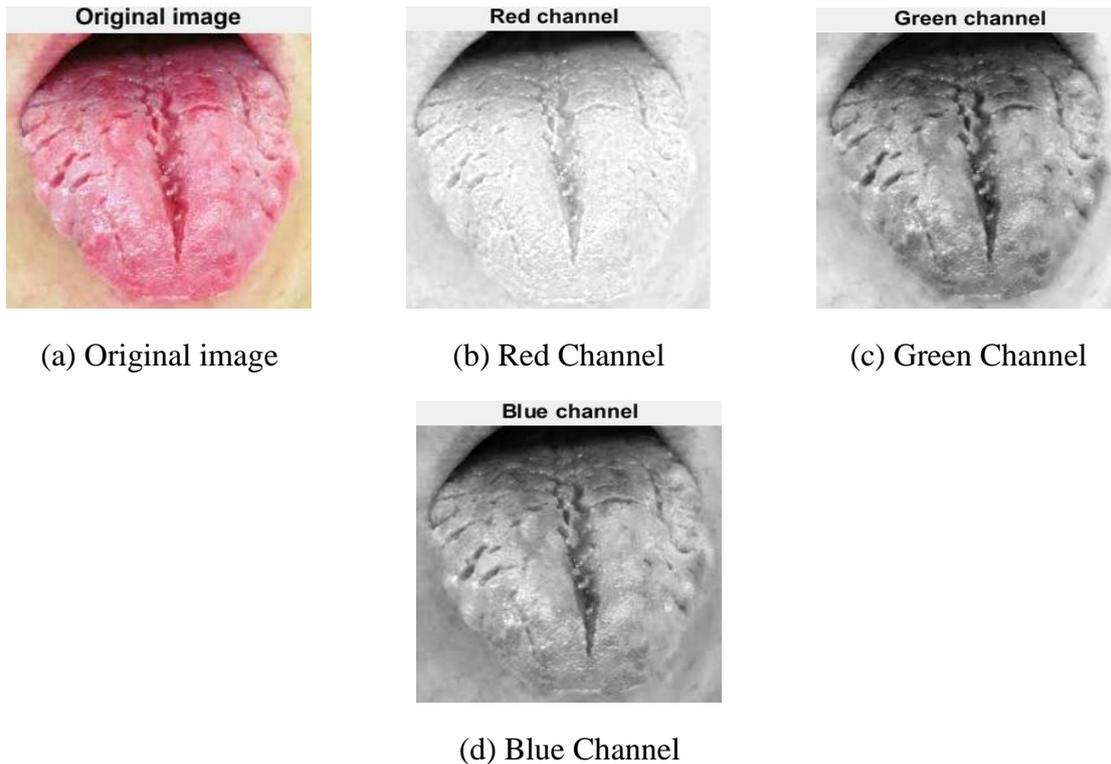


Figure 3 Performance of diabetes detection using tongue images

Initially, the global features are used for feature extraction. The color of the tongue identifies the diabetes detection in the human. Finally, decision tree classifier is used for classification. Table 1 shows the performance of proposed system.

Table 1 Performance of diabetic detection using texture features and RFC

	Accuracy (%)	Sensitivity (%)	Specificity (%)
Normal images	95	94	93
Abnormal images	93	92	91

From the above table, it is observed that the classification accuracy of normal tongue image is 95% and also its sensitivity and specificity are 94% and 95%. Whereas, the classification accuracy of abnormal tongue images is 93% and its sensitivity and specificity are 92% and 91% by using global features and decision tree classifier.

Conclusion:

Diabetes detection using tongue image using extraction of global and decision tree is presented in this study. The texture features and decision tree are used for the prediction of diabetes using tongue images. The colour of tongue is used to identify the diabetes. Initially, the normal and abnormal images are given to feature extraction by using global features. Then the prediction is made by using decision tree classifier for the identification of diabetes using tongue images. Finally, the colour of the tongue identifies the diabetes. Then the classification accuracy of normal abnormal tongue images is 95% and 93% using RFC.

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