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A Detection of Diabetes Mellitus and Diabetes Retinopathy by Tongue Diagnosis Using SVM Technique

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ABSTRACT: Diabetes Mellitus (DM) and its complications leading to Diabetic Retinopathy (DR) are soon to become one of the 21st century's major health problems. A non-invasive capture device with image correction first captures the tongue images. A tongue colour gamut is established with 12 colour representing the tongue colour features. The texture values of eight blocks strategically located on the tongue surface, with the additional mean of all eight blocks are used to characterize 9 texture features of the tongue. In addition to this, we can predict the different stages of diabetes and we also train different datasets using Support Vector Machine (SVM).

KEYWORDS: Detection of Diabetes, A non-invasive, SVM Technique, GVF, Gabor Filter

I. INTRODUCTION

This paper proposes a non-invasive (without any damage/pain) method to detect DM the initial stage of DR based on three groups of features which includes color, texture and geometry extracted from tongue images. A non-invasive capture device with image correction first captures the tongue images. A tongue color gamut is established with 12 color representing the tongue colour features. The texture values of eight blocks strategically located on the tongue surface, with the additional mean of all eight blocks are used to characterize 9 texture features of the tongue. Finally, 13 feature extracted from tongue images based on measurements, distances, areas and their ratios represent the geometric features. Applying a combination of the 34 features, the proposed method can separate Healthy/DM/NPDR tongues as well as DM samples with and without NPDR tongues using features from each of the three groups with average accuracies of 80.52% and 80.33%, respectively. Diabetes is due to either the pancreas not producing enough insulin, or the cells of the body not responding properly to the insulin produced.

II. DISEASE SYMPTOMS

Patients should monitor for signs and symptoms of type 2 diabetes mellitus (see below). Symptoms of type II diabetes mellitus include

- Constant hunger
- Unexplained weight loss
- Weight gain
- Flu-like symptoms, including weakness and fatigue
- Blurred vision
- Slow healing of cuts or bruises
- Tingling or loss of feeling in hands or feet
- Recurring gum or skin infections
- Recurring vaginal or bladder infections

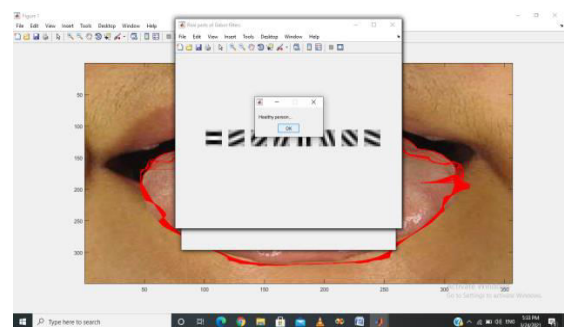
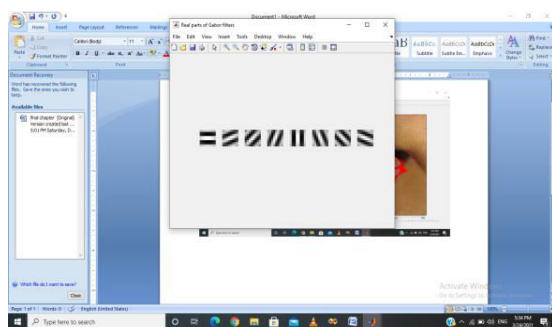
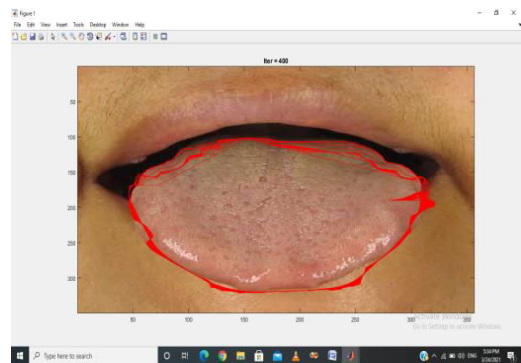
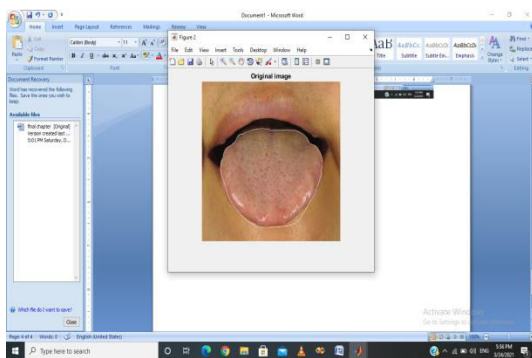
The classic symptoms of untreated diabetes are weight loss, polyuria(frequent urination),polydipsia (increased thirst), and polyphagia (increased hunger). Symptoms may develop rapidly (weeks or months) in type 1 diabetes, while they usually develop much more slowly and may be subtle or absent in type 2 diabetes.

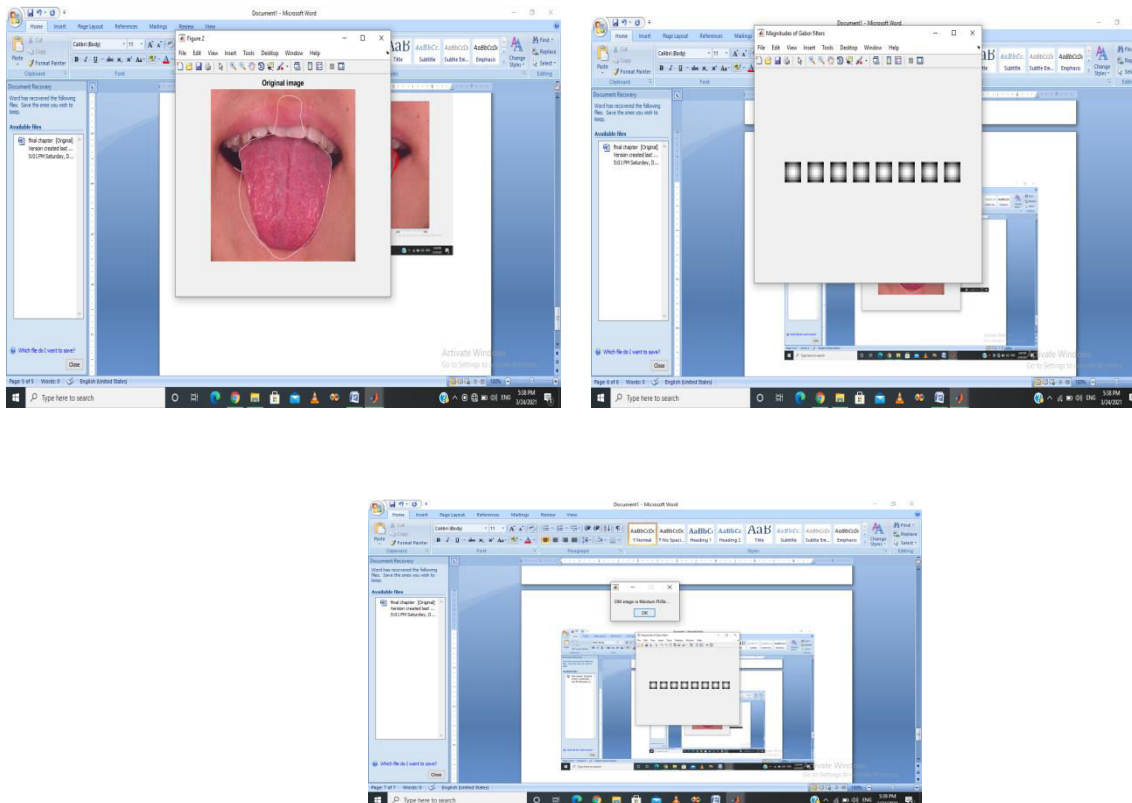
Several other signs and symptoms can mark the onset of diabetes, although they are not specific to the disease. In addition to the known ones above, they include blurry vision, headache, fatigue, slow healing of cuts, and itchy skin. Prolonged high blood glucose can cause glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. A number of skin rashes that can occur in diabetes are collectively known as diabetic dermadromes

III. PROPOSED METHODOLOGY

In existing method using Bielliptical Deformable Contour (BEDC) the output of the system accuracy is near 81%. In proposed system Support Vector Machine method is used to achieve high accuracy of the system (above 81%) and also this algorithm works based neural network concept. For segmentation we use Gradient Vector flow Segmentation, it is the recent Segmentation which is accurate boundary and region and pixel based segmentation in digital image.

IV. THE EXPERIMENTAL RESULT





V. RESULT

The simulation tool used for processing input images of tongue is MATLAB. The version of MATLAB used is 13. image processing toolbox is used for simulation. the input images are collected from internet. Images are in digital format.

The input tongue image used for simulation is diabetes mellitus and diabetic nonproliferative affected patient's image. The output of segmented image by using GVF (Gradient Vector Flow) algorithm.

VI. CONCLUSION AND FUTURE SCOPE

The main objective in carrying out this project is to detect the diabetes mellitus and diabetic nonproliferative affected region in the tongue images. it is clearly mentioned with proof image processing is a safe tool for detecting diabetes mellitus and diabetic nonproliferative in a efficient and accurate manner with in a short periode of time. Advances methods in image processing now make it possible to detect diabetes mellitus and diabetic nonproliferative. from that Gradient vector flow algorithm is selected part in the images.

Various classifier like neuro network, neuro fussy, support vector machine are used for classification purpose. in my future work suitable classifier will be selected and classification process will be done. from this, the diabetes mellitus and diabetic nonproliferative affected part in tongue will be automatically detected. in the medical field this automatic detection of tongue images will play a major role in detecting tongue diabetes mellitus and diabetic nonproliferative.

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