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Oral Cancer Detection Using Image processing

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Abstract

One of the most common form of cancer is oral cancer. It was an irrecoverable disease, but if diagnosed and treated early, medical developments have made it curable. Oral cancer is an increase in the number of cells that are capable of impacting neighboring tissues or cells. It occurs when the cells are broken out of balance and the growth or tumor develops. There is a persistent mortality rate, despite a large range of developments in fields such as radiation therapy and chemotherapy. Therefore, early detection of cancer is considerable. Image Processing and Machine Learning are used in this research as a field for detecting oral cancer in the sense of victim datasets. It is then classified using a K-means algorithm. We are designing an application for the health sector that also uses data mining and data extraction for prediction techniques.

Keywords— *Machine Learning,ImageProcessing,K-MeansAlgorithm, MRI Images,CNN Algorithm.*

I. INTRODUCTION

Cancer happens when cells in the body change and develope out of control. Your body consists of tiny building blocks called cells. Normal cells expand when your body needs them and die when your body no longer needs them. Cancer is made up of abnormal cells that expand even though your body does not need them. In most types of cancer, abnormal cells develop to form a lump or mass called a tumor. Oral cancer is a cancer that occurs in the mouth or throat. Oral cancer is fairly common and very curable if it is detected and treated early. Oral cancer is usually found by a doctor or dentist at an early stage because the mouth can be easily inspected.MRI images are magnetic resonance images which can be acquired on computer when a patient is scanned by MRI machine. We can acquire MRI images of the part of the body which is under test or desired.

II. LITERATURE REVIEW

Roshan Alex Welikala , Paolo Remagninoprovided a novel strategy to combine bounding box annotations from multiple clinicians. Further to this,deepneuralnetworkswereusedtobuildautomatedsystems,inwhichcomplexpatternswerederivedfortackling this difficult task. Using the initial data gathered in this study, two deep learning based computer vision approaches wereassessed for the automated detection and classification of oral lesions for the early detection of oral cancer, these were imageclassification with ResNet-101 and object detection with the Faster R-CNN. Image classification achieved an F1 score of 87.07%foridentification ofimagesthatcontained lesionsand 78.30%forthe identification ofimagesthatrequired referral [1].

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Dr. P.V. Rama raju et al., proposed an automatic segmentation technique based on convolution neural network, patch,analyzing 10*10 kernels using MATLAB. The main use of CNN's their accuracy in image detection problems. Input image ischanged into aspecific numberofpatchesforeasy processing[2].

G. Nagaraju et al., proposed an efficient algorithm for tumor detection based on segmentation and morphological operators.Firstly, qualityofscanned image getting by removing noiseand then morphologicaloperatorsareapplied to detect the tumorinthe scanned image[3].

Zhalong Hu , AbeerAlsadoon , Paul Manoranjan proposed system that focused on image pre-processing and segmentationsteps, using anisotropic diffusion and fuzzy c-means to enhance the quality of the image, then improve the accuracy of tumordetectionandclassification.the findingfromthe currentsolutionare basedonaproposedapproachusingsupportvector machine (svm) as the traditional machine learning method to classify the oral tumor. with the combination of the anisotropic filterand fuzzy c-means algorithm, the proposed approach achieved 90.11% accuracy, 87.5% specificity and 92.157% sensitivity ratewhereastheaccuracy rate oftheselected current bestsolution isonly 87.18%[4].

Dr. P.V. Rama Raju et al., concentrates on detecting nodules, early stages of cancer diseases, appearing in patients' lungs.Most of the nodules can be observed after carefully selection of parameters. The training dataset of CT images are processed inthree stagesto attain morequality andaccuracy in theprocessed examination[5] .

Xu, Y. Liu, W.Hu, C.Zhang, C. Liu, Y.Zong, S. Chen, Y. Lu, L.Yang, E. Y. K. Ng, Y. Wang, and Y. Wangestablished a3DCNNs-based image processing algorithm for the early diagnosis of oral cancers, which was compared with a 2DCNNs-basedalgorithm. The 3D and 2D CNNs were constructed using the same hierarchical structure to profile oral tumors as benign ormalignant.Results showed that 3DCNNs with dynamic characteristics of the enhancement rate image performed better than2DCNNSwith singleenhancement sequenceforthediscrimination oforal cancerlesions[6].

III. System Architecture

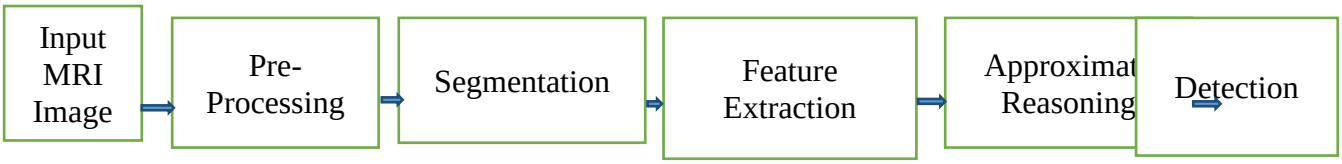

Fig.1 Block Diagram

MRI images collected from Kaggle website are fed to system and then preprocessing and segmentation is done. The feature extraction in this segmented image is a process as the MRI image need to undertake various processes such as clustering and bonding the pixels calculation the accurate position my means of algorithm methodology here we are using CNN algorithm to extract the feature i.e. to detect the cancer region in an image.

Input MRI Image :

We providing the input image which are collected from the Kaggle dataset.

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Image pre-processing:

In pre-processing some basic image enhancement and noise reduction techniques are implemented. Apart from that different ways to detect affected area and doing segmentations have also been used. The purpose of these steps is basically to improve the image and the image quality to get more surety and ease in detecting the oral cancer.

Segmentation :

Segmentation procedures partition an image into in constitute parts or objects. In general, autonomous segmentation is one of the most difficult takes in digital image processing. A rugged segmentation procedure brings the process a long way toward successful solution of imaging problems that requires object to be identified individually we use CNN and FCM for segmentation and filter process.

Feature Extraction :

The feature extraction in this segmented image is a process as the MRI image need to undertake various processes such as clustering and bonding the pixels calculation the accurate position my means of algorithm methodology here we are using CNN algorithm to extract the feature i.e. to detect the cancer region in an image.

Detection and output :

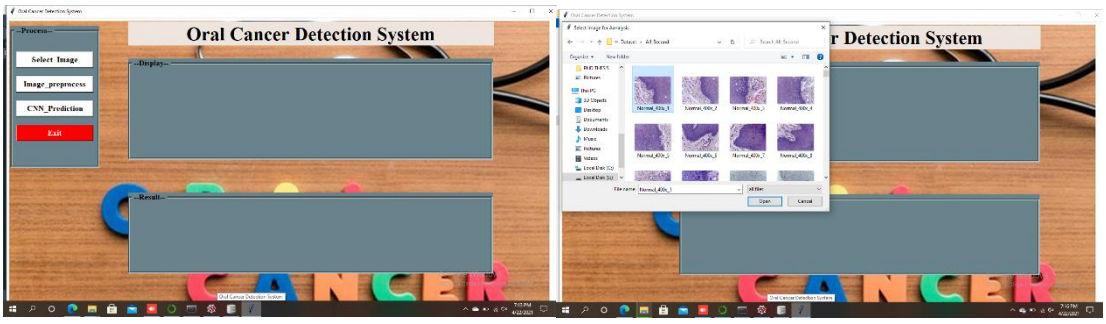
After feature extraction we detect cancer is detected or not.

IV. Results and Discussions

The work would have extensive applications in the field of medicine mainly oncology.The fully automated oral cancer detection and diagnosis system is divided into two different sections as cancer segmentation and detection. This oral cancer detection and segmentation approach on oral images is applied on the oral images obtained from thedataset. The performance of the proposed oral cancer region segmentation on oral images using classification method is evaluated in terms of sensitivity and accuracy.

In this MRI image are selected from dataset to process that image. As a result, Intent will load the selected image into display.In our work even though we are using MRI images some noise will be there in that images. So to avoid that noise/error on that image we are converting that image into grayscale image.

In the work to detect the areas such as teeth, gum and background of MRI we have to segment the image. In that process CNN algorithm is used to classify the MRI images into either normal or abnormal images.



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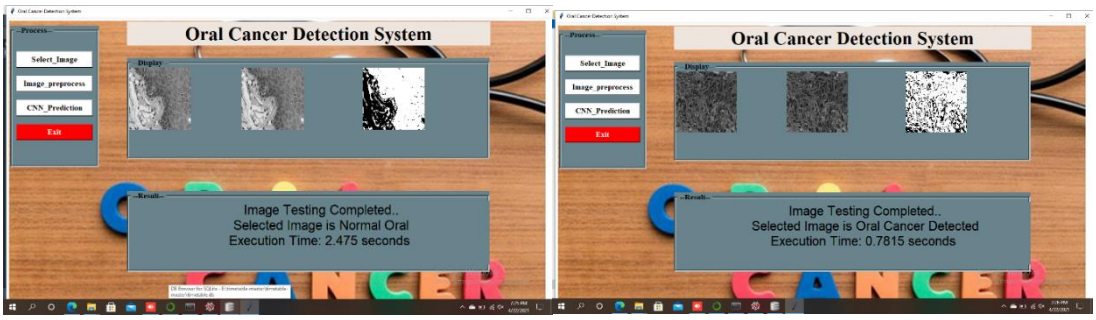

Fig. 2 Cancer Detection system

V. CONCLUSIONS

For detecting the Cancerous Cells in the Oral cavity and to Classify Cancer affected position to give results for easier approach to the doctors to start their treatment efficiently. This work is applying various techniques in the field of Computer technology using the Image Processing and future aspect of this is to verify whether the cancer cells are spreading to other parts of the system.

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