



Oral Cancer Detection Using Android Application

¹Narayan Naik, ²Anusha Amin, ³Dechamma K.C, ⁴Deepthi B.A, ⁵Nidhi Hegde

¹ Professor, Department of ISE, Canara Engineering College, Benjanapadavu, Mangalore, India

^{2, 3, 4, 5} Research Scholar, Department of ISE, Canara Engineering College, Benjanapadavu, Mangalore, India

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Abstract— *Cancer is one of the leading causes of death in developing countries. Among various cancers, Oral cancer is a common cancer which affects both men and women. This work presents the detection of oral cancers using Image Processing in android application. Dental X – Rays are used as the Input Image for detection. At first, Linear Contrast Stretching is used to remove noise from the Dental X – Ray Image. Watershed Segmentation Algorithm is used to segment tumors from the enhanced Image. Based on affected area level of cancer stage will be identified in android application.*

Keywords—*Cancer Detection, Oral Cancer, X-ray images, Android application.*

I. INTRODUCTION

Systemic problems those that affect the entire body most of the times appear in the mouth first. In general, mouth is a good indicator of what is going on in the entire body, which is why the physicians for generations have asked patients to open their mouth. The discovery of a wound in the mouth indicates so many problems in the Human Body and despite developments in surgery, radiation and chemotherapy, the mortality rate associated with oral cancer has no improvement in the last 40 years. Eventually, 50 percent of people who have oral cancer end up dying because of the malignancy. Early evaluation of oral precancerous lesions can have a dramatic impact on oral cancer mortality rates. Tumors can be benign, premalignant or malignant. Benign tumors are harmless and do not spread. Premalignant tumors can transform into Malignant. Malignant tumors are cancerous. Oral cancer can affect any area of the oral cavity including the lips, gum tissues, tongue, cheek lining and the hard and soft palate. Maharashtra has the highest incidence of mouth cancer in the world. The common oral precancerous lesions are leukoplakia, erythroplakia, and oral sub – mucous fibrosis. The diagnosis of Oral precancer and cancer remains a challenge to the dental profession (OSF). Particularly in the detection, evaluation and management of early phase alterations or frank disease.

II. LITERATURE SURVEY

The paper by Banumathi.A, Praylin Mallika.J, Raju.S, Abhai Kumar proposes a system which detects the cyst and also measures the severity of the cysts are calculated using the circulatory values [4].

The paper by Woonggyu Jung, Jun Zhang, Junrae Chung, Petra Wilder – Smith, Matt Brenner, J. Stuart Nelson and Zhongping Chen proposes a technique of detecting oral cancer using OCT. OCT stands for Optical Coherence Tomography and this is the technique which uses light wave to take a cross section of pictures. Each of these cross sections will have a depth of about 2-3mm [3].

The paper by James J. Sciubba proposes the usage of an oral CDX and scalpel biopsy. This process includes a brush like instrument used for the detection. The brush is placed on the epithelial layer of the tumour and once it processes the information it decides whether this lesion is cancerous or precancerous [1].

III. PROPOSED METHODOLOGY

The system that we have proposed is shown in fig 1 below. The basic process included in building the application are:

- A. Reading X-ray image
- B. Removing unwanted details
- C. Detecting affected area
- D. Diagnosing stage of tumor

A. Reading X-ray Image

In this module, the android application is reading the x-ray images to find out presence of oral cancer. In android bitmap concept is used to handle images. A bitmap is simply a rectangle of pixels. Each pixel can be set to a given color but exactly what color depends on the type of the pixel. The first two parameters give the width and the height in pixels.

The third parameter specifies the type of pixel you want to use.

B. Removing Unwanted Details

In this process, apart from tooth and gum area other areas will be avoided in order to concentrate only the area that will be affected by cancer where the tumor is present. By doing this unwanted information from the x-ray image is removed.

C. Detecting Affected Area

This process aimed to identify detecting the areas which are affected by cancer disease. Image segmentation is used for this identification. Image segmentation is the process of partitioning a digital image into multiple segment. The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image. After segmentation watershed process is applied on segmented image to extract the location of affected cells.

D. Diagnosing Stage of Tumor

In this module, the stage of the cancer is detected and is displayed on the screen. The stage is predicted based on the area that the tumor accumulates in the mouth.

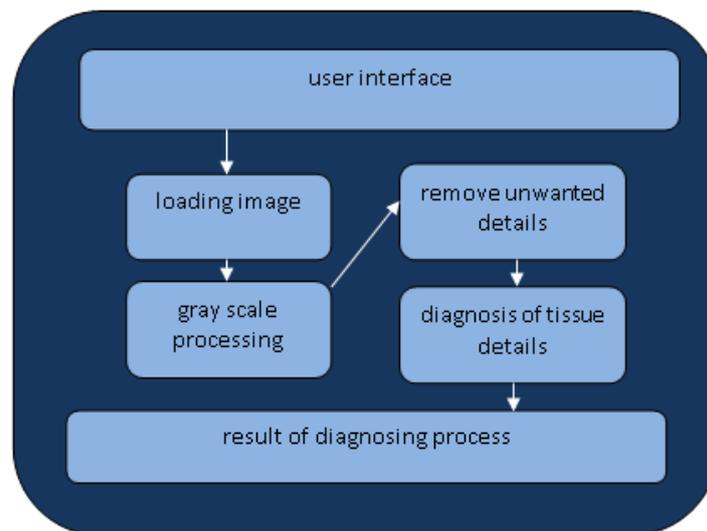


Fig 1 Block diagram

IV. EXPERIMENTAL RESULTS

The system developed in this paper is an application that can be installed on the smartphones. The development is done using android studio software and xml as the design language. The input to the application is the X-ray images which is then converted to grayscale and then the edge detection process is done. All these processes occur in the background. Once the input is processed the output comes as shown in the snapshot. The affected area gets highlighted and based on the highlighted area the size of the tumor is figured out and stage of the cancer is predicted.





Fig 2 Snapshots of the application

V. ADVANTAGES AND DISADVANTAGES

As observed this system developed in the form of an application is very useful for this purpose of detection of the presence of cancer at home from the mobile phones. The user may get the opinion from the Oncologist and can use the application for reconfirmation.

The disadvantages of this is that diseases like cancer must be detected with utmost care and hence relying solely on the outcome of the application is not recommended. An Oncologist needs to be consulted.

VI. CONCLUSION

In our work, we implemented an android application to detect presence of oral cancer. Based on our implementation, by giving an input x-ray image the application will detect whether the image has the presence of a cancerous tumor and also the stage of the tumor. In future by applying various algorithm we can obtain more accuracy in detection process.

The proposed system can further be improved by giving more and more genuine images as input and checking if the detection is done effectively. This can also be improved by using direct pictures captured on the phone instead of X-ray images. Increasing the accuracy level is the main goal.

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