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Teeth Detection Using Machine Learning Techniques

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ABSTRACT: The objectives of this work were to create a mechanism for tooth cavities to be detected automatically and to suggest quantitative methods for doing so. Recently, machine learning and deep learning algorithms have been used to segment teeth in dental pictures and support dentists in making clinical judgements. The area-of-interest (ROI), which should be the maxillofacial region, must be extracted from the source pictures by removing all irrelevant data. However, due to the poor image qualityand the quick and precise maxillofacial segmentation without hand-crafted features is difficult. To solve this issue, we generate a sizable maxillofacial dataset and suggest the EED-Net encoder-decoder networkarchitecture. There are 2602 images of teeth in this collection.

KEYWORDS: CNN, X-ray, Preprocessing, Feature Extraction, Deep Learning, Image Processing.

I. INTRODUCTION

Human teeth are typically made of strong materials that are difficult to destroy. After a person has passed away, their shapes can hold without eroding. The most common chronic disease worldwide is dental caries. While a skilled dentist is needed for cavity detection. Due to expense or dental anxiety, 1 in 3 Americans miss out on annual dental visits. A lot of interest in machine learning has grown in the field of medical research as a result of its outstanding performance in detection, prediction, and classification. Specialists can detect issues in areas with poor sight, inside the buccal cavity, or in challenging-to-reach places by analysing panoramic dental radiographies. The diagnosis, however, may vary due to poor imaging quality or exhaustion, which may eventually make treatment more difficult. In this study, we provide a novel method for automatically identifying teeth in real photographs, which can help the medical staff decide on the mostappropriate diagnosis.The annotated data was used to train a CNN to gain semantic segmentation information.

Fig. Tooth Cavity

II. PROPOSED SYSTEM

2.1 PROBLEM STATEMENT

To Develop the methodology that automatically detect the cavity without the use of X-ray images to reduce the cost of X-rays.

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2.2 EXISTING SYSTEM

By studying previous papers in that , we provide a deep learning strategy based on quicker data for automatic teeth recognition, detection thresholds for human dental tissues. The analytical method detection thresholds for various elements. X-ray technology has been used to quantify the amounts of some trace element constituents as well as some minor and macro elements in different tooth samples.

2.3 PROPOSED SYSTEM

By understanding the problem in Existing papers In this project we are using image dataset by using CNN algorithm. Technology to be used is image processing.

2.4 ALGORITHMS

1. Input Image:

   Here we will upload the Input Image

2. Image Preprocessing:

   In this step we will applying the image processing methods like grey scale conversion, image noise removal.

3. Image Feature Extraction:

   In this step we will be extracting the features from the image.

4. CNN Algorithm Working:

   In this step we are applying the CNN algorithm to the input image.

5. Results:

   In this step we will show the final result.

2.45 MATHEMATICAL MODEL

Relevant mathematics associated with Project:

Let S be the Whole system S = I, P, O

I-input

P-procedure

O-output

I= Input as image dataset

Where,

Dataset Image

Procedure (P),

P=I,

Using I System perform operations and calculate the prediction Output(O)-

O = Detect the Cavity.

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2.6 SYSTEM ARCHITECTURE

A system architecture is the conceptual model that defines the structure, behavior, and more views of the system. The Softwaresystem`s of the components connections, constraints and divisions are abstracted by the system architecture diagram which is a crucial tool in offering the comprehensive view of the physical deployment and the development plan.

An architecture description is the formal description and representation of a system, organized in a way that supports the reasoning about the structures and behaviors of the system. A system architecture can consist of System components and the sub-systems developed, that will work together to implement the overall system.

System Architecture is abstract, conceptualization-oriented, global and focused to achieve the mission and life cycle concepts of the system.

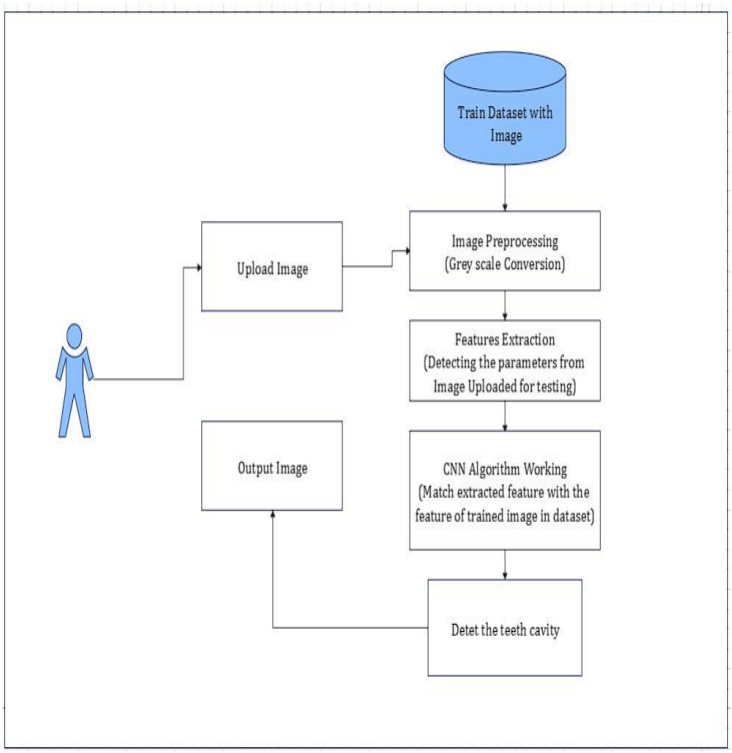

Fig. System Architecture of Project

2.7 SYSTEM REQUIREMENTS

2.7.1 HARDWARE REQUIREMENTS

- Processor : Pentium-IV
- Speed : 1.1GHz
- RAM : 512 MB(min)
- Hard Disk : 40GB
- Key Board : Standard Windows Keyboard

2.7.2SOFTWARE REQUIREMENTS

- Operating System : Windows
- IDE : Spyder
- Programming Language : Python

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2.8 ADVANTAGES

1. Benefits for Cavity Detection System.
2. Improved accuracy.
3. Detects cavities during the earliest stage.
4. Allows for immediate treatment of decay.
5. Reduces the cost for X-rays.

2.9 APPLICATIONS

1. Used in Hospitals.
2. State of the art of artificial intelligence in dental applications.
3. Dental applications, such as the detection of teeth, caries, filled teeth crown.
4. Used in dental implants and endodontic treatment.
5. Used in day to day life.

III. CONCLUSION

This study presented a novel approach for detecting teeth and diagnosing dental problems using real images.Images from three different sources and dental clinic were gathered in order to get the desired results.In this study a method to detect the cavity on real image is proposed. This is achieved by using a relatively small training dataset.
This work presented a novel approach for dental cavity detection utilising the real image collection. To get the intended outcomes, pictures from three distinct sources and a dental facility were acquired.Images were utilised to train the semantic segmentation CNN after various strategies were applied to enrich the annotated data. A technique to find cavities in real images is suggested in this paper. This is accomplished by utilising a modest training dataset.

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