

Automated Dental Disease Diagnosis *via* Image Processing

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ABOUT THE STUDY

It is an active area of research in the field of dental imaging and computer vision. With the help of advanced algorithms and techniques, it is possible to automatically detect and diagnose dental diseases using dental images such as X-rays, intraoral photographs, and 3D scans.

This is a rapidly growing field that has the potential to revolutionize the way dental diseases are detected and diagnosed. This technology uses digital images of the teeth and surrounding tissues to identify and diagnose various dental conditions, such as cavities, gum disease, and oral cancer.

The process of automated dental disease diagnosis *via* image processing involves several steps. First, the dental image is pre-processed to enhance the quality and remove any noise or artifacts. Then, various feature extraction methods are used to extract relevant features from the image. These features are then used to classify the image into different classes based on the type of dental disease present.

Image processing techniques such as edge detection, thresholding, segmentation, and pattern recognition are commonly used to extract important features from digital dental images. These features are then used to train machine learning models, which can classify images into different categories of dental diseases.

Some of the commonly used image processing techniques in automated dental disease diagnosis include segmentation, feature extraction, machine learning, and deep learning. Segmentation is used to separate the dental structures from the background and isolate the region of interest. Feature extraction techniques such as texture analysis, shape analysis, and color analysis are used to extract relevant features from the image. Machine learning algorithms such as decision trees, support vector machines, and neural networks are used to classify the

dental image into different classes based on the extracted features. Deep learning algorithms such as Convolutional Neural Networks (CNNs) have also shown promising results in automated dental disease diagnosis.

Radiography plays a crucial role in clinical analysis, medical procedure, and treatment. Dental 2D radiography examinations are used to find hidden threats, dental structures or sort masses, depressions, and bone misfortune. The analysis and treatment systems include root channel therapy, orthodontic patient identification and treatment planning, caries assessment, and dental radiography analysis. By using radiographs of the teeth, specialists can determine the prevalence of diseases. Some dental diseases include cracks in teeth, periodontitis, abrasion, malignancies, dental caries, attrition, impacted teeth, gingivitis, abscesses, interdental bone loss, extra teeth, developmental abnormalities, cysts, and future malocclusion. A beneficial dedication to the symptomatic process is provided by digital image processing. Dental injuries while undergoing treatment and the quantitative outcome of the digital method show that the most recent developed accurate data on the injury estimate. According on the clinical characteristics, which show the unique sore, dental caries can be ordered in several courses. The individual teeth and their structure are used to characterize the dental images, and the smooth surface has been recognized using X-beams. Researchers discovered that virgin and recurrent caries are categorized according to the damaged area. The analysis of the damage in cases of virgin caries is based on the teeth's changing color. Doctors used teeth edges as a basis for their analysis in cases of recurrent caries.

Automated dental disease diagnosis *via* image processing has the potential to revolutionize dental diagnosis and treatment planning by providing accurate and timely diagnosis of dental diseases. However, it is important to validate the accuracy and reliability of these automated systems before they can be used in clinical practice.

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Received: 01-Mar-2023, Manuscript No. DCR-23-20524; **Editor assigned:** 06-Mar-2023, Pre QC No. DCR-23-20524 (PQ); **Reviewed:** 20-Mar-2023, QC No. DCR-23-20524; **Revised:** 27-Mar-2023, Manuscript No. DCR-23-20524 (R); **Published:** 04-Apr-2023, DOI: 10.35248/2161-1122.23.13.628

Citation: Declan B (2023) Automated Dental Disease Diagnosis *via* Image Processing. J Dentistry. 13:628.

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