Patent Search

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Abstract:

The invention discloses a computer-implemented hybrid system for automated detection and classification of oral cancer using K-Means clustering and a You Only Look Once (YOLO) deep learning model. The system preprocesses oral cavity images, segments regions of interest through unsupervised clustering, and performs real-time lesion localization and classification. The integrated approach achieves high diagnostic accuracy with reduced false detections and minimal computational complexity. The invention provides a non-invasive, scalable, and efficient diagnostic framework suitable for clinical, mobile, and telemedicine applications.

Complete Specification

Description:FIELD OF THE INVENTION

[001] The present invention generally relates to the field of medical diagnostics and image processing. More particularly, it pertains to a computer-implemented system and method for automated detection and classification of oral cancer based on digital image analysis. The invention integrates artificial intelligence (AI) and machine learning (ML) techniques, specifically employing K-Means clustering for unsupervised image segmentation and a You Only Look Once (YOLO) deep learning model for lesion detection and classification. The invention lies at the intersection of biomedical imaging, computer vision, and clinical decision-support technologies, providing an intelligent diagnostic framework capable of identifying and classifying oral malignancies in a rapid, non-invasive, and reliable manner.

BACKGROUND OF THE INVENTION

[002] Oral cancer, particularly oral squamous cell carcinoma (OSCC), constitutes a significant global health concern and remains one of the most prevalent malignancies among head and neck cancers. Despite continuous advancements in medical research and treatment modalities, mortality and morbidity rates remain high primarily due to delayed diagnosis and limited access to specialized diagnostic facilities. Conventional diagnostic procedures for oral cancer, such as visual inspection, histopathological examination, and biopsy, are often subjective, invasive, time-consuming, and highly dependent on the expertise of the clinician. Early detection is critical to improving patient prognosis; however, existing screening techniques fail to deliver consistent accuracy and reliability, especially in resource-limited clinical environments.

View Application Status

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