



An AI System for Detecting Gum Inflammation from Photographs.

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Abstract

Gingivitis is one of the most prevalent oral diseases in Thailand, yet many individuals remain unaware of their condition and have limited access to professional dental care. Delayed diagnosis may lead to the progression of gingivitis into more severe periodontal diseases. This study presents GumAI, an artificial intelligence-based system for the preliminary detection of gingivitis from intraoral photographic images. A dataset of 1,500 annotated oral photographs was collected and divided into training (70.0%), validation (20.0%), and testing (10.0%) sets. ResNet50 was employed for gingivitis classification, while YOLOv8 was used to detect and localize inflamed gingival regions using bounding-box detection. The trained models were integrated into a user-friendly application connected to the LINE Messaging API, enabling convenient image submission and automated screening. Experimental results showed that ResNet50 achieved a classification accuracy of 90.0%, whereas YOLOv8 achieved 85.5% accuracy in localizing gingival inflammation. These findings demonstrate that the proposed system can effectively support early gingivitis screening, improve access to oral healthcare, and assist dental professionals, particularly in underserved communities. Future work will focus on expanding the dataset and improving model robustness under diverse imaging conditions.

Keywords: Gingivitis, Artificial Intelligence, Deep Learning, ResNet50, YOLOv8