

DIAGNOSTIC CHARTING ON PANORAMIC RADIOGRAPHY USING DEEP- LEARNING ARTIFICIAL INTELLIGENCE SYSTEM

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Abstract

Aims of the Study: A radiographic examination is a significant part of the clinical routine for the diagnosis, management, and follow-up of the disease. Artificial intelligence in dentistry shows that the deep learning technique high enough quality and effective to diagnose and interpret the images in the dental practice. For this purpose, it is aimed to evaluate diagnostic charting on panoramic radiography using a deep-learning AI system in this study. **Methods:** 1084 anonymized dental panoramic radiographs were labeled for 10 different dental situations including crown, pontic, root-canal treated tooth, implant, implant-supported crown, impacted tooth, residual root, filling, caries, and dental calculus. AI Model (Craniocatch, Eskişehir, Turkey) based on a deep CNN method was proposed. A Faster R-CNN Inception v2 (COCO) model implemented with Tensorflow library was used for model development. The training and validation data sets were used to predict and generate optimal CNN algorithm weight factors. **Results:** The proposed artificial intelligence model has promising results for detecting dental conditions in panoramic radiographs except for caries and dental calculus. The most successful F1 Scores were obtained from the implant, crown, and implant-supported crown as 0,9433, 0,9122, 0,8947, respectively. **Conclusion:** Thanks to the improvement of the success rate of AI models in all areas of dentistry radiology, it is predicted that they will help physicians especially in panoramic diagnosis and treatment planning, as well as digital-based student education, especially in this pandemic period when online training is on our agenda.

RESEARCH ARTICLE

DIAGNOSTIC CHARTING ON PANORAMIC RADIOGRAPHY USING DEEP- LEARNING ARTIFICIAL INTELLIGENCE SYSTEM

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Running Title: *artificial intelligence on panoramic radiographs*

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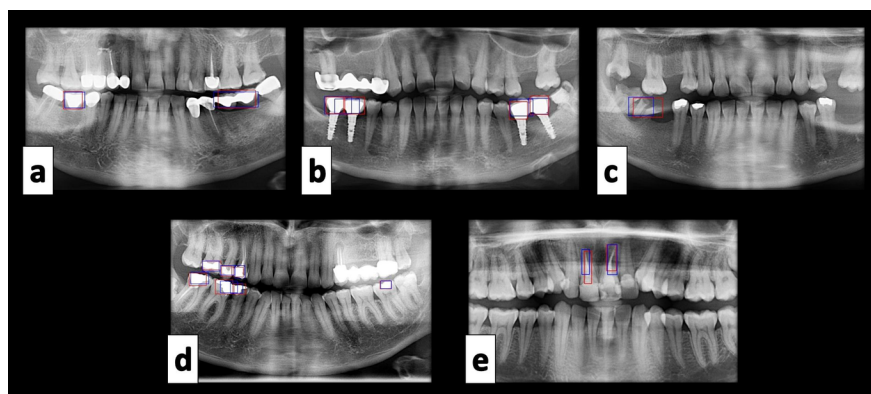
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