

Development of a training module to introduce deep learning approach to identify caries in radiographs

Riddhi Solanki, Sonamben Patel, Chun-Teh Lee, DDS, MS, DMSc, Ana Neumann, DDS, MPH, PhD, University of Texas Health Science Center at Houston, School of Dentistry, Houston, Texas, USA.

Objective: To employ a deep learning approach to identify caries in radiographs, we conducted the research project in two phases. *Phase 1:* Annotation of teeth, caries, and restorations in thirty Full Mouth Series (FMS) radiographs, including periapical and bitewing images. *Phase 2:* The software used to annotate dental radiographs to be included in the artificial intelligence database requires trained and calibrated examiners. The training module is a standardized approach that is sustainable, consistent, and efficient.

Methods: *Phase 1:* Thirty full mouth series, which included periapical and bitewing radiographic images with annotation of caries lesions, teeth, and restoration. *Phase 2:* Development of a training module consisting of an introduction, an 8-minutes step-by-step annotation video, and pre- and post-quizzes. The training takes approximately 20 minutes. Since there is a steep learning curve, it is necessary to teach the students and faculty the correct approach to annotate the images and calibrate examiners.

Results: The training module delivers standardized training, and examiners will be calibrated. Our target audiences are dental students and faculty with varying levels of experience in radiographic interpretation and artificial intelligence knowledge. We pilot-tested the learning module with colleagues for feedback and fine-tuning. The module is available for use and can be integrated into the dental curriculum.

Conclusions: Building an extensive database to implement machine learning to aid dentists in caries diagnosis requires many examiners familiar with annotation software. A training module will facilitate understanding the content that is not yet taught as part of the dental curriculum, boost efficiency, and enhance training and skills development.

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