

# Object detection on dental X-rays

– Report –

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# Chapter 1

## Introduction

### 1.1 Description of the problem solved with the help of AI

In dentistry, Dental X-ray systems help dentists by showing the basic structure of tooth bones to detect various kinds of dental problems. However, depending only on dentists can sometimes impede treatment since identifying things in X-ray pictures requires human effort, experience, and time, which can lead to delays in the process. In image classification, segmentation, object identification, and machine translation, recent improvements in deep learning have been effective. Deep learning may be used in X-ray systems to detect objects. Radiology and pathology have benefited greatly from the use of deep convolutional neural networks, which are a fast growing new area of medical study. Deep learning techniques for the identification of objects in dental X-ray systems are the focus of this study. As part of the study, Deep Neural Network algorithms were evaluated for their ability to identify dental cavities and a root canal on periapical radiographs. An automated detection method for dental caries and root canals in X-rays is presented utilizing Tensor Flow tool packages' faster regions with convolutional neural network characteristics (faster R-CNN).

## 1.2 Description of the application's functionalities

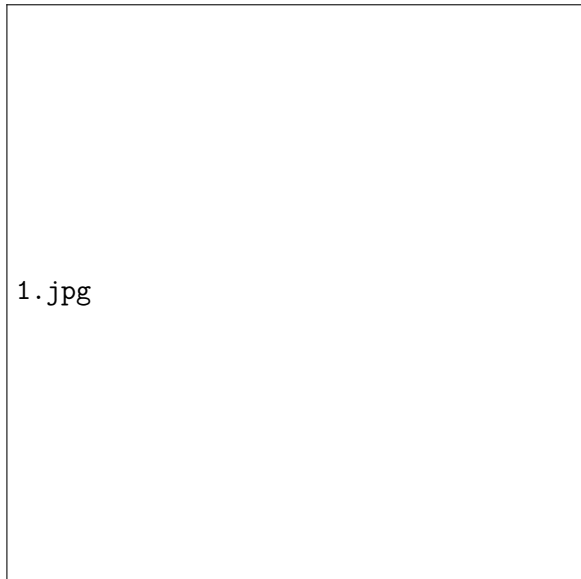


Figure 1.1: Before detection

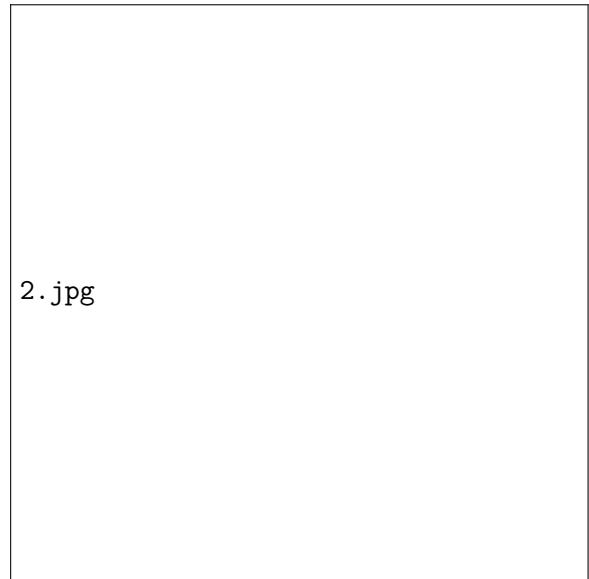


Figure 1.2: After detection

- **Upload Image**

By clicking the "Upload Image" Button, the user can select an X-Ray image from his computer which will be uploaded and further analyzed (Figure 1.1).

- **Detect**

By clicking the "Detect" Button, the application will start analyzing the image and will detect possible dental problems which will be highlighted on the previously uploaded X-Ray (Figure 1.2).

## 1.3 Related work and useful tools and technologies

- [TensorFlow](#)
- [DeepMedic](#)
- [U2Net](#)
- [DeepLab](#)
- [Deep learning object detection on dental x-rays](#)