

The Role of Artificial Intelligence in Orthodontics

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ABSTRACT

Alan Turing brought up the concept of the Turing machine in 1936, which can simulate the process of human calculation. The concept of the Turing machine as well as the theory of computation provided a fundamental basis for the development of artificial intelligence (AI). AI is transforming the practice of medicine. It's able to find insights in a data set to help physicians in diagnosis, treatment planning, decision making, and prediction. What can AI do in orthodontic field? How can we apply this magic tool in our daily practice and why is AI so important? In this presentation, the latest research using AI will be discussed. The applications include the following: 1. Automatic landmark identification in lateral cephalometric X-ray 2. Segmentation of anatomical structures from computed tomography 3. Disease classification 4. Diagnosis and treatment planning of conventional orthodontic treatment and surgical orthodontic treatment 5. Prediction of treatment outcomes in surgical orthodontic treatment 6. Evaluation of treatment results state of the art machine learning algorithms will be explained focusing on how they can solve clinical problems and research questions using deep learning neural networks. With supervised learning, human experts label or classify a data set as ground truth. After training and testing processes, the trained AI model can make predictions or classifications on unlabeled or unclassified data sets. Evaluation of efficiency and accuracy of AI tools will also be discussed. AI algorithms makes it possible for computers to learn from human expert experience through supervised learning. In the end of this presentation, future prospects of AI applications in the orthodontic field will be covered.

Keywords: Artificial intelligence, Machine learning, Orthodontic treatment, Deep learning

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