Dental Image Classification Technique for Wisdom Teeth

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ABSTRACT

Nowadays, medical dental panoramic images are used mainly to diagnose different problems of the jaws and teeth including the examination of the wisdom tooth, which are erupted usually between the ages 18 to 25 years old [2]. As the wisdom teeth developed, it can cause different problems and complications for the patients and affect other teeth. Depending on several factors including the orientation's degree of the wisdom teeth, the dentist and jaw surgeon should determine to keep the wisdom tooth or should be removed surgically. Image classification techniques are used widely in medical area to extract information from images such as X-ray images, and perform a medical diagnosis of a patient. The goal of the classification process is to decide whether an image belongs to a certain category or not. It assists doctors and medical specialists in the diagnosis process, and it is usually the final stage in Computer-Aided Diagnosis (CAD). A new algorithm for dental image classification of wisdom teeth was developed to classify the orientation of wisdom teeth and the degree of inclination. It also classifies the teeth from its location in which jaw, and its orientation and the degree of inclination perspectives. The classification algorithm is based on the number of white pixels (1's pixels) in the image, which was used to define the location of the wisdom teeth (upper jaw or lower jaw), find in which side it is located in the jaw (Left or Right), and find the orientation degree (acute or mild). The algorithm was completely implemented using MATLAB along with the graphical user interface to help the user select the required panoramic images for classification. The input for the classification system is a segmented image for the wisdom teeth. The proposed classification algorithm was tested using 174 images of segmented wisdom teeth. The results showed that the developed system could successfully determine the wisdom tooth and then classify the orientation of the image and its degree. The performance of classification was 88% to classify the images correctly and 12% incorrectly classified. The proposed algorithm proved to be robust and accurate from the obtained results, and could be used for wisdom teeth classification orientation as it was recommended by the dentist who tested it.