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Semi-automatic Segmentation and Classification of Dental Periapical Lesions

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10:30 – 11:30 @ BEB 411

Abstract

This talk will cover a summary of the studies on segmentation and classification of periapical cyst (PC) and keratocystic odontogenic tumor (KOT) lesions in three dimensional (3D) cone beam computed tomography (CBCT) images. 50 CBCT 3D image dataset files have been employed as the full dataset of the study. Experts have identified half of the data as periapical cyst (PC) and the other half as keratocystic odontogenic tumor (KCOT). The diagnosed lesions were used in experiments with specially developed software for this study. The lesional volumetric regions were manually segmented with the developed software tools to obtain a ground truth set. A noise removal approach has been proposed for the preprocessing step for removing noise detected in the CBCT images. A semi-automated segmentation approach has been proposed to accommodate the anatomical and internal variations of the lesions. Basic statistics and 3D Gray Level Co-Occurrence Matrix (GLCM) information were calculated from the segmented lesions and feature vector containing 636 feature information was obtained. Six different classifiers were used for classification experiments. As a result of classification experiments, PC and KCOT lesions can be detected and classified with great accuracy.

Biography

Ercüment YILMAZ received his **M.Sc.** and **Ph.D.** degrees from **Computer Engineering Department** at **Karadeniz Technical University** in June'18. In January'02, he joined Karadeniz Technical University **Department of Informatics** as academic staff member. As a senior lecturer he currently teaches lectures on **Information Technologies**. During his graduate studies, he developed algorithms for segmentation and classification of dental apical lesions on 3D images obtained via cone beam computed tomography devices.

His current research includes the development of noise reduction, semiautomatic segmentation and classification algorithms in order to increase noninvasive diagnosis of dental apical lesions detected via **3D CBCT images**.

Ercüment Yılmaz is also the founder of **Yılmaz Bilişim**, which is located in **Trabzon Technology Development Zone**. Yılmaz Bilişim is a R & D company that has been established with the aim of developing "**Road Traffic Simulation Software**" product.