EARLY DETECTION OF CERVICAL CANCER WITH THE USE OF COLPOSCOPIC IMAGES BASED ON CONVOLUTIONAL NEURAL NETWORK

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Abstract

At present, Cervical cancer is the second most common cancer among women around the world. This cancer develops in the cervix, which is the entrance to the uterus. This paper proposes a deep learning method for detecting cervix cancer from colposcopy images. Colposcopy is one of the significant stages in the clinical screening of cervical intraepithelial neoplasia (CIN) and early cervical disease. The proposed methodology consists of the following stages as bilateral pre-processing, semantic segmentation for segmenting overlapped nuclei, Histogram of Oriented Gradients (HOG) feature extraction and classification. The network uses a hybrid structure that combines a CNN as well as a bidirectional long short-term memory (BLSTM) to categorise cervical cancer as benign or malignant. Based on the confusion matrix obtained for the proposed classifier, performance parameters (recall, specificity, precision, and accuracy) were analysed. The results showed an accuracy of 98.3%, a recall of 99%, precision 99.6% and a specificity of 98%. The experimental results show that our proposed method (CNN-BLSTM) yields better accuracy than the other existing methods.

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