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(57) Abstract :
Tongue diagnosis is an important way of monitoring human health status in Indian ayurvedic medicine (1AM), which helps to identify the different diseases of human through tongue image analysis. Several machine learning models are presented to classify the diseases through tongue image analysis. However, they are suffering with the low classification performance due to variations in tongue appearance such as color, shape, coating, and texture properties. Therefore, this article focuses on deep learning convolutional neural network (DLCNN) for disease predication through tongue image analysis, which is hereafter named as Tongue-Net. Initially, fast nonlocal mean (FNLM) filtering is applied on given tongue image for preprocessing operations such as noise removal, and quality enhancement. Next, color features from preprocessed tongue image are extracted using color statistics such as mean, skewness, and standard deviation. In addition, grey level cooccurrence matrix (GLCM) and local binary pattern (LBP) approaches are used extract the texture and shape features. Finally,DLCNN classifier is used to classify the different diseases from extracted features. The proposed Tongue-Net model is capable of predicting six distinct diseases including the healthy, appendicitis, bronchitis, gastritis, heart disease, and pancreatitis disease. The simulation results shows that proposed Tongue-Net classification model obtained 97.90% of accuracy, and 98.01% of FI-score.

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