ABSTRACT

A common bone disorder called osteoporosis is characterized by a decrease in bone density and an elevated risk of fractures. For prompt diagnosis and treatment, osteoporotic areas must be identified early and segmented. In this work, we use the convolutional neural network (CNN) algorithm to offer a unique method for osteoporosis diagnosis and segmentation. To start, we preprocess photos of bone density to improve contrast and reduce noise. Next, we take advantage of the preprocessed images to extract relevant aspects including texture, intensity, and form descriptors. The CNN classifier efficiently learns the patterns associated with osteoporotic regions through training it with these features. Here, we utilize a combination of YoloV5 and Vision Transformer; this can be named as YOViT. After processing the input image, YOLOv5 would identify any items present in it by providing bounding box coordinates and class probabilities for each item found and the detected items (bounding boxes) and the full image might be processed through the ViT model. ViT can now evaluate the scene as a whole and extract contextual data and high-level features. A collection of bone density pictures is used for experimental evaluation, which shows how well the suggested method works to identify and classify osteoporotic zones. In conclusion, our methodology achieves higher accuracy and resilience than previous methods, which makes it a promising tool for automated osteoporosis diagnosis and therapy planning.