ABSTRACT

Identification of bone fractures with computer aided detection and diagnosis is an utmost need of today. It helps the radiologists in saving the time and improving the performance. There were many image processing techniques used earlier for detecting the bone fractures. Deep learning model in specific convolutional neural networks are widely used currently in the medical image processing. It also extends its horizon in bone fracture detection from the X-Ray images. The commonly used dataset for bone fracture detection is MURA Dataset. This work concentrates on classifying the bone fractures and it employs the MURA dataset. While almost all the works that detects bone fracture employs the entire MURA Dataset, this work uses only the specific type of bone called as the humerus bones and tries to classify the bone fractures. The work is three-fold, the first phase of the work concentrates on comparing the pre-trained models DenseNet169 Model and VGG Model. Two variants of the DenseNet169 Models one with pre-trained weights and another without the pre-trained weights is experimented and the results are compared.

The second phase of the work concentrates on comparing the three models VGG, DenseNet169 and DenseNet121. Two datasets, humerus dataset as it is in the MURA Dataset and the same one without the images that has metal fitted to it. The performances of the models are tested and DenseNet169 is further chosen for transfer learning process. The method of transfer learning approach used is carefully designed to meet the requirements. Customization of the layers was made with the consideration that the pre -trained models are trained with the ImageNet dataset and the dataset to which it has to be applied is X-Ray images. The model is tested with both the dataset and the results are inferred.

The third phase of the work concentrates on developing a new CNN Model. A customized model is developed for detecting the bone fracture of humerus bones. The model is tested with the two datasets. A slight change has

been made in the validation set for the second dataset where the X-Ray images with metals fixed to it are removed which is not the case with the first dataset. It has been observed that the newly designed Convolutional Neural Network model performs well than the model to which the transfer learning is applied as well as the pre-trained models DenseNet121, DenseNet169 and VGG16 models. The performance parameters used for evaluating the model and comparing it with the other models are Accuracy, precision, recall and F1-Score.