ABSTRACT

Medical image classification is a complex and challenging task due to the heterogeneous nature of medical data. Deep transfer learning has emerged as a promising technique for medical image classification, allowing the leveraging of knowledge from pre-trained models learned from large-scale datasets, resulting in improved performance with minimal training and overcoming the disadvantage of small data sets. This paper concisely overviews cutting-edge deep transfer learning optimization approaches for medical image classification. The study covers convolutional neural networks and transfer learning techniques, including relation-based, feature-based, parameter-based, and instance-based transfer learning. Classical classifiers such as Resnet, VGG, Alexnet, Googlenet, and Inception are examined, and their performance on medical image classification tasks is compared. The paper also discusses optimization techniques, such as batch normalization, regularization, and weight initialization, as well as data augmentation and kernel mathematical formulations. The study concludes by identifying challenges when using deep transfer learning for medical image classification and proposing potential future approaches for this field.