**Transfer Learning forAutomatic Brain Tumor Classification Using MRI Images**

**Abstract**

Brain tumor detection successfully in the early-stage plays an important role in improving patient treatment and survival. Evaluating magnetic resonance imaging (MRI) images manually is a very difficult task due to the numerous numbers of images produced in the clinic routinely. So, there is a need for using a computer-aided diagnosis (CAD) system for early detection and classification of brain tumors as normal and abnormal. The paper aims to design and evaluate the convolution neural network (CNN) Transfer Learning state-of-the-art performance proposed for image classification over the recent years. Five different modifications have been applied to five different famous CNN to know the most effective modification. Five-layer modifications with parameter tuning are applied for each architecture providing a new CNN architecture for brain tumor detection. Most brain tumor datasets have a small number of images to train the deep learning structure. Therefore, two datasets are used in the evaluation to ensure the effectiveness of the proposed structures. Firstly, a standard dataset from the RIDER Neuro MRI database including 349 brain MRI images with 109 normal images and 240 abnormal images. Secondly, a collection of 120 brain MRI images including 60 abnormal images and 60 normal images. The results show that the proposed CNN Transfer Learning with MRI’s can learn significant biomarkers of brain tumor, however, the best accuracy, specificity, and sensitivity gained is 100% for all of them.