

ABSTRACT

Deep Learning has gained a lot of importance in medical imaging field recently, because of its success in solving various complex computer vision related problems. Medical images such as MRI, pathological slides are very complex to analyze and to extract information by manual analysis. With the capability of deep learning to extract information from very complex images, it is encouraging to use deep learning to solve medical imaging classification problems in which incorrect diagnosis can be very costly. In this thesis we have studied about early detection of Alzheimer's disease using one of the sophisticated brain imaging modalities called Magnetic resonance imaging(MRI). For this study, we analyzed a strategy to use segmentation and data augmentation techniques to increase the number of samples and use deep learning models for the classification of risk factor for Alzheimer's disease. We used a strategy of forward prediction and backward prediction by training the model using a particular timestamp data and analysing the predictions for data at different timestamps. In the second part of this thesis, we studied about identifying the presence of dysplastic cells that can help in the prevention and early diagnosis of oral cancer. In this work, we proposed a deep learning approach to classify histopathological slides of buccal mucosa into two categories, normal buccal mucosa(NBM) and high risk epithelial dysplasia(HR). For this classification task, we created a 2D Convolutional neural network(CNN) base model and compared its performance with state of the art deep learning neural network ResNet50. We achieved the best accuracy of 94.56% with ResNet50 when compared to 91.30% accuracy with our base model which was built and trained from scratch.