ABSTRACT

Detecting Brain Tumour in MRI images using Deep Learning

MOTIVATION - A brain tumour is an abnormal growth of brain cells in an uncontrollable way. Brain tumours can also be cancerous which need to be identified at early stages. In the worst case, it can cause brain damage, which can be life-threatening. Manual identification of brain tumours and tracking their changes over time are tedious and error-prone activities hence, automated systems that are highly accurate are required to replace the conventional manual methods.

IDEA - Deep Learning is a machine learning field that has gained a lot of attention over the past few years due to its wide range of real-world applications. Therefore, I will be applying deep learning concept to perform an automated brain tumour detection using brain MRI images and measure its performance. The proposed methodology aims to differentiate between a normal brain and a brain with some kind of tumour. This is based on learning multiple levels of representations by making a hierarchy of features where the higher levels are defined from the lower levels and the same lower-level features can help in defining many higher-level features. For this project I will be using the Convolution neural network (CNN). CNN are most commonly applied to analysing visual

imagery. Convolutional Neural Networks can learn extremely complex mapping functions when trained on enough data. I will be using a pre-defined CNN architecture for the purpose of transfer learning.

In transfer learning, we take the pre-trained weights of an already trained model and use these already learned features to predict new classes. The use of transfer learning makes the training faster, requires less computational power and, we do not require large amount of data to train the model.

The steps that will be done in this project are data acquisition, data pre-processing, data augmentation, building model architecture, training and testing the model, calculation of model accuracy and model loss.

CONCLUSION – In this project I will be creating a model that can detect a brain tumour in an MRI image using deep learning techniques. Expected output of the project is to get the highest accuracy possible with the limited dataset and computational power.