ILLUMINATING BRAIN TUMOR IN MRI METAPHORS BY USING A HYBRID MODEL OF FASTER R-CNN AND CNN

Mr. A. Muruganandham, Research Scholar, Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi, Tamil Nadu, India**.** muruganandham24@gmail.com
Dr. R. Nandhakumar, Assistant Professor, Department of computer Science, Nallamuthu Gounder Mahalingam College, Pollachi, Tamil Nadu, India. nkumarram@gmail.com

Abstract:
In this study the problem of fully computerized brain tumor classification and segmentation, in Magnetic resonance imaging (MRI) containing both Glioma and Meningioma types of brain tumors are considered. This paper proposes a Convolutional Neural Network (CNN), for classification problem and Faster Region based Convolutional Neural Network (Faster R-CNN) for segmentation problem with reduced number of computations with a higher accuracy level. This research has used 218 images as training set and the systems shows an accuracy of 100% in Meningioma and 87.5% in Glioma classifications and an average confidence level of 94.6% in segmentation of Meningioma tumors. The segmented tumor regions are validated through ground truth analysis and manual analysis by a Neurologist.

Keywords:
Convolutional Neural Networks, Brain Tumor, Magnetic resonance imaging, Segmentation, Classification, Computer Vision

INTRODUCTION
Brain tumor is the advancement of unusual tissues in the cerebrum and distinguishing something very similar at a beginning phase can be dealt with appropriately. By and large, brain tumor can be delegated in excess of hundred kinds in light of the area and development of growth. Specialists have named mind tumor in stages as Grade I, II, III and IV as per the development and side effects of cerebrum growth. The significant brain growths are harmless and Threatening where harmless have some consistency in shape and non-dynamic, yet dangerous doesn't have consistency in shape and dynamic. The image processing techniques used to identify the brain tumor are Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET) and Computed Tomography (CT). By comparing all these three imaging techniques, MRI is good quality medical imaging for detecting brain tumor. In this study, four types of brain tumor are used namely benign- slow growing tumor, malignant, which are most commonly seen in infants and children called PNE, glial-astrocytic tumor and astrocytoma-low grade tumor.

LITERATURE REVIEW
In previous works segmentation techniques are used to detect brain tumor by segmenting the tumor area. Faster R-CNN algorithms are mainly used for object detection in natural images by creating bounding box with class names and score. In this system object detection algorithm Faster R-CNN are used to detect the tumor in brain and created bounding box on tumor with tumor name.
Brain Tumor is an abnormality growth arising from the brain tissues, which could be life threatening if not detected and appropriately treated at an early stage. Typically, Magnetic resonance imaging (MRI) and Computer Tomography (CT) scans are used by medical staff to obtain detailed images of the brain for initial analysis, over invasive procedures such as tissue biopsies. Further, use of computer-based image analysis in collaboration with medical knowledge, can contribute significantly to aid the early diagnosis [2]. Hence, increasing number of existing and new computer-based image classification and segmentation algorithms are applied and validated in this line of study by many researchers [1-3, 5-7].
Image classification and segmentation has been studied for many years with several different types