MAIN PROJECT

Project Title	Categorization of Brain Tumor based on Convolutional Deep Learning Techniques
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Aim:

The aim of this project is to develop an accurate and efficient system for Categorization of Brain Tumor based on Convolutional Deep Learning Techniques.

Objectives:

The primary goal of this project is to identify and categorize brain tumour using convolutional deep learning techniques, that is, whether a brain tumour exists or not, and if so, what type of tumour it is. In this suggested model, primary tumour such as glioma and meningioma, pituitary are used to assess model performance in terms of accuracy, sensitivity, and specificity in order to establish the most effective model for brain tumor classification.

Introduction:

The brain is one of the most complex organs in the human body that works with billions of cells. A brain tumor arises when there is an uncontrolled division of cells forming an abnormal group of cells around or inside the brain. There are many types of tumors are there in that Gliomas,meningioma, pituitary gland tumors are considered as the most common type of primary brain tumors and these are rated as per the World Health Organization's grading system. Meningioma is usually a benign tumor that is a slowgrowing tumor that develops from the brain, spinal cord membrane layers, and is found at the outer coverings of the brain just under the skull. Pituitary is another type of tumour that is due to excessive growth of braincells in the pituitary gland of the brain. On the other hand, glioma tumours grow from glial cells called astrocytes and also in the cerebral hemispheres. There are different methods for capturing medical imaging data including radiography, magnetic reasoning imaging (MRI), tomography, and echocardiography. Among them, MRI is the most prominent as it provides higher resolution images without any radiation. The proposed model uses deep learning techniques , particularly Convolutional Neural Networks (CNNs), have shown promising results in various medical imaging applications. This study compares the performance of this Categorization of brain tumor using well-known CNN architectures, GoogleNet and AlexNet, SqueezeNet, and U-Net. Magnetic resonance imaging (MRI) is a medical imaging technique that uses a strong magnetic field and radio waves to create detailed images of the inside of the body. MRI is often used to detect brain tumors because it

can show the brain more clearly than other imaging tests, such as computed tomography (CT) scans. MRI scans of brain tumors can show the size, shape, and location of the tumor. They can also show the type of tumor, which can help doctors determine the best course of treatment. A dataset containing Magnetic Resonance Imaging (MRI) brain images comprising images of glioma, meningioma, and pituitary gland tumors. The treatment for a brain tumor is based on the size of the tumor, the type of the tumor, and the growth stage of the tumor, and its location. Treatment options may include surgery, radiation therapy, chemotherapy,Targeted therapy, or a combination of these treatments.

Proposed Methodology:

The biggest issue before starting treatment is detecting and classifying tumors from brain MRI scans. Although most research on brain tumor diagnosis has concentrated on tumor slicing and positioning techniques, there are few studies on tumor diagnosis as a time-saving technique. Most researchers are using a convolutional neural network to classify brain tumors but it collects features randomly without knowing the global and local features.Convolutional Neural Network is a well-ordered technique in the field of the medical image process. A convolutional neural network (CNN) could be a type of artificial neural network works in image recognition and process that's specifically designed for method component knowledge. CNN is a powerful image processing, computing method that use deep learning to perform each generative and descriptive tasks. Detecting and analyzing tumors using deep learning models like U-Net, AlexNet, and GoogLeNet involves several steps. Initially, In the proposed model collect medical images with labeled data and pre-process them for analysis and then select an appropriate model architecture and train it using the labeled dataset. Throughout the training process, and refine the model by adjusting suitable loss functions to enhance its accuracy. Subsequently, evaluate the model's performance on independent testing sets, using metrics such as accuracy. Finally, compare the outcomes of various models to determine the best fit for the specific requirements of tumor detection and classification.

What technical or social issue does project address ?:

Deep learning models can accurately identify and classify brain tumors, enabling early detection. This can reduce the risk of misdiagnosis and improve the overall reliability of brain tumor diagnoses , and early detection enhances the chances of timely intervention, leading to better treatment outcomes and potentially saving lives. This can reduce the risk of misdiagnosis and improve the overall reliability of brain tumor diagnoses.

Timeline:

By 15-07-2023: Literature survey

By 29-07-2023: Methodology Implementation

By 26-08-2023: Methodology Implementation

By 16-09-2023: Validation of Results

By 07-10-2023: Documentation

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Signature of the Project Guide