Context

Brain tumor among children and adults is known to be one of the most aggressive diseases. Of all primary Central Nervous System (CNS) tumors, brain tumors account for 85 to 90 percent. Around 11,700 individuals are diagnosed with a brain tumor every year. For individuals with a cancerous brain or CNS tumor, the 5-year survival rate is around 34 percent for men and 36 percent for women. Brain Tumors are known as: Benign Tumor, Pituitary Tumor, Malignant Tumor, etc. In order to increase the life expectancy of patients, adequate care, preparation, and reliable diagnostics should be introduced. Magnetic Resonance Imaging (MRI) is the best way to identify brain tumors. Through the scans, a huge amount of image data is produced. There are several anomalies in the brain tumor size and location (s). This makes it very difficult to completely comprehend the nature of the tumor. For MRI analysis, a trained neurosurgeon is also needed. The lack of qualified doctors and lack of knowledge about tumors also makes it very difficult and time-consuming for developing countries to produce MRI studies. Due to the level of difficulty involved in brain tumors and their properties, a manual analysis can be error-prone. So an automated system can solve this problem.

Application of automated classification techniques using Machine Learning (ML) and Artificial Intelligence (AI) has consistently shown higher accuracy than manual classification. It would therefore be beneficial to propose a method that performs detection and classification by using Deep Learning Algorithms.

Problem Statement

To build a classification model that can take images of MRI scans as an input and can classify them one of the following types of tumor - glioma_tumor, meningioma_tumor, no_tumor, and pituitary_tumor

Data Dictionary

There are 2881 train and 402 test grayscale images that have been taken from the MRI scans. These images are of the following categories-

- **Glioma tumor -** Tumor that occurs in the brain and spinal cord.
- **Meningioma tumor -** Tumor that arises from the membranes surrounding the brain and spinal cord.
- **No tumor -** There is no tumor in the brain.
- **Pituitary tumor -** Tumor in the pituitary gland that doesn't spread beyond the skull.

Note: These images require some preprocessing before they are prepared to work in the google colab. The code for the same is given below.

Data Set Link: https://drive.google.com/drive/folders/19EZWFujef6FITEen-sgaY2NZiesJMUN9?usp=sharing

Code to get the data in google colab

https://colab.research.google.com/drive/11phUUI-FwmIoTDAeIFwoWKWpDqL-hf-Z?usp=sharing

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