Brain Tumor Detection (MRI)

1. Executive Summary:

A Brain tumor is considered as one of the aggressive diseases, among children and adults. Brain tumor account for 85 to 90 percent of all primary Central Nervous System(CNS)tumors. Every year, around 11,700 people are diagnosed with a brain tumor. The 5-year survival rate for people with a cancerous brain or CNS tumor is approximately 34 percent for men and36 percent for women. Brain Tumors are classified as: Benign Tumor, Malignant Tumor, Pituitary Tumor, etc. Proper treatment, planning, and accurate diagnostics should be implemented to improve the life expectancy of the patients. The best technique to detect brain tumors is Magnetic Resonance Imaging (MRI). A huge amount of image data is generated through the scans. These images are examined by the radiologist. A manual examination can be error-prone due to the level of complexities involved in brain tumors and their properties.

Application of automated classification techniques using Machine Learning (ML) and Artificial Intelligence (AI) has consistently shown higher accuracy than manual classification. Hence, proposing a system performing detection and classification by using Deep Learning Algorithms using Convolution Neural Network (CNN), Artificial Neural Network (ANN), and Transfer Learning (TL) would be helpful to doctors all around the world.

2. Problem Statement:

Background: A Brain tumor is considered as one of the aggressive diseases, among children and adults. Brain tumor account for 85 to 90 percent of all primary Central Nervous System(CNS)tumors

Objective: To Detect and Classify Brain Tumor using, CNN and TL; as an asset of Deep Learning and to examine the tumor position(segmentation).

Scope: Proposing a system performing detection and classification by using Deep Learning Algorithms using Convolution Neural Network (CNN), Artificial Neural Network (ANN), and Transfer Learning (TL) would be helpful to doctors all around the world.

3. Data Sources:

Primary Data:kaggle.com

Secondary Data: N/A

4. Methodology:

Data Collection: Major steps in the present study comprise brain tumor dataset selection, pre-processing MRI images, feature extraction, and classification by various classifiers.

Data Preparation: Clean and prepare data, handling missing values, and standardizing formats.

Analysis Techniques: CNN to classify glioma, meningioma, and pituitary tumors.

Tools: Python (using libraries like pandas ,scikit-learn,etc) for modeling.

5. Expected Outcomes:

we proposed two deep learning methods and several machine learning approaches for diagnosing three types of tumor, i.e., glioma, meningioma, and pituitary gland tumors, as well as healthy brains without tumors, using magnetic resonance brain images to enable physicians to detect with high accuracy tumors in early stages. As a result we will be able to predict accurately whether the MRI image shows any tumor or not..

6. Risks and Challenges:

Detecting brain tumors in their early stages is crucial.

7. Conclusion:

As a result we will be able to predict accurately whether the MRI image shows any tumor or not.