Capstone Three: Project Proposal

Problem Identification

Problem statement formation
Brain Tumor Classification and Prediction using Convolutional Neural Networks to help automate the diagnostic process which will ensure proper treatment and will save lives and resources.

Context
Brain Tumors are complex. There are a lot of abnormalities in the sizes and location of the brain tumor(s). This makes it difficult for complete understanding of the nature of the tumor. Also, a professional Neurosurgeon is required for MRI analysis. Often, in developing countries the lack of skillful doctors and lack of knowledge about tumors makes it really challenging and time-consuming to generate reports from MRI'. So, an automated system on Cloud can solve this problem.

Criteria for success
The objective of this project is to classify whether a patient has a brain tumor or not by using deep neural networks. The main criteria will be to have a high recall value so that there are minimum false negatives and maximum true positive rates. Accurately identifying the tumor in the initial stage will have a chance to get proper treatment, and finally will save lives.

Scope of solution space
The main aim of this project is to build a classifier model by using Convolutional Neural Network which will be used by Doctors, Hospitals, and Diagnostics Centers for their MRI examination report to identify tumors more accurately.

Constraints
The dataset contains only seven thousand images of four different tumor types. For deep learning projects the volume of data is the main key for model performance because the neural network will fetch more features as the size of the dataset increases. Also, the dataset contains RGB high resolution images. So, more computational resources will be required to properly tune the hyperparameter of the models.

Stakeholders
Doctors, Hospitals, Medical Centers, and Patients.

Data sources
I have collected the data from Kaggle and from other websites, and it contains the MRI images of patient's medical records. The dataset contains four different tumor classes including Glioma Tumor, Meningioma Tumor, Pituitary Tumor, and No-tumor.