**Project: Machine Learning Approach for Brain Tumor Detection and Classification**

**Problem Statement:** Given a set of raw MRI images, correctly detect, classify and label them as benign, malignant and no\_tumor using a machine learning algorithm.

***In the Solution…***

**Folders:**

* **“1.raw\_mri”** folder contains all the raw MRI images that is used to build the model.
* **“2.train\_binary”** and **“3.train\_tumor\_detected”** folders contain processed binary images.
* **“4.input”** folder in turn contains the 3 other folders, namely “benign”, “malignant”, and “no\_tumor”. Where, “benign” folder contains binary MRI images which are of type benign. Same in case of malignant and no\_tumor also.
* **“5.test\_sample”** folder contains raw MRI images which are used for testing the model.
* **“6.test\_binary”** and **“7.test\_tumor\_detected”** folders contain the processed binary images of the raw images present in ‘5.test\_sample’.
* **“model”**: The trained model is saved into this folder.

**Python Files:**

* **“0\_Visualized\_Tumor\_Detection.pynb”**: It visually highlights the tumor for one image at a time.
* **“1\_Pre-Processing.pynb”**: It converts the raw MRI image to binary image.
* **“2\_Feature\_Extraction.pynb”**: Extracts features like 'Contrast', 'Energy', 'Homogeneity', 'Correlation', 'Dissimilarity', 'ASM', 'Area', 'Perimeter', 'Epsilon', 'Is Convex'.
* **“3\_Train\_Model.pynb”**: Train the model using the extracted data.
* **“4\_Test\_Classification.pynb”**: Testing the model performance.

**Other Files:**

* **“data.csv”**: All the extracted features along the class label of the MRI image is stored into the csv file.
* **“rf\_model.pkl”**: Trained Random forest model.