Project Title: Detecting and Diagnosing Brain Trumor MRI Images

Modern health care is becoming concerned with brain illness, and it is in the hospitals that such problems are treated. For example, brain cancer has some serious psychological as well as social impacts on an individual. Most brain diseases can be classified as caused by an abnormal growth of cells, which has actually hampered the brain normal functioning, affecting the health of other vital organs. Most of the aggressive diseases, like glioblastoma species, usually develop from unchecked cell growth and may result in death in the earlier stages of growth in the organism.

Early detection of brain tumors is one of the most vital aspects of treatment in reducing the mortality rate caused by such conditions. Advanced image processing techniques were used in the medical image tumor identification through CT and MRI scans. During acoustic preprocessing, noise and artifacts are eliminated in image enhancement.

This model employs high-tech deep learning methods like the Support Vector Machines and Convolutional Neural Networks in the effective detection and diagnosis of brain tumors. Evaluation of all performance with such models will be made with respect to several metrics including accuracy, recall, loss, and area under curve (AUC).

The future aspiration of this effort is to build up an intelligent system that makes it possible for medical practitioners to efficiently discover brain tumors in MRI images. Incorporating technology into medical diagnostics will enhance early detection and perhaps also offer a better prognosis outcome, if not save lives.

Objective and Scope:

Objective:

This project aims to develop a reliable and efficient system that will be able to detect and diagnose brain tumors, given MRI images using advanced deep learning techniques. The project highly emphasizes early detection of brain tumors that would reduce mortality due to brain tumors and improve treatment outcomes.

Scope:

- **Data Collection:** The collection of a large amount of MRI and CT scan images from several hospitals became the base of the dataset.

- **Data Preprocessing:** Improvement or Enhance the quality of images by eliminating noise and adjusting contrast so that analysing accuracy is ensured.

- **Model Development:** The model shall build and train using advanced deep learning techniques such as Convolutional Neural Networks (CNN) and Support Vector Machines (SVM) techniques for tumor detection and classification.

- **Data Validation:** Divide the data into training, validation, and testing subsets for ensuring fair evaluation and unbiased results.

- **Performance Evaluation:** Validate the models using various metrics, such as accuracy, recall, loss, and area under curve (AUC), to consider reliability and effectiveness.

- **Impact:** Provide an artifact for identifying early brain tumors by medical professionals to eliminate diagnostic errors in patients and improve outcome.