MRI-Based Brain Tumor Detection

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Abstract

Detecting brain tumors in their early stages is crucial. Brain tumors are classified by biopsy, which can only be performed through definitive brain surgery. Computational intelligence-oriented techniques can help physicians identify and classify brain tumors. Herein, I want to use deep learning methods and machine learning approaches for diagnosing types of tumor, using MRI brain images to enable to detect with high accuracy tumors in early stages.

Project Steps

1. Understanding Tumor Formation

- Provide a comprehensive explanation of how tumors form in the brain, exploring the biological processes involved.

2. Role of MRI Images in Tumor Detection

- Elaborate on the significance of MRI (Magnetic Resonance Imaging) in visualizing brain structures.
- Explain how specific characteristics in MRI images can be indicative of the presence of tumors.

3. Explain And Implementation of Deep Learning and Machine Learning Models

- Outline the steps involved in implementing deep learning and machine learning models for tumor detection.
- Detail the choice of algorithms and methodologies, emphasizing their suitability for medical image analysis.

4. Model Training and Evaluation

- Describe the training process of the implemented models using the prepared dataset.
- Detail the metrics and criteria used for evaluating the performance of the models.

5. Results Visualization

- Showcase the results obtained from the trained models through effective visualization techniques.
- Emphasize the accuracy, sensitivity, and specificity achieved in tumor detection.