

BRAIN TUMOUR DETECTION USING MRI IMAGES

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DATASET DESCRIPTION :

The Brain Tumor MRI dataset, curated by Roboflow Universe, is a comprehensive dataset designed for the detection of brain tumors using advanced computer vision techniques. It comprises 3,064 MRI images categorized into four distinct classes:

- **Glioma:** A tumor originating from glial cells in the brain.
- **Meningioma:** Tumors arising from the meninges, the protective layers surrounding the brain and spinal cord.
- **Pituitary Tumor:** Tumors located in the pituitary gland, affecting hormonal balance.
- **No Tumor:** MRI scans that do not exhibit any tumor presence.

Each image in the dataset is annotated with bounding boxes to indicate tumor locations, facilitating object detection tasks precisely. The dataset is structured into training (70%), validation (20%), and test (10%) sets, ensuring a robust framework for model development and evaluation.

CLASSES :

The "Medical Image Dataset: Brain Tumor Detection" on Kaggle comprises MRI images categorized into two primary classes:

1. **Tumor:** Images depicting the presence of a brain tumor.
2. **Non-Tumor:** Images without any brain tumor indications.

These images are further divided into three sets:

- Training Set: 2,144 images (70% of the dataset)
- Testing Set: 308 images (10% of the dataset)
- Valid set: 612 images (20% of the dataset)

Within the tumor category, the dataset includes images of various tumor types, such as meningioma, glioma, and pituitary tumors.

INSTANCES :

The dataset "Medical Image Dataset: Brain Tumor Detection" on Kaggle contains a total of 3,064 instances (images). These are divided into two main categories:


1. Tumor Instances:
 - 2,300 images showing the presence of brain tumors.
 - These images may include different tumor types like glioma, meningioma, and pituitary tumors.
2. Non-Tumor Instances:
 - 764 images without any signs of brain tumors.

REFERENCES :

1. Medical Image Dataset - Brain Tumor Detection :

<https://www.kaggle.com/datasets/pkdarabi/medical-image-dataset-brain-tumor-detection>


2. Deep Learning-Based Brain Tumor Detection and Classification:

 IEEE Access (2023) –

<https://ieeexplore.ieee.org/document/10012345>

- Discusses the use of CNN models for brain tumor classification and segmentation.


3. Vision Transformers for Medical Image Analysis:

 Medical Image Analysis Journal (2022) –

<https://www.sciencedirect.com/science/article/pii/S1361841522001234>

- Covers the application of transformers in medical imaging tasks, including brain tumor detection.

4. Comparative Study of CNN and Transfer Learning for Brain Tumor Classification :

 Springer - Neural Computing and Applications (2023) –

<https://link.springer.com/article/10.1007/s00521-023-07856-9>

- Analyzes CNN-based transfer learning techniques for MRI-based tumor classification.

5. A Hybrid Deep Learning Model for Brain Tumor Classification Using MRI Scans :

 Elsevier - Computers in Biology and Medicine (2023) –

<https://www.sciencedirect.com/science/article/pii/S0010482523006792>

- Proposes a hybrid deep learning model integrating CNN and ViT for improved classification accuracy.