Overview

The aim of this project is to build a machine learning model capable of detecting the presence of a brain tumor from medical images (such as MRI scans). The notebook outlines:

- Data preparation and visualization
- Feature extraction from medical images
- Machine learning model training and evaluation

Installation

To run the notebook and reproduce the results, you will need to install the following dependencies:

- Python 3.x
- Jupyter Notebook
- pandas
- numpy
- scikit-learn
- matplotlib
- seaborn
- OpenCV (for image processing)
- TensorFlow/Keras (if using deep learning models)

Dataset

The dataset used in this project contains medical images (e.g., MRI scans) labeled to indicate the presence or absence of a brain tumor. Some of the key features include:

- `Image`: MRI scan of the brain.
- `Label`: Binary label (1 for tumor present, 0 for no tumor).

Preprocessing

- **Image Resizing**: Resizing images to a consistent size.
- **Normalization**: Scaling pixel values for better model performance.

Modeling

The notebook demonstrates several machine learning approaches:

1. **Image Preprocessing**: Using OpenCV to preprocess MRI images for model training.
2. **Feature Extraction**: Extracting key features from the images to use in model training.

3. **Model Selection**: Training models such as Convolutional Neural Networks (CNN), Random Forest, and Support Vector Machines (SVM).
4. **Model Evaluation**: Evaluating model performance using metrics like accuracy, precision, recall, and F1 score.

Results

The best-performing model in this project is [Model Name] with the following metrics:

- **Accuracy**: X
- **Precision**: Y
- **Recall**: Z
- **F1 Score**: W

Contributing

Contributions are welcome! Feel free to open an issue or submit a pull request to improve the project.