This is documentation for Brain Tumor Segmentation Project

Names of all files used in this project

1. Config.py
2. Dataset.py
3. Feature_extraction.py
4. Inference.py
5. Loss.py
6. Main.py
7. Process_dataset.py
8. Trainer.py
9. Unet_model.py
10. Visualize_results.py
11. Segmenation_notebook.ipynb

Config.py

In this file we created Config class in which we set all global variables and parameters.

Dataset.py

In this file we created two classes:

- **DatasetCreator**:
  - This class is responsible for splitting our dataset (images and masks) into test and train sets
- **TumorDataset**:
  - This class is responsible for creating datasets for testing and training from test and train sets

Feature_extraction.py

This file has one function “extract_features” which takes image and mask, and finds features

Perimeter

- Area
- Radius
- Diameter

- Circularity
- Eccentricity
- texture_features

Inference.py

This file consists of one function “inference” which loads images from inference folder and does inference on all images, saves results in combined_image_mask folder.

Loss.py

This file has two class:

- **BCEDiceLoss**:
  - This class is used to calculate loss binary_cross_entropy + dice_loss, we used it in our training.
- **DiceLoss**:
  - This class is used to calculate dice_loss, we used it in validation.

Main.py

This file creates two folders in which model weights are to be stored during training process, and trains segmentation model.

Process_dataset.py

This file has three functions

- **Makedir**:
  - Creates directory (folder)
- **Unzip**:
  - Unzips zip file(s)
- **Convert_matfiles_to_images**:
  - Extracts images and masks from matfiles

Trainer.py

This file has a class of Trainer

- **constrcutor** provides model with best weights, loss funtions, and device
- **setup_training_env()**, the setup for the training prepares eg dataset, dataloaders and optimizer
- **train_fn(),** trains the model and saves best weights and optimizer
- **save_results_to_csv()**, saves history in csv file

Unet_model.py

This file has four helper classes

- DoubleConv
- Down
- Up
- OutConv

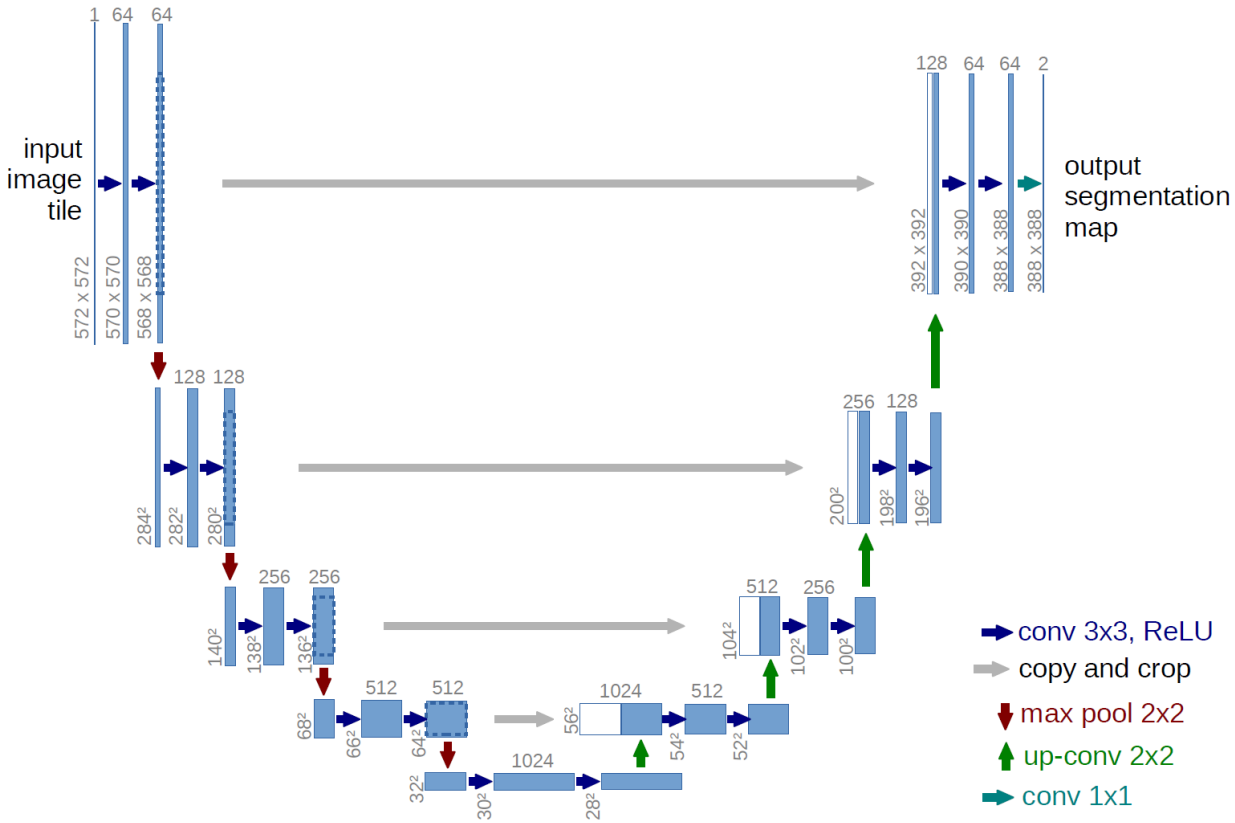
These classes are used in Unet class to make Unet segmentation model

Visualize_results.py

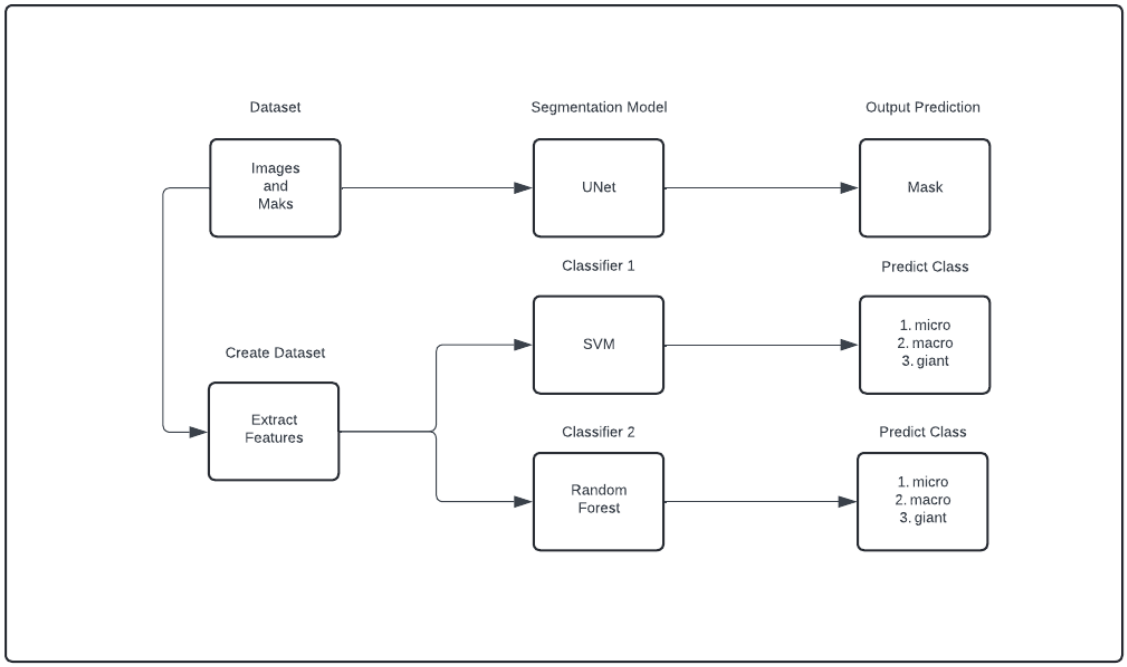
This file has a function plot_loss which is used to visualize training matrices

Segmenation_notebook.ipynb

Flow of running files + full pipeline for inference is available in this notebook



Trainiing



Full Inferenc Pipeline