**Project Structure**

Please organize your dataset in a folder named dataset, with each class stored in its own subfolder. The general structure should look like this:

project\_root/

├── dataset/

│ ├── class\_1/

│ ├── class\_2/

│ └── ...

├── classifier\_training.py # Script for training the model

├── tune.py # Script for hyperparameter tuning

├── predict.py # Script for making predictions

├── classifier\_model.pth # Saved trained model

└── requirements.txt # Required Python packages

**Necessary Installations**

All required packages are listed in the requirements.txt file. Install them using the following command:

**pip install -r requirements.txt**

**Training the Model**

To train the classifier, simply run the classifier\_training.py script:

**python classifier\_training.py**

The script uses optimized default parameters based on prior hyperparameter tuning.

**Hyperparameter Tuning**

To reproduce the hyperparameter tuning process, run the tune.py script:

**python tune.py**

Ensure that tune.py is in the same directory as classifier\_training.py, as it relies on this file for model training during the tuning process.

**Making Predictions**

To generate predictions on new images, execute the predict.py script from the command line:

**python predict.py**

You can specify the model you’d like to use by providing the appropriate .pth file. For our trained model, please use classifier\_model.pth.