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Parameters to be set:

Adapt the config.py file and set the PROJECT_ROOT and DATASET_PATH constants.

Commands for model training:

Run the following commands:

```
$ python ./split_data.py
```

```
$ python ./task2.py
```

```
$ python ./task3.py
```

what py-file to run the reproduction routine using the final model:

Download the final models here: https://download-directory.github.io/?url=https://github.com/luca-heitmann/data-science-courses/tree/main/deep-learning/vorleistung/final_results

Extract the archive, rename the directory to „final_results“ and put it into the PROJECT_ROOT directory.

Copy the „logits.pt“ and „logits.csv“ files from the final model (e.g. final_results/2025-12-20_20-26-13-task2-results) to PROJECT_ROOT/reproduction

For task 3 reproduction: If a different model is used to verify the logits, adapt REPRODUCTION_MODEL_PATH in config.py to the path of the model.pkl file.

Run the following command:

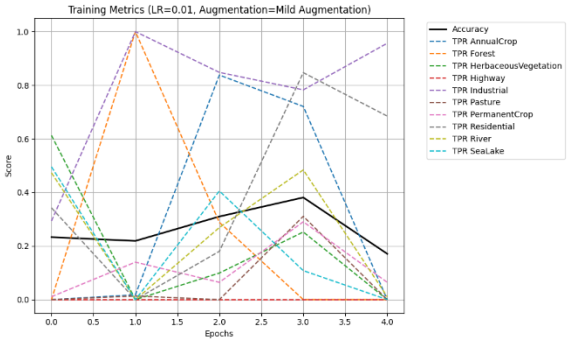
```
$ python ./task2_reproduction.py
```

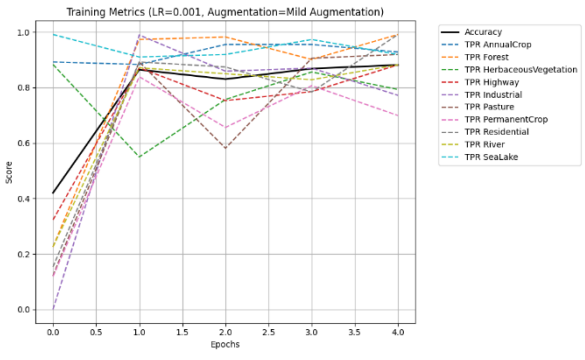
what py-file to run to compute the prediction on the test data using the final model:

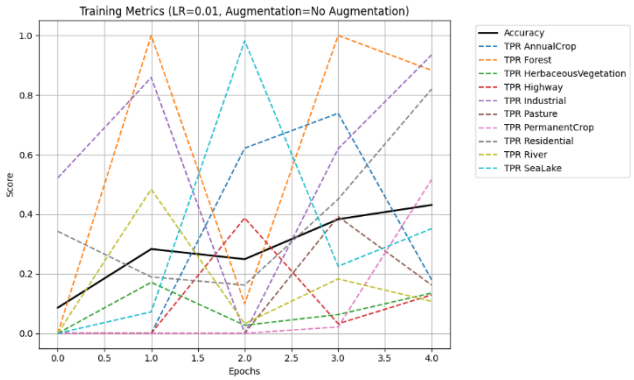
Run the following command:

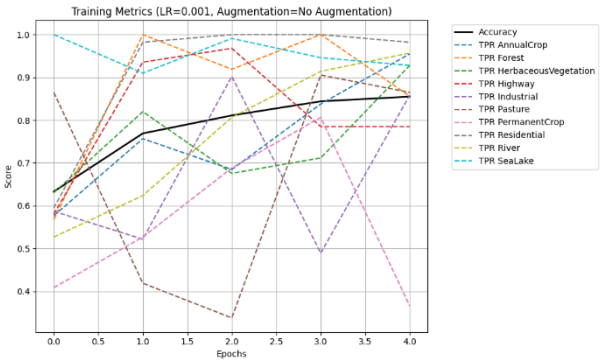
```
$ python ./task2_reproduction.py --generate-logits
```

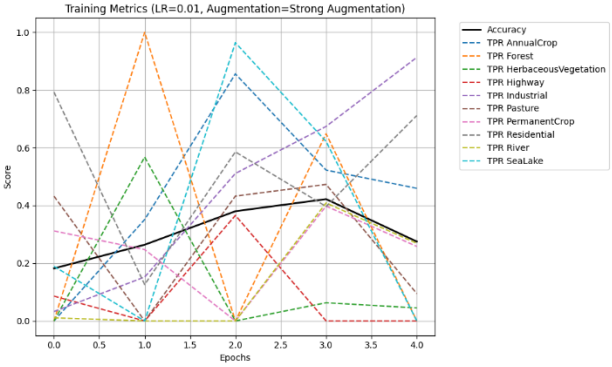
it shows the validation performance graphs and the final performance number on test data using the saved selected model:

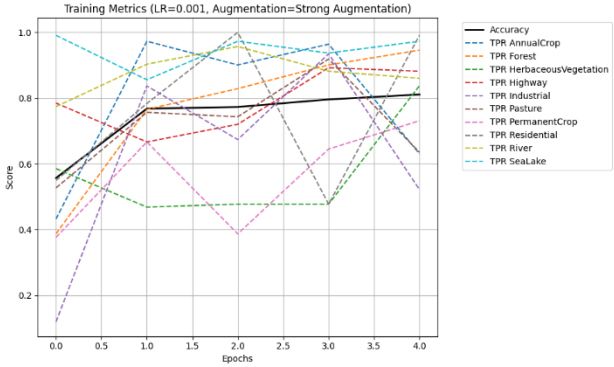













```
Final Result: val_acc=0.8810, test_acc=0.8735

Class                 TPR
AnnualCrop          : 0.9505
Forest              : 0.9865
HerbaceousVegetation  : 0.7523
Highway             : 0.8108
Industrial          : 0.7838
Pasture             : 0.9392
PermanentCrop       : 0.7351
Residential         : 0.9686
River               : 0.8919
SeaLake             : 0.8919

Best Hyperparameter: LR=0.001
Best Augmentation: Mild Augmentation
Num Epochs: 5
Batch Size: 32
All Hyperparameters: LR=[0.001, 0.01]
All Augmentations: dict_keys(['Strong Augmentation', 'Mild Augmentation', 'No Augmentation'])
```

Top + Bottom 5 images for 3 Classes:

```
Top 5 Scoring Images for AnnualCrop:
  - EuroSAT_MS/AnnualCrop/AnnualCrop_253.tif
  - EuroSAT_MS/AnnualCrop/AnnualCrop_1904.tif
  - EuroSAT_MS/AnnualCrop/AnnualCrop_1313.tif
  - EuroSAT_MS/AnnualCrop/AnnualCrop_136.tif
  - EuroSAT_MS/AnnualCrop/AnnualCrop_274.tif
Bottom 5 Scoring Images for AnnualCrop:
  - EuroSAT_MS/Industrial/Industrial_740.tif
  - EuroSAT_MS/Highway/Highway_2483.tif
  - EuroSAT_MS/Industrial/Industrial_300.tif
  - EuroSAT_MS/Forest/Forest_309.tif
  - EuroSAT_MS/Industrial/Industrial_1870.tif

Top 5 Scoring Images for Forest:
  - EuroSAT_MS/Forest/Forest_309.tif
  - EuroSAT_MS/Forest/Forest_1811.tif
  - EuroSAT_MS/Forest/Forest_251.tif
  - EuroSAT_MS/Forest/Forest_2411.tif
  - EuroSAT_MS/Forest/Forest_1566.tif
Bottom 5 Scoring Images for Forest:
  - EuroSAT_MS/Residential/Residential_425.tif
  - EuroSAT_MS/Residential/Residential_1767.tif
  - EuroSAT_MS/Residential/Residential_1205.tif
  - EuroSAT_MS/Residential/Residential_1657.tif
  - EuroSAT_MS/Residential/Residential_1658.tif
```

Top 5 Scoring Images for Industrial:
- EuroSAT_MS/Industrial/Industrial_300.tif
- EuroSAT_MS/Industrial/Industrial_1870.tif
- EuroSAT_MS/Industrial/Industrial_1988.tif
- EuroSAT_MS/Industrial/Industrial_740.tif
- EuroSAT_MS/Industrial/Industrial_1206.tif

Bottom 5 Scoring Images for Industrial:
- EuroSAT_MS/SeaLake/SeaLake_2107.tif
- EuroSAT_MS/SeaLake/SeaLake_1482.tif
- EuroSAT_MS/SeaLake/SeaLake_1481.tif
- EuroSAT_MS/SeaLake/SeaLake_360.tif
- EuroSAT_MS/SeaLake/SeaLake_2706.tif