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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:

Only for task 3 reproduction:

1. 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 (e.g. „final_results/2025-12-20_23-14-40-task3-results/model.pkl“)
2. Copy the „logits.pt“ and „logits.csv“ files from the final model (e.g. final_results/2025-12-20_23-14-40-task3-results) to `PROJECT_ROOT/reproduction` (or generate the logits with `python ./task2_reproduction.py --generate-logits`)

Run the following command:

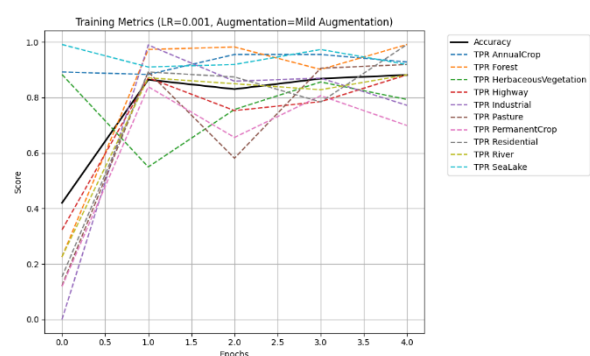
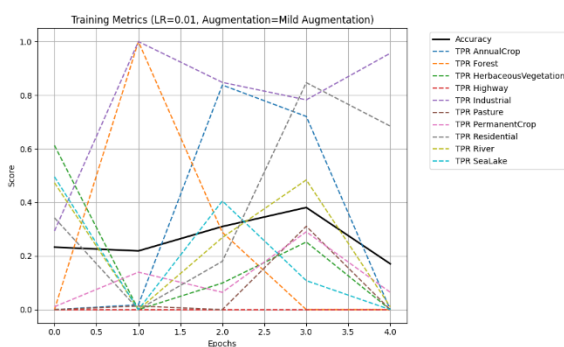
```
$ python ./task2_reproduction.py
```

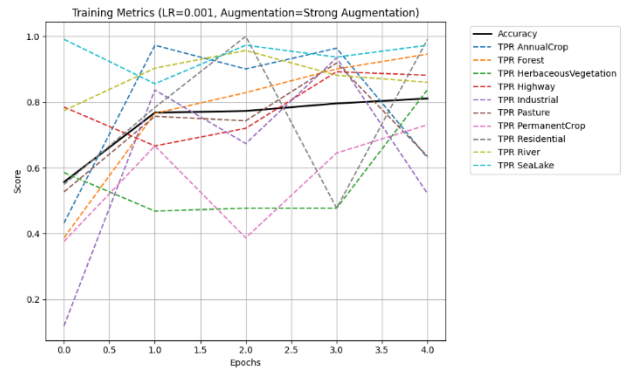
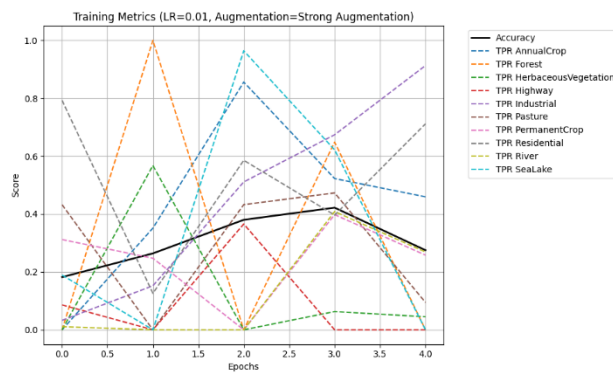
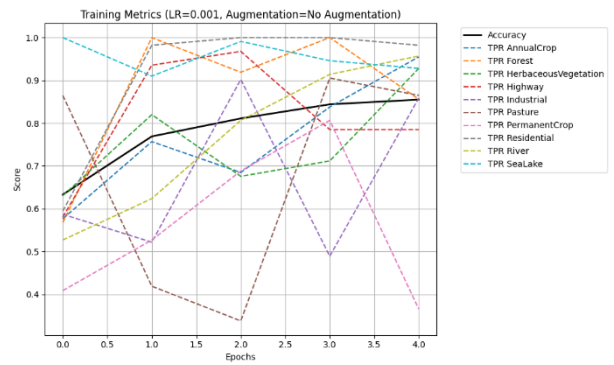
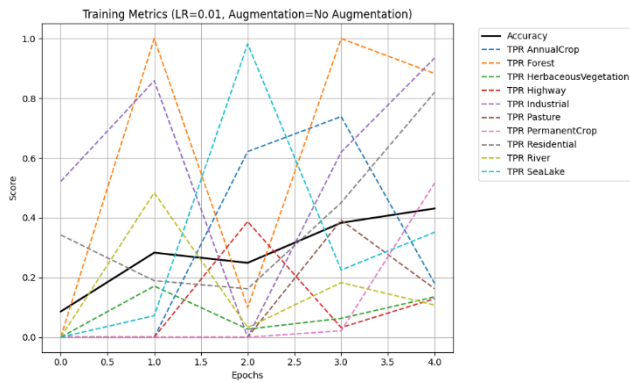
what py-file to run to compute the prediction on the test data using the final model:

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

Final models

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

(also included in the archive in moodle)