



Brain MRI classification

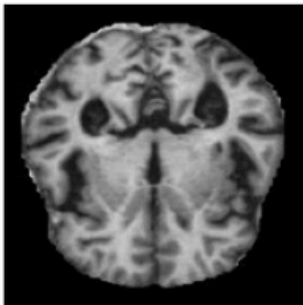
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Nguyen Ba Phi
Varga Krisztián

The task

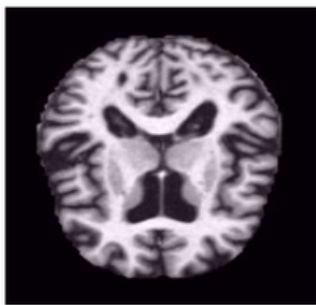
<https://www.kaggle.com/datasets/arjunbasandrai/medical-scan-classification-dataset/data>

- Classify stages of Alzheimer's
- 4 categories:
 - NonDemented,
 - VeryMildDemented,
 - MildDemented,
 - ModerateDemented
- Grayscale images in various sizes
- Dataset of 35k images
- Comparing different convolutional models

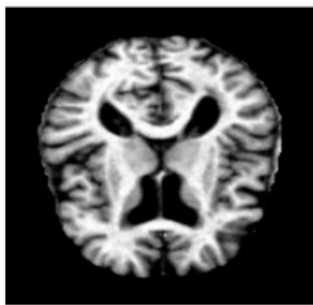
MildDemented



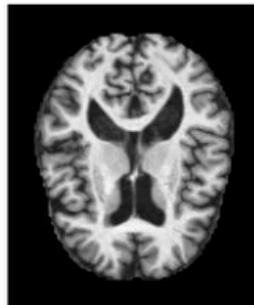
MildDemented



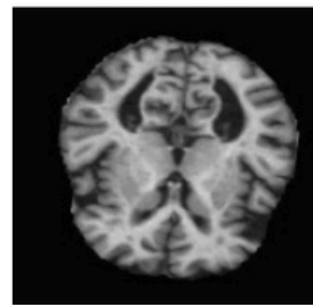
MildDemented



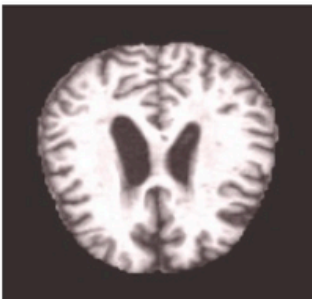
MildDemented



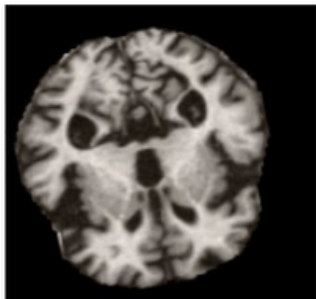
MildDemented



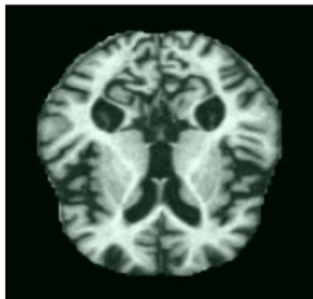
ModerateDemented



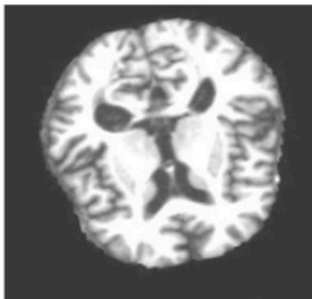
ModerateDemented



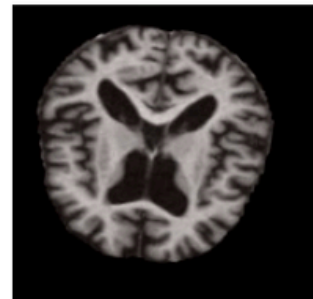
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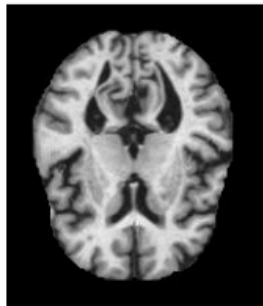
ModerateDemented



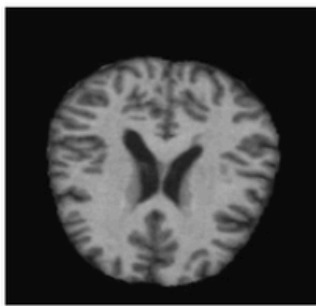
ModerateDemented



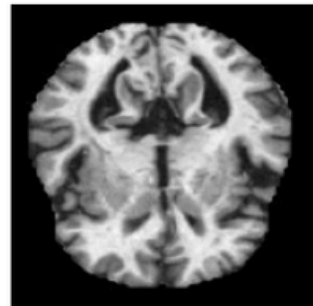
NonDemented



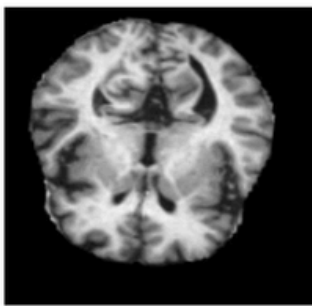
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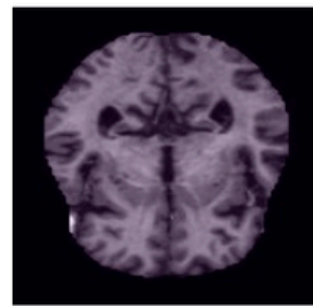
NonDemented



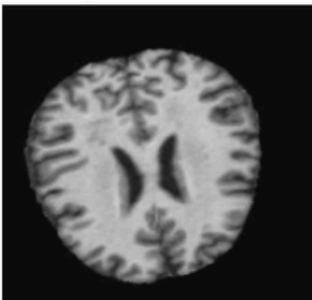
NonDemented



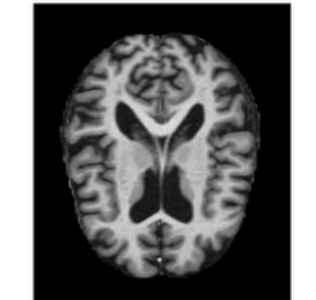
NonDemented



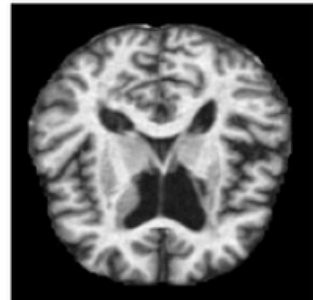
VeryMildDemented



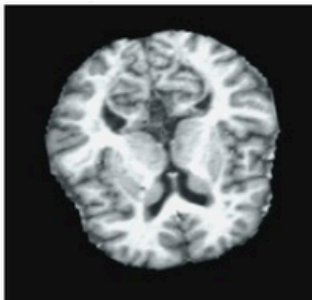
VeryMildDemented



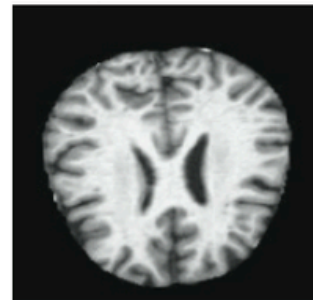
VeryMildDemented



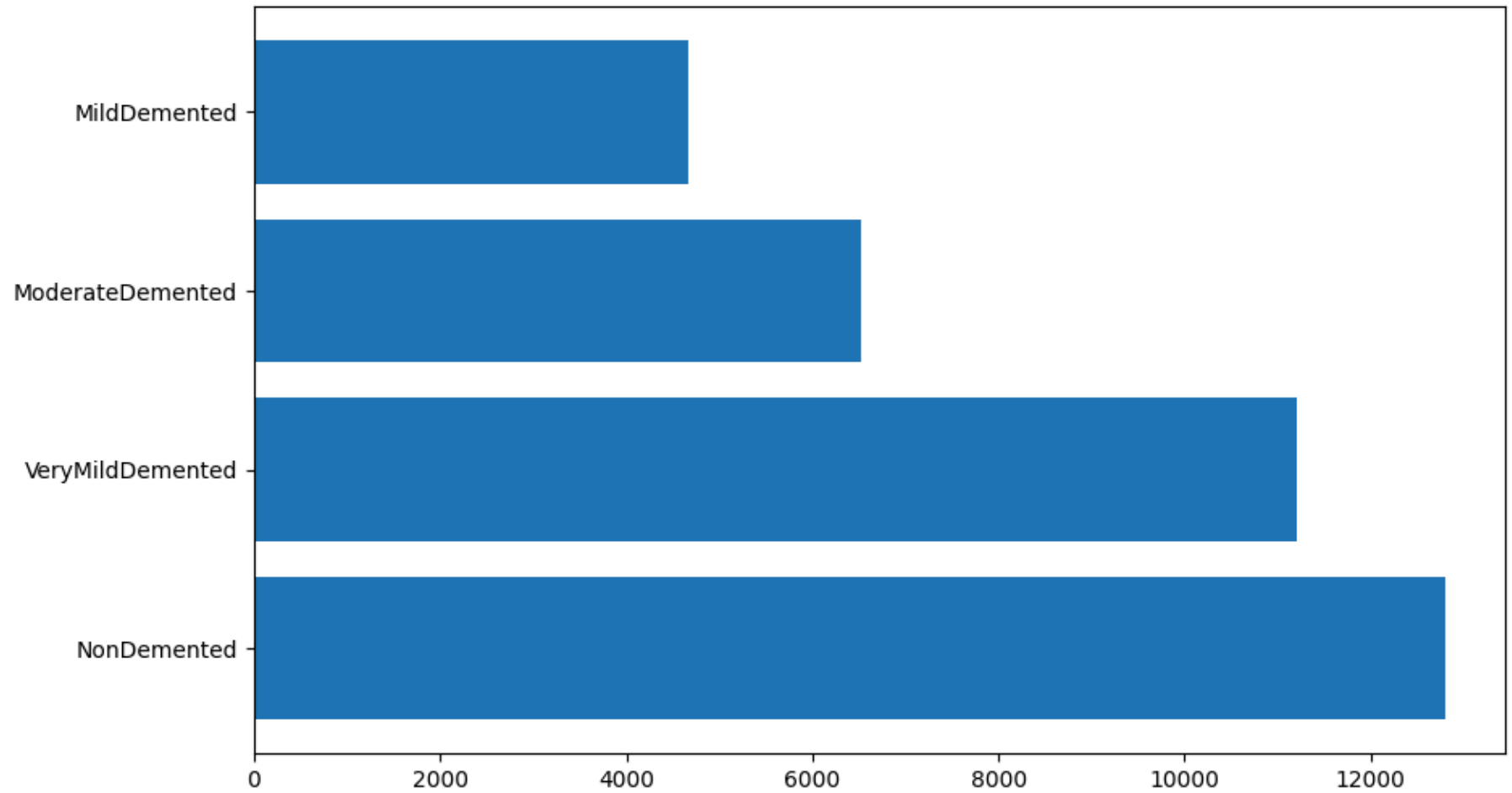
VeryMildDemented



VeryMildDemented



Class distribution





Models

- ResNet50
 - VGG16
 - EfficientNetB0
 - MobileNetV2
-

Hyperparameters

- Batch size: 128 (in the case of VGG bigger batchsize doesn't fit in the memory)
- Number of epochs: 15 (it's very slow)
- Learning rate initially bigger, than smaller
- Adam optimizer
- EarlyStopping

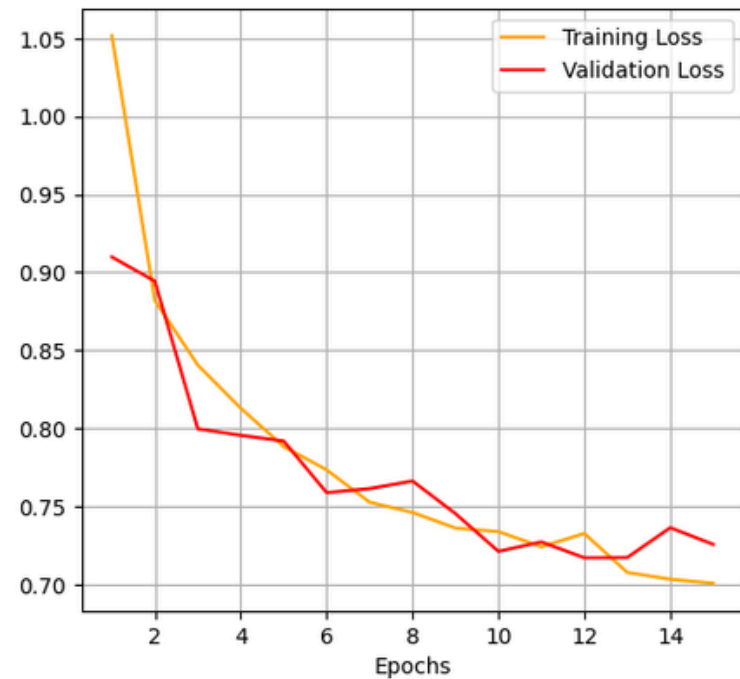
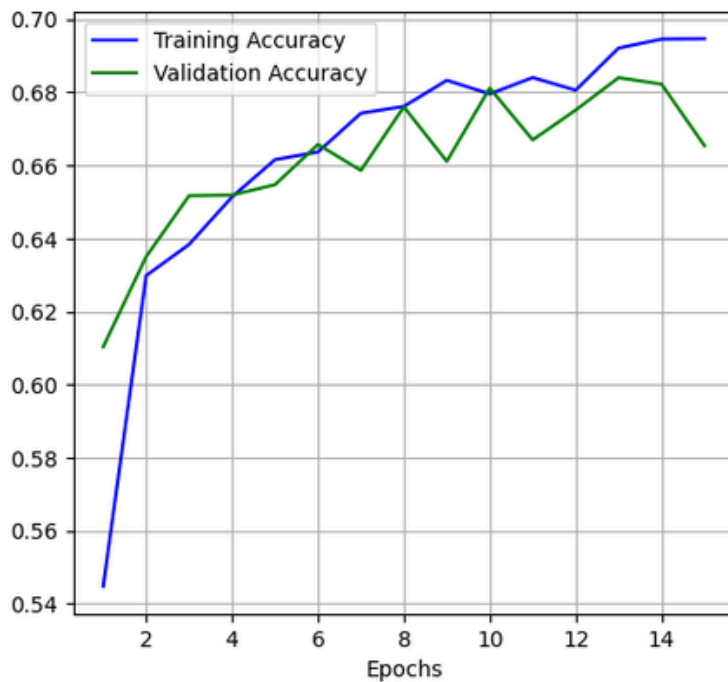
```
num_classes = 4  
learning_rate = 1e-3  
batch_size = 128  
num_epochs = 15
```



ResNet50

- Validation loss: 0.72
- Validation accuracy: 0.675

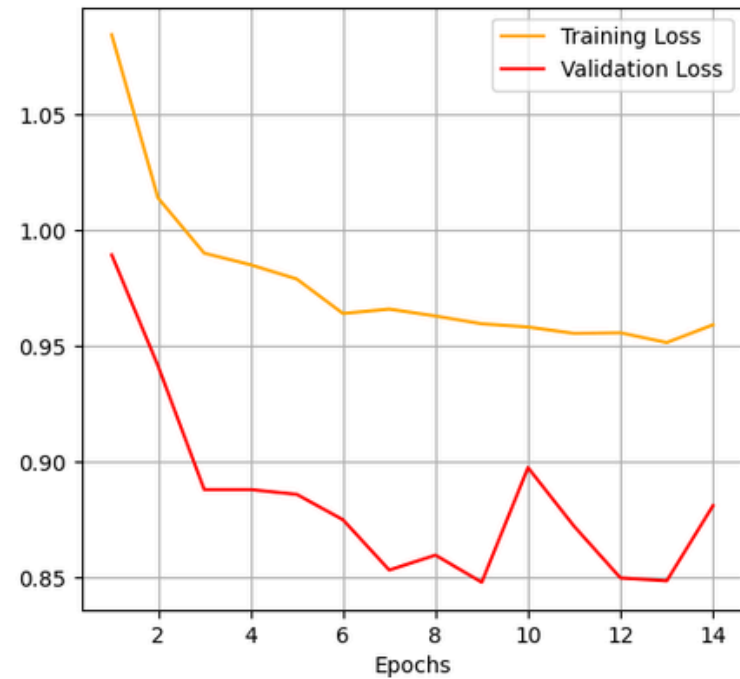
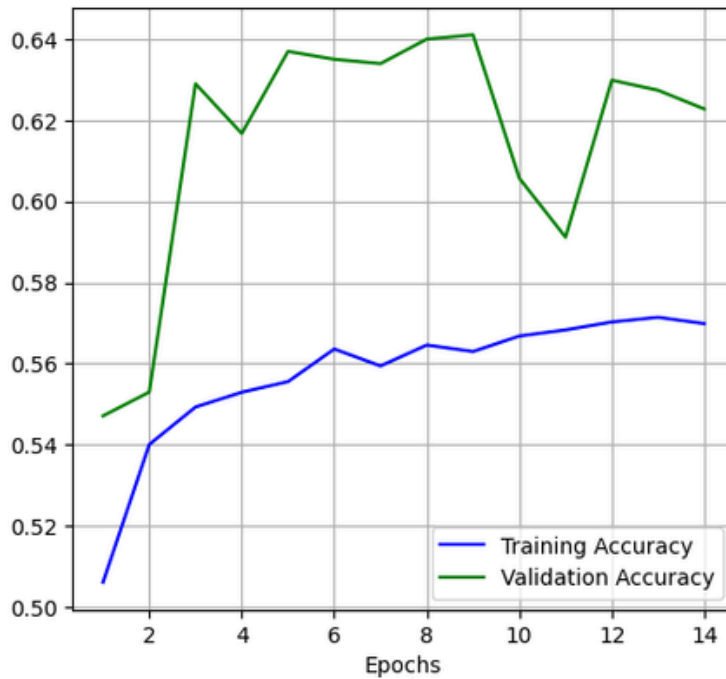
Model Evaluation Metrics



VGG16

- Validation loss: 0.85
- Validation accuracy: 0.64

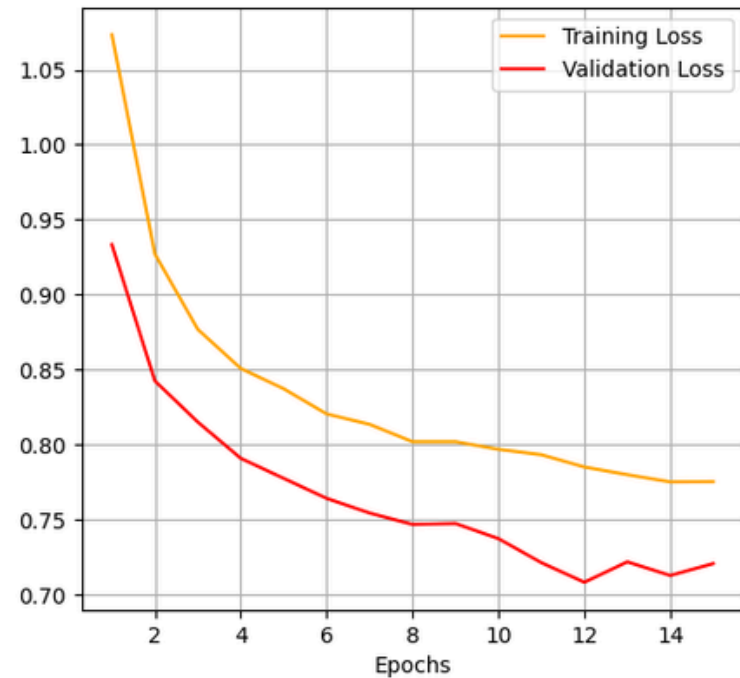
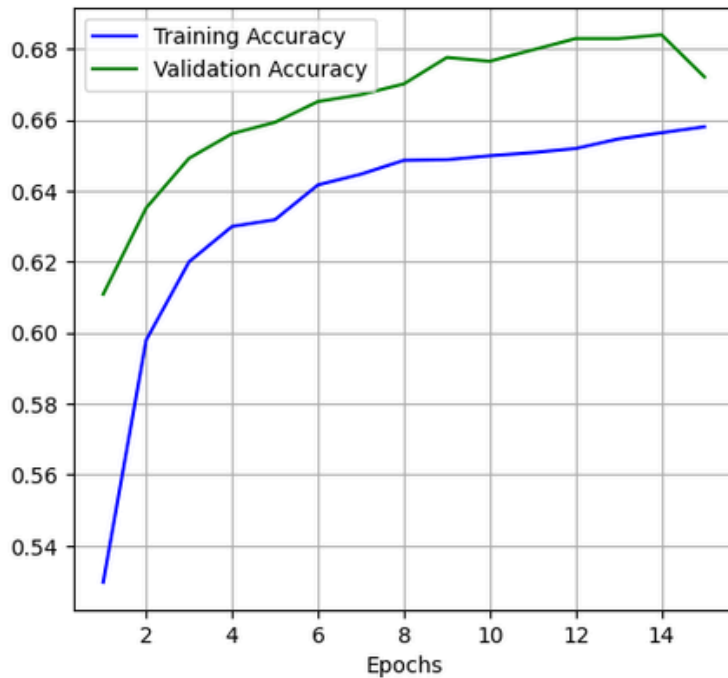
Model Evaluation Metrics



EfficientNetBO

- Validation loss: 0.71
- Validation accuracy: 0.68

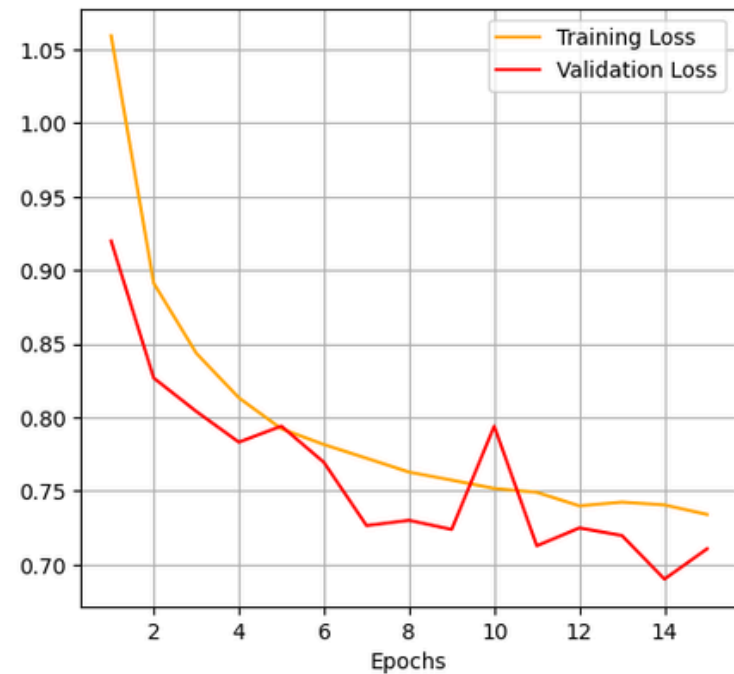
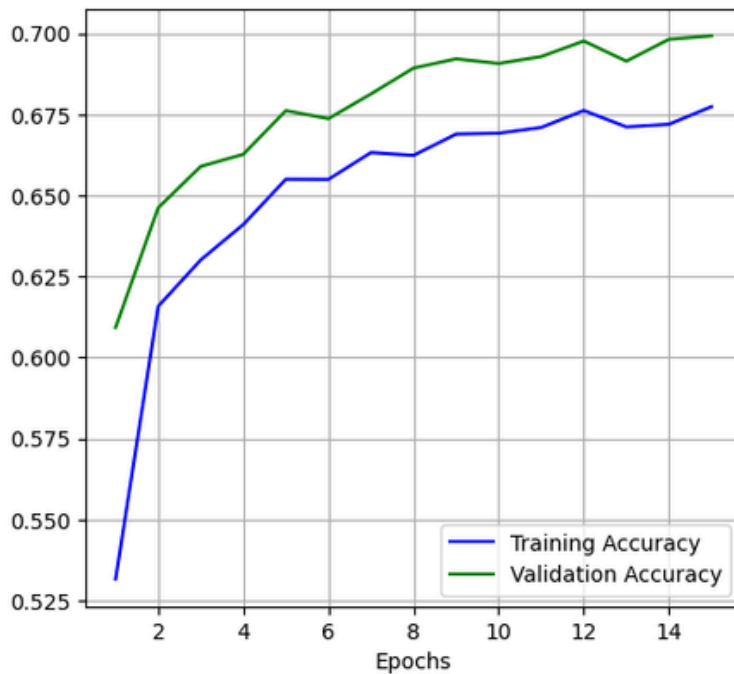
Model Evaluation Metrics



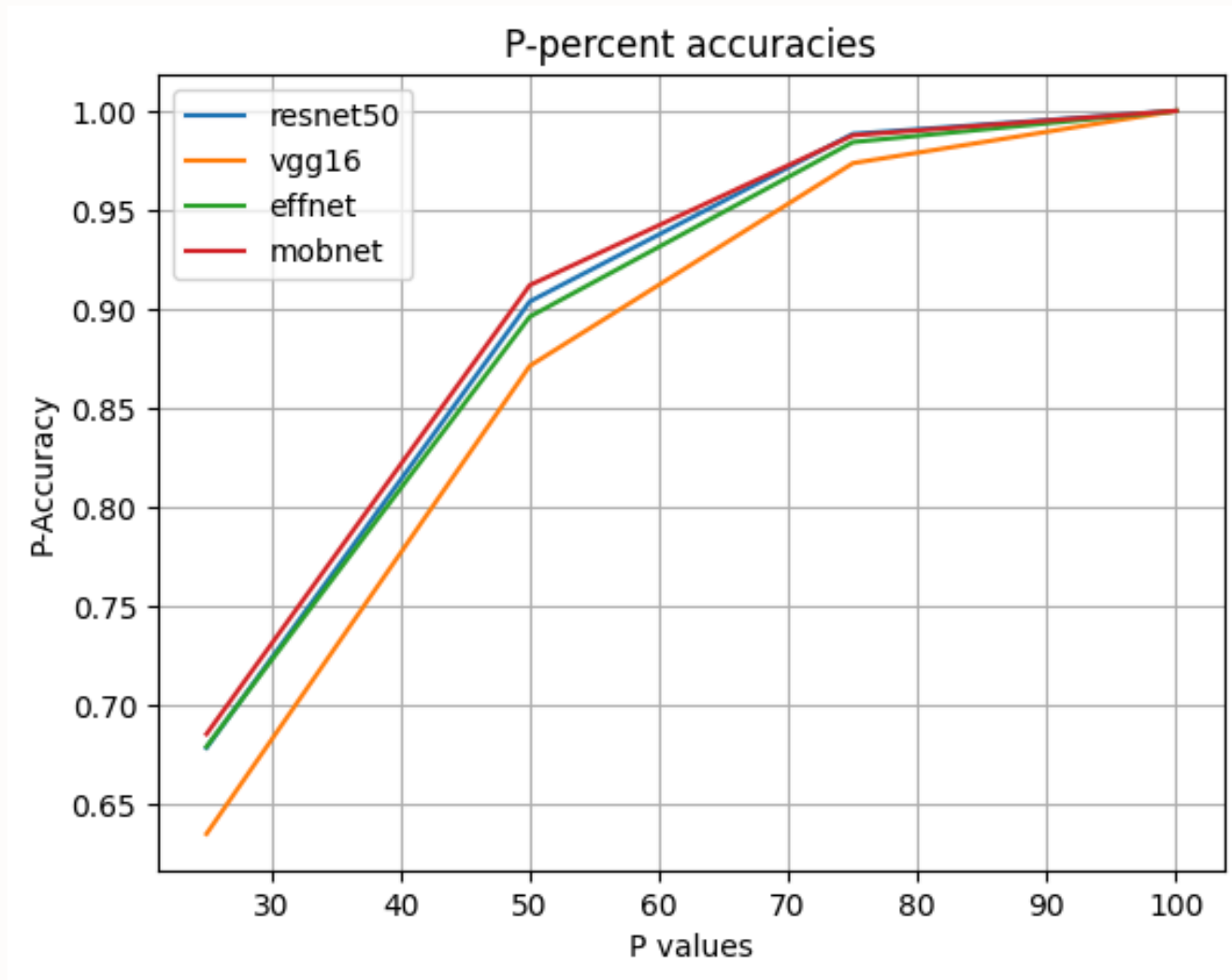
MobileNetV2

- Validation loss: 0.71
- Validation accuracy: 0.7

Model Evaluation Metrics



Evaluation on the test set



Next steps

- Find the best hyperparameters
- Make class sizes equal with augmentation
- Try different models, e. g. transformer
- Write the project paper



Thank you for
your attention!