



Brain MRI classification

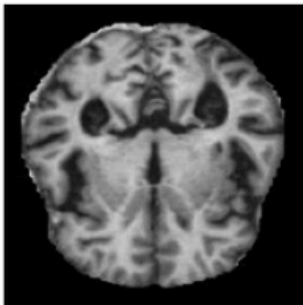
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Nguyen Ba Phi
Varga Krisztián

The task

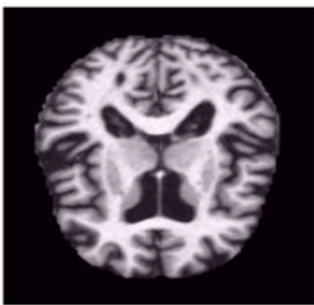
<https://www.kaggle.com/datasets/arjunbasandrai/medical-scan-classification-dataset/data>

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

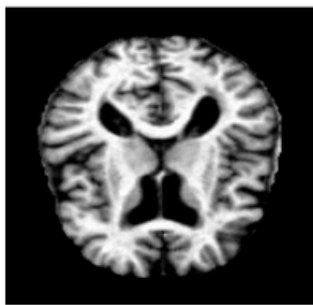
MildDemented



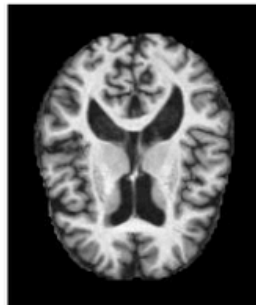
MildDemented



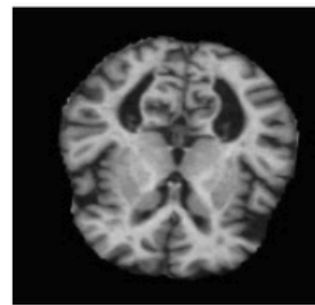
MildDemented



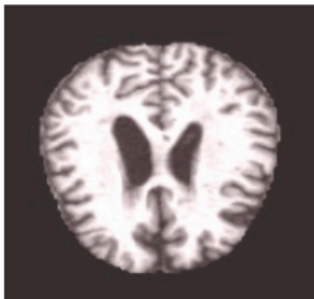
MildDemented



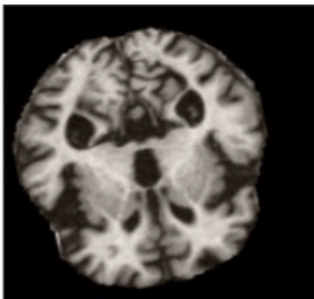
MildDemented



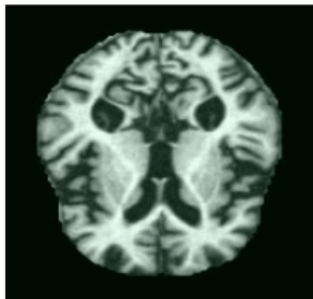
ModerateDemented



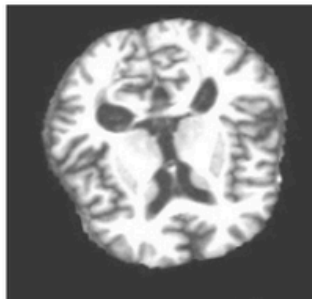
ModerateDemented



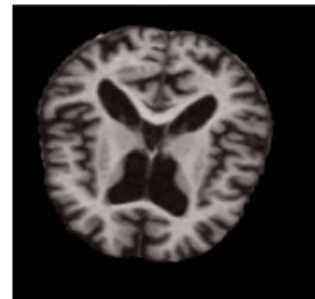
ModerateDemented



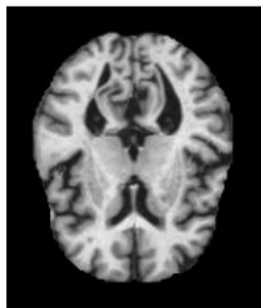
ModerateDemented



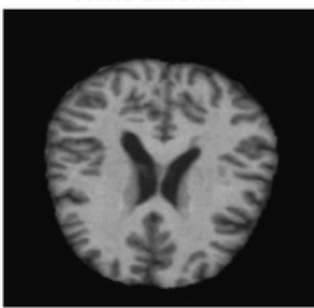
ModerateDemented



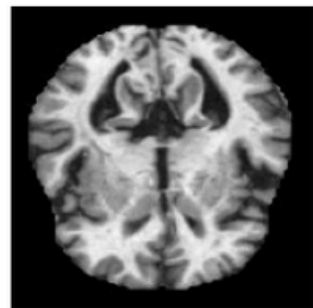
NonDemented



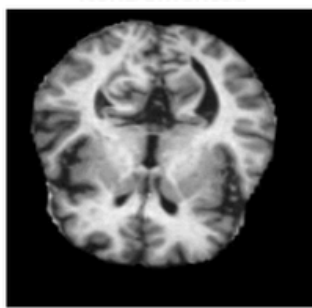
NonDemented



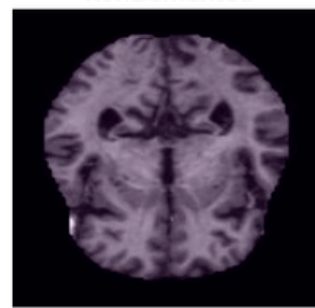
NonDemented



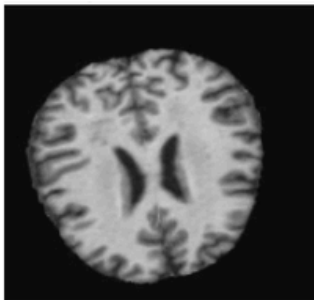
NonDemented



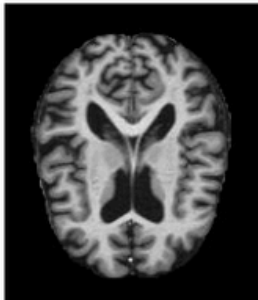
NonDemented



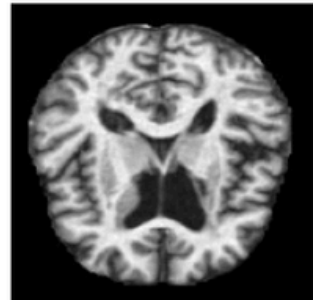
VeryMildDemented



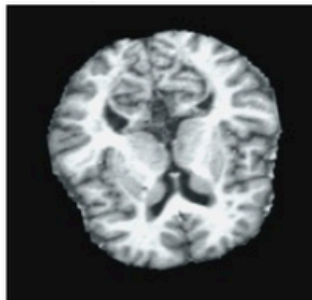
VeryMildDemented



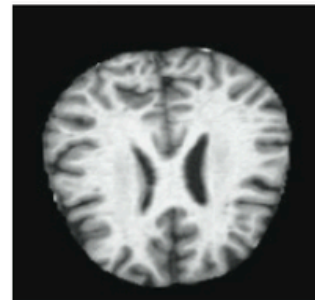
VeryMildDemented



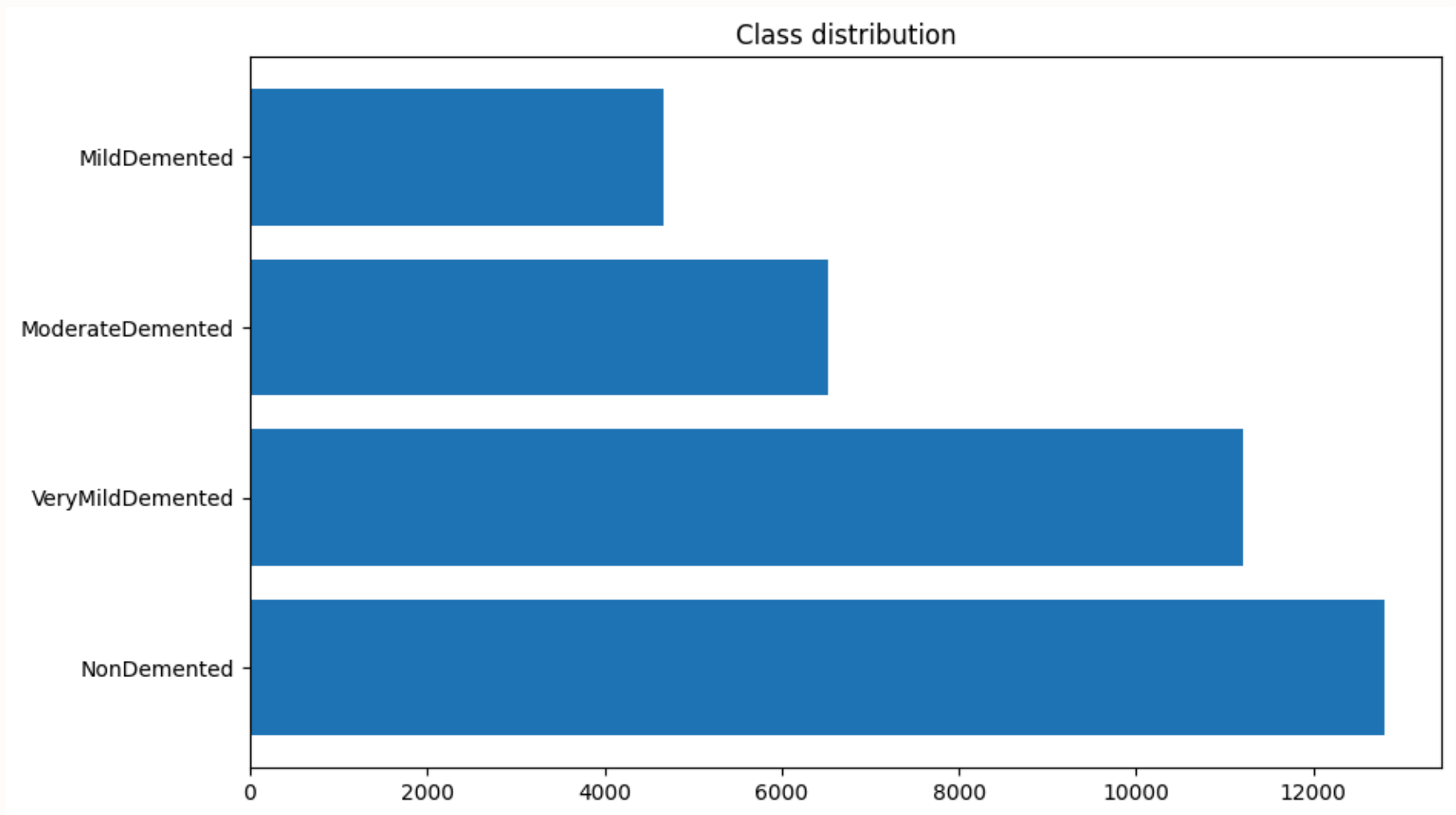
VeryMildDemented



VeryMildDemented



Initial class sizes:



→ Balancing by downsampling the large classes



Models

- ResNet50
- VGG16
- EfficientNetB0
- MobileNetV2

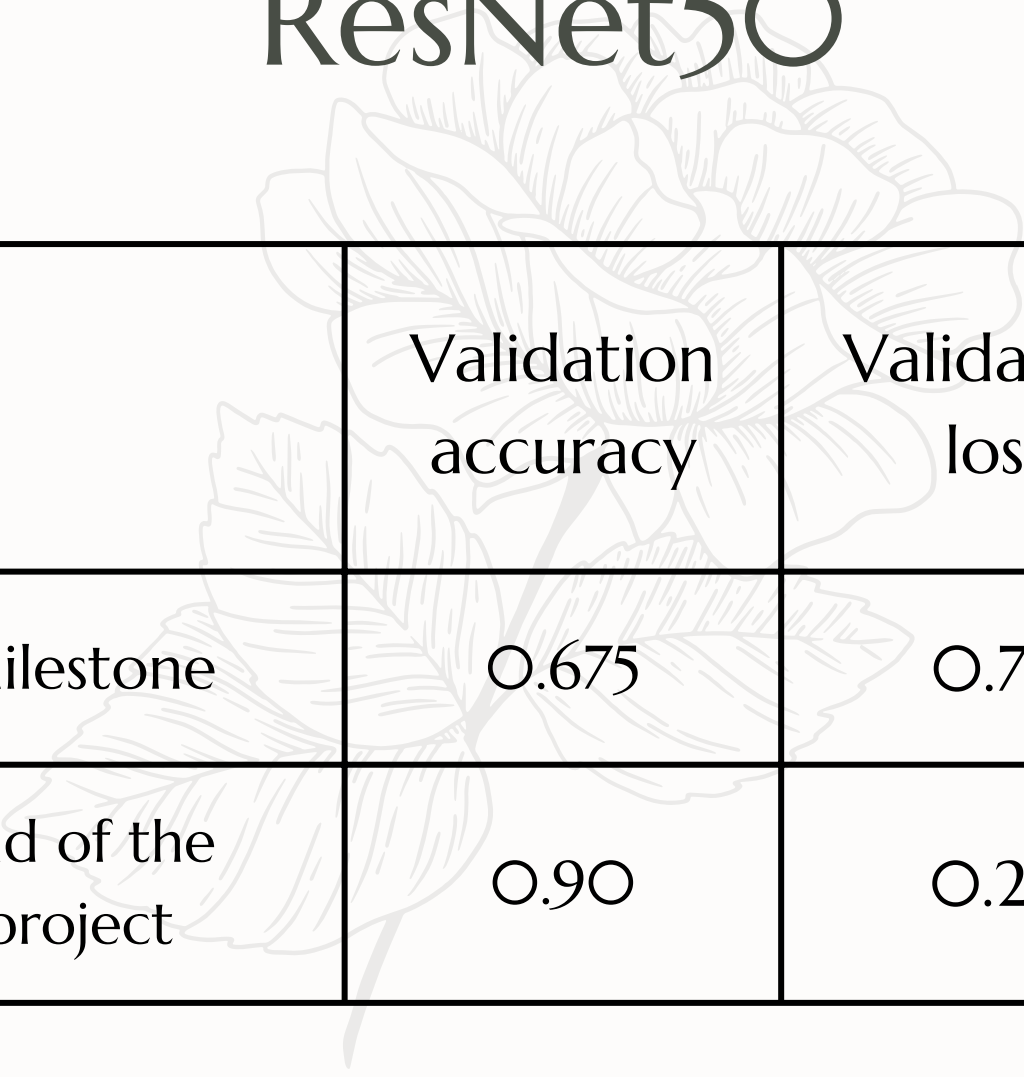
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Hyperparameters

- Batch size: 128
- Number of epochs: 25(with frozen weights)
+5(fine tuning)
- Learning rate initially 0.001
- CosineAnnealingScheduler
- Adam optimizer
- EarlyStopping

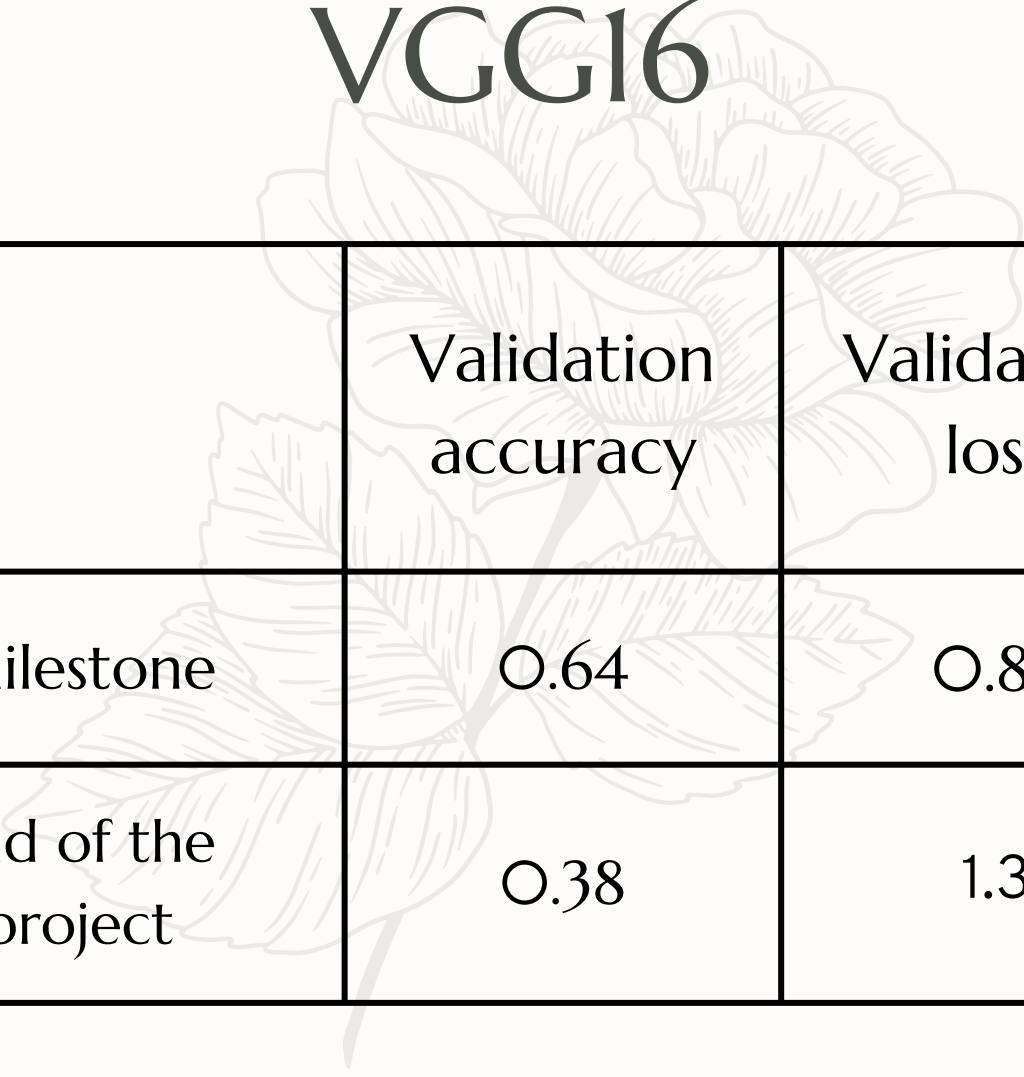


ResNet50



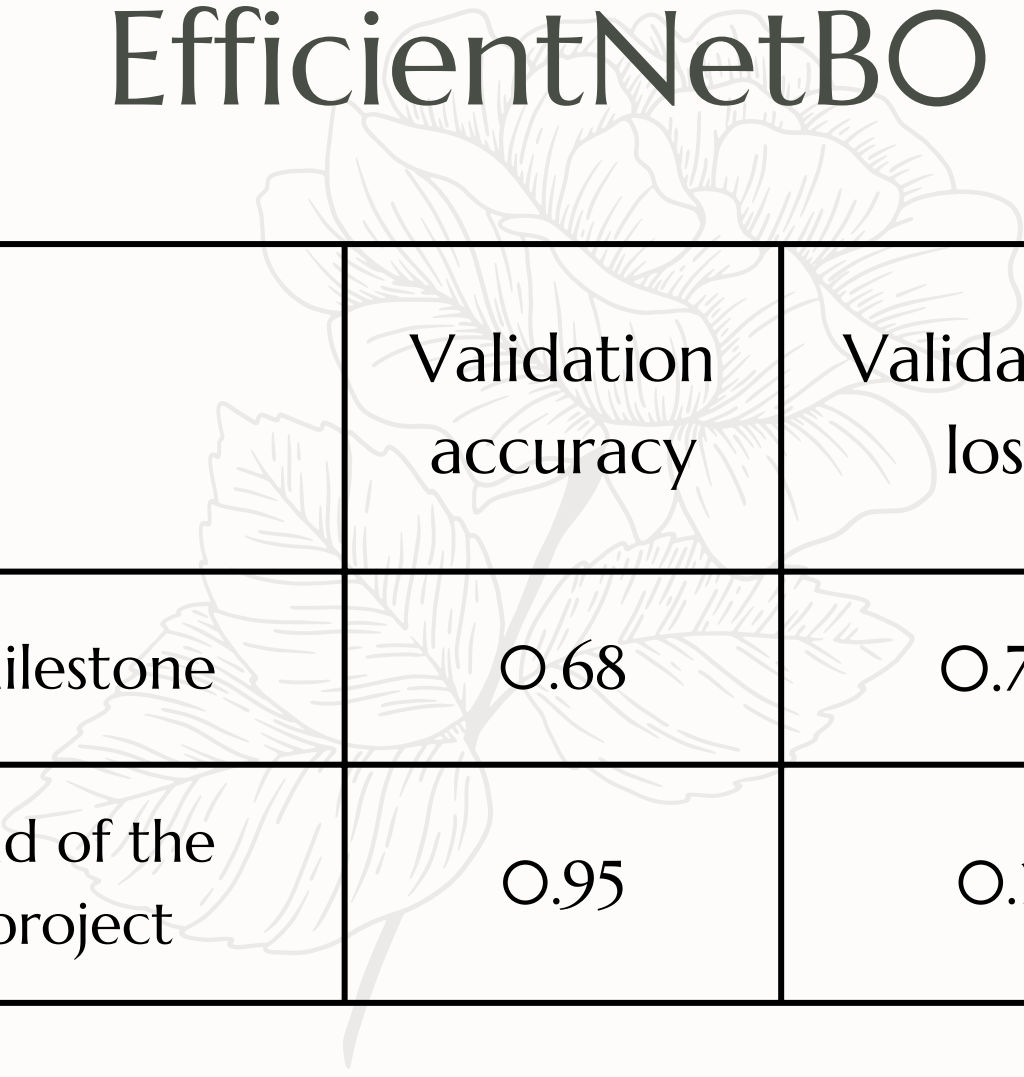
	Validation accuracy	Validation loss
Milestone	0.675	0.72
End of the project	0.90	0.22

VGG16



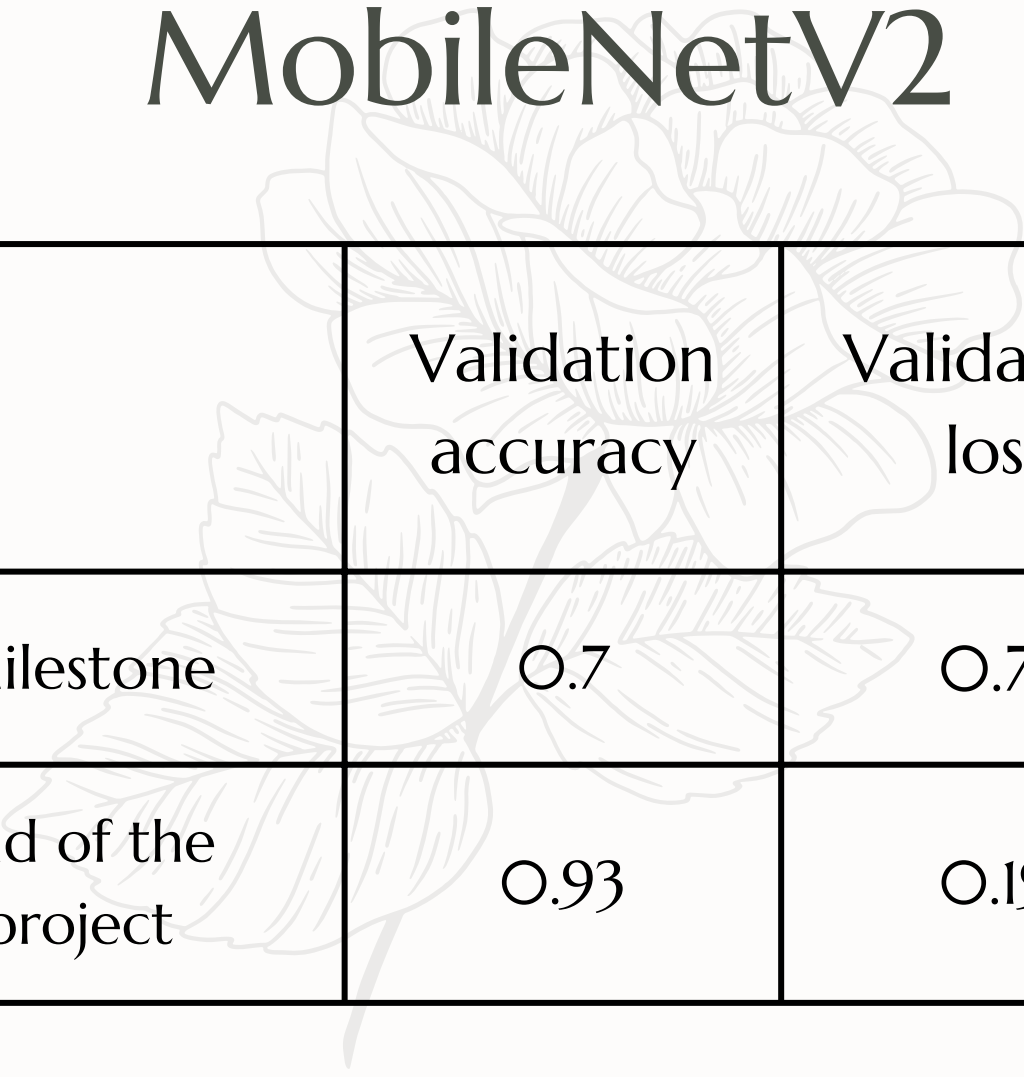
	Validation accuracy	Validation loss
Milestone	0.64	0.85
End of the project	0.38	1.3

EfficientNetBO



	Validation accuracy	Validation loss
Milestone	0.68	0.71
End of the project	0.95	0.1

MobileNetV2

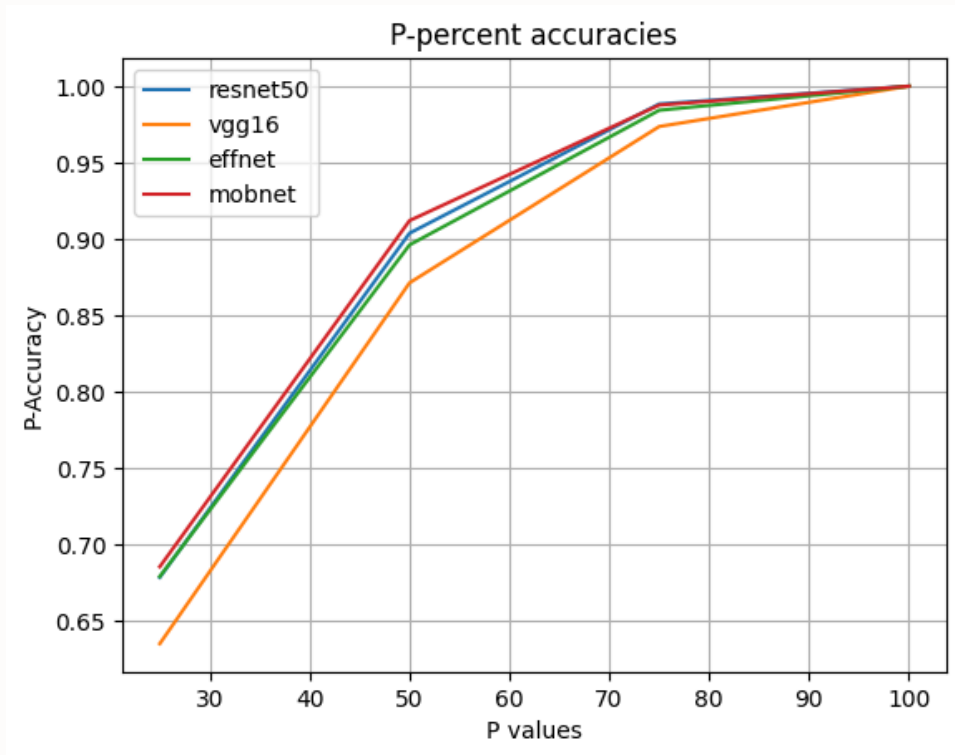


	Validation accuracy	Validation loss
Milestone	0.7	0.71
End of the project	0.93	0.19

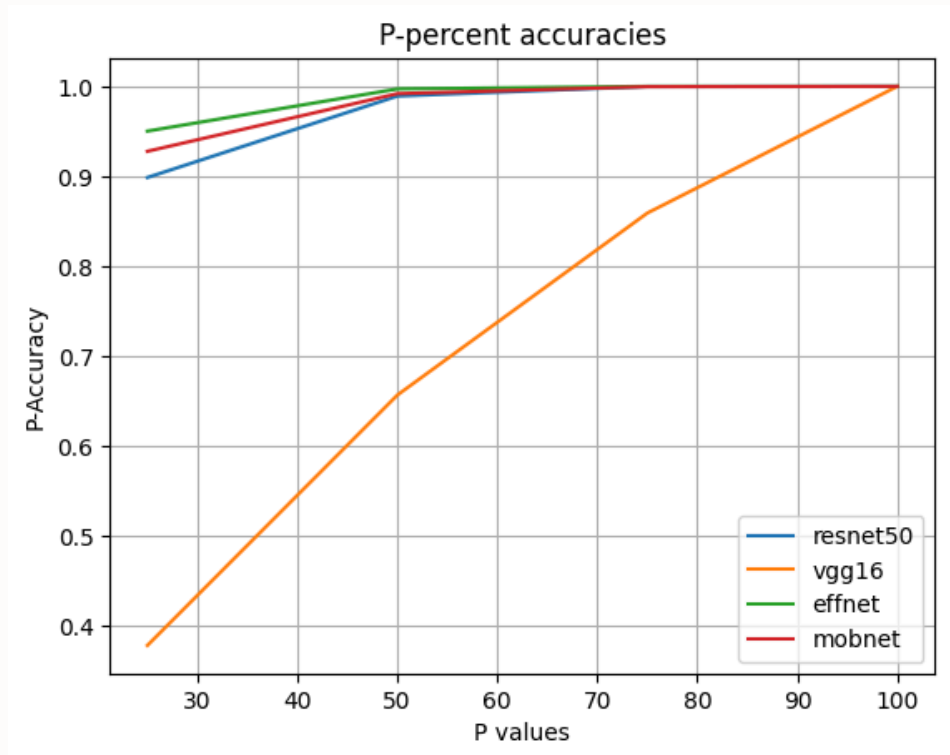
Evaluation on the test set



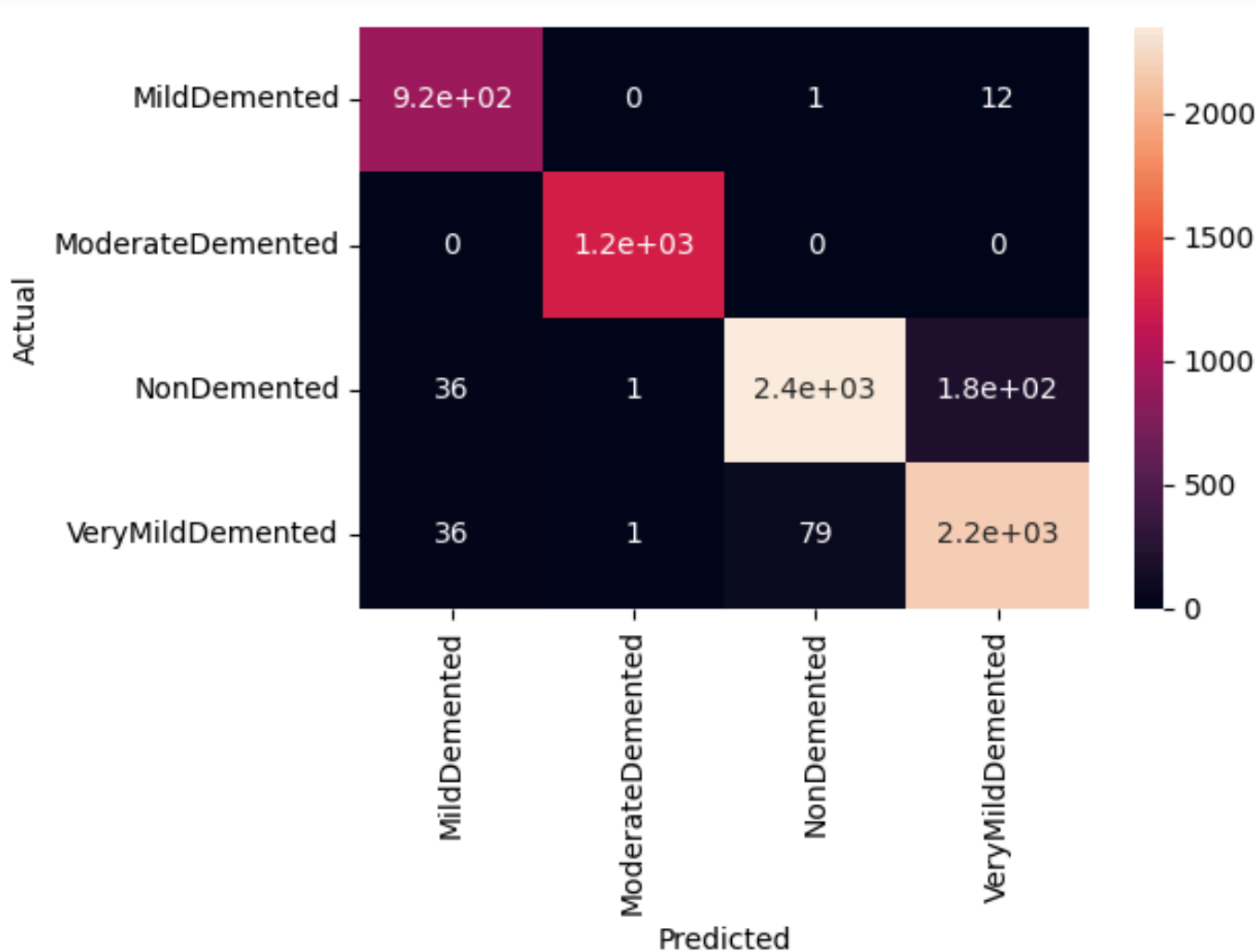
Milestone



End of the project



Confusion matrix of EfficientNet





Thank you for
your attention!