

# Reproducing Deep Transfer Learning for Art Classification Problems

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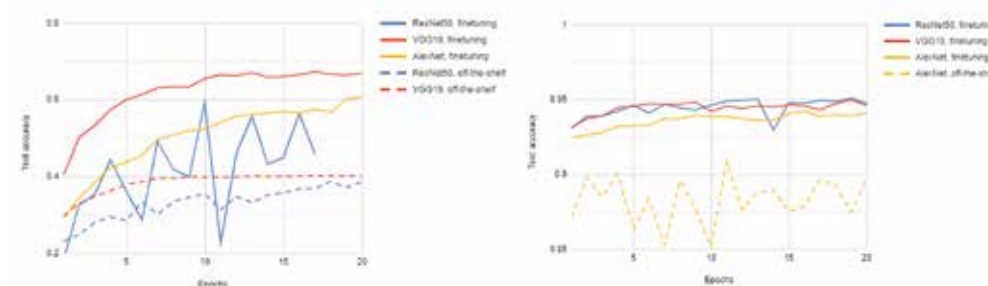


*This poster provides an overview of the results of our reproduction of a paper by Sabotelli et al. (2018). They explore the field of Transfer Learning by transferring the knowledge of deep convolutional networks pretrained on ImageNet to much smaller art image datasets. They investigate accuracies when only training the top-layer classifier (off-the-shelf) and when finetuning all parameters in the network.*

Challenge	Dataset	Number of items		Number of labels	
		paper	our	paper	our
Type	Rijksmuseum	112,012	100,950	1,054	189
Artist	Rijksmuseum	82,018	100,950	1,196	1,027
Material	Rijksmuseum	110,668	100,950	206	66
Material	iMet 2020	-	17,494	-	235
Country	iMet 2020	-	25,153	-	61

We reproduced experiments with three art classification challenges on the Rijksmuseum dataset and we contributed experiments on the iMet datasets. These are the number of items and labels for each challenge and dataset.

## Results on Rijksmuseum Dataset

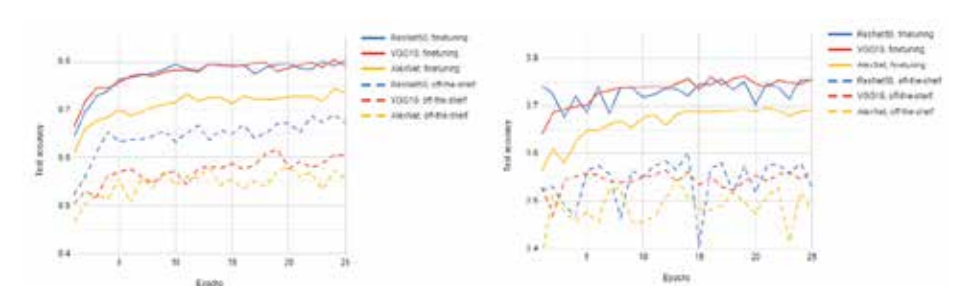


The Rijksmuseum dataset is an art image collection from the Rijksmuseum in Amsterdam. We trained the networks to classify by artist (left), by material (right) and by type. Unfortunately, the data is currently incomplete as we are still running experiments.

Challenge	Model	Off-the-shelf		Finetuning	
		paper	ours	paper	ours
Material	ResNet50	0.8681	-	<b>0.9295</b>	<b>0.9507</b>
Material	VGG19	<b>0.9212</b>	-	0.9223	0.9496
Material	AlexNet	-	<b>0.9008</b>	-	0.9422
Type	ResNet50	0.7123	-	<b>0.9130</b>	<b>0.9508</b>
Type	VGG19	<b>0.7733</b>	-	0.9027	0.9467
Type	AlexNet	-	-	-	-
Artist	ResNet50	0.008	<b>0.3875</b>	0.4613	0.5922
Artist	VGG19	<b>0.3811</b>	0.3697	0.4498	<b>0.6690</b>
Artist	AlexNet	-	-	-	-

We reproduced the table as given by the paper. The table is still incomplete, but shows promising results. For all challenges our results are close to that of the authors. For the best performing models, results are even higher. We expect this deviation due to the fact that our dataset contains a smaller number of different labels.

## Results on iMet 2020 Dataset



The iMet 2020 dataset is an art image collection from the New York Metropolitan Museum of Art. We trained the networks to classify by material (left) and by country (right). Material classification accuracies are lower than for the Rijksmuseum. This is due to the fact that iMet 2020 has much less data.

Challenge	Model	off-the-shelf	finetuning
Material	ResNet50	<b>0.6898</b>	0.8022
Material	VGG19	0.6185	<b>0.8053</b>
Material	AlexNet	0.5816	0.7442
By country	ResNet50	<b>0.6013</b>	0.7563
By country	VGG19	0.5652	<b>0.7615</b>
By country	AlexNet	0.5451	0.6965

## Summary

- Rijksmuseum dataset approximately equally large
- Less labels on Rijksmuseum dataset
- Close results on Material and Type classification
- Artist classification reproduction performs significantly better
- Worse results on iMet 2020 dataset due to less data