

Part. 09

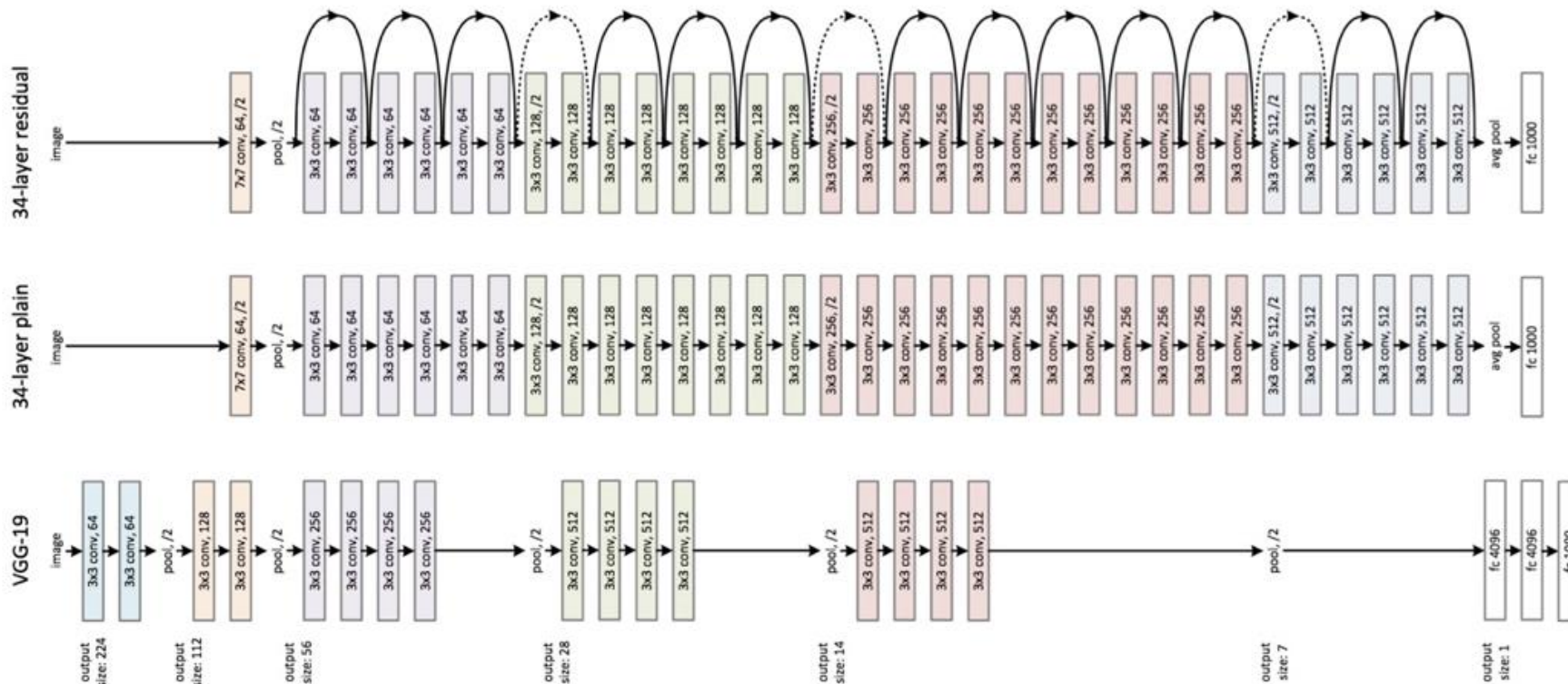
Modern Neural Networks

| Pre-Trained Model과 Fine-Tuning

FASTCAMPUS
ONLINE

강사. 신제용

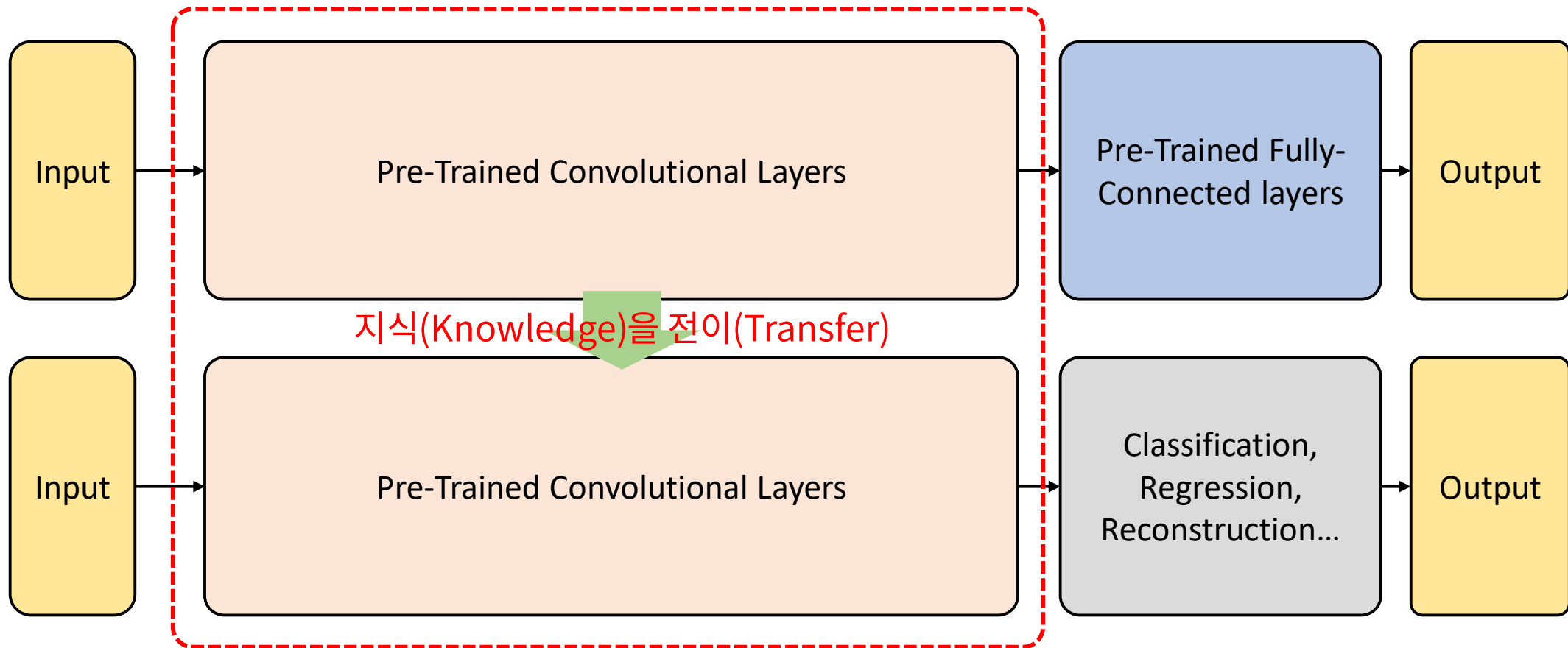
Learning from Scratch



지금까지 배운대로, 이러한 구조를 구성해 처음부터 학습하는 것을

‘처음부터 배운다(**Learning from scratch**)’라고 표현한다.

이전이 학습 (Transfer Learning)



범용적으로 다양한 물체를 구분하기 위한 ImageNet에 대해 학습된 Feature Map은 대부분의 다른 Task에 대해서도 좋은 성능을 보인다. (Classification, Regression, Reconstruction ...)

Why Transfer Learning?



Dataset 부족의 해결



비용 절감



학습에 필요한 인력 감소

Pre-trained Model

Locally-connected Layers

Recurrent Layers

Embedding Layers

Merge Layers

Advanced Activations Layers

Normalization Layers

Noise layers

Layer wrappers

Writing your own Keras layers

PREPROCESSING

Sequence Preprocessing

Text Preprocessing

Image Preprocessing

Losses

Metrics

Optimizers

Activations

Callbacks

Datasets

Applications

Available models

Usage examples for image classification models

Backend

Initializers

```
# this could also be the output a different Keras model or layer
input_tensor = Input(shape=(224, 224, 3)) # this assumes K.image_data_format() == 'channels_last'

model = InceptionV3(input_tensor=input_tensor, weights='imagenet', include_top=True)
```

Documentation for individual models

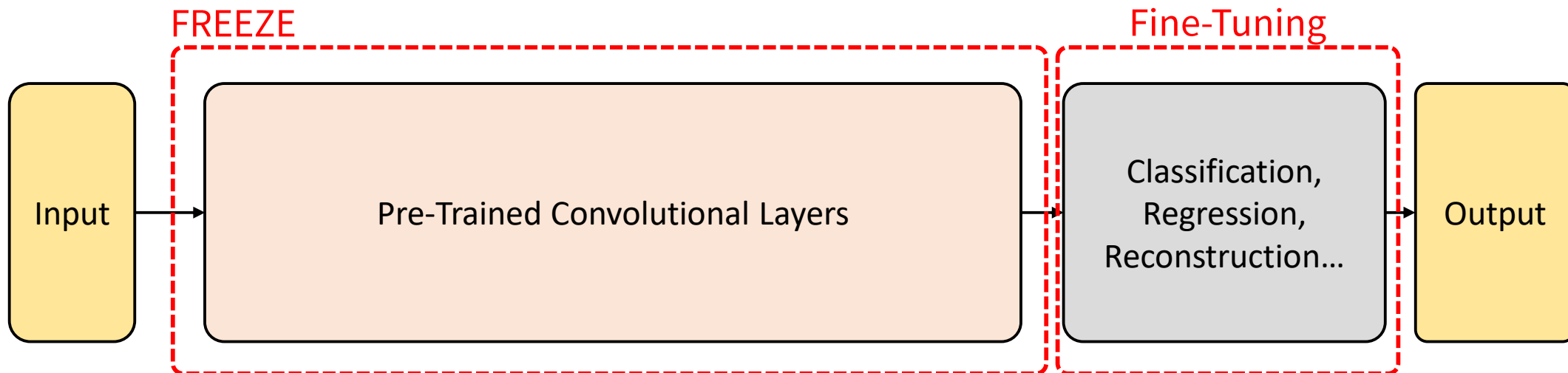
Model	Size	Top-1 Accuracy	Top-5 Accuracy	Parameters	Depth
Xception	88 MB	0.790	0.945	22,910,480	126
VGG16	528 MB	0.713	0.901	138,357,544	23
VGG19	549 MB	0.713	0.900	143,667,240	26
ResNet50	98 MB	0.749	0.921	25,636,712	-
ResNet101	171 MB	0.764	0.928	44,707,176	-
ResNet152	232 MB	0.766	0.931	60,419,944	-
ResNet50V2	98 MB	0.760	0.930	25,613,800	-
ResNet101V2	171 MB	0.772	0.938	44,675,560	-
ResNet152V2	232 MB	0.780	0.942	60,380,648	-
InceptionV3	92 MB	0.779	0.937	23,851,784	159
InceptionResNetV2	215 MB	0.803	0.953	55,873,736	572
MobileNet	16 MB	0.704	0.895	4,253,864	88
MobileNetV2	14 MB	0.713	0.901	3,538,984	88
DenseNet121	33 MB	0.750	0.923	8,062,504	121
DenseNet169	57 MB	0.762	0.932	14,307,880	169
DenseNet201	80 MB	0.773	0.936	20,242,984	201
NASNetMobile	23 MB	0.744	0.919	5,326,716	-
NASNetLarge	343 MB	0.825	0.960	88,949,818	-

The top-1 and top-5 accuracy refers to the model's performance on the ImageNet validation dataset.

Depth refers to the topological depth of the network. This includes activation layers, batch normalization layers etc.

Keras에서는 위와 같이 다양한 Pre-trained Model을 제공하고 있다. 대부분 ImageNet으로 학습되어 있다.

I Fine-Tuning



일반적으로 Knowledge Transfer해 온 계층들은 Freeze시켜서 학습하지 않고, 새로운 계층만 학습을 한다.

단, 학습 데이터셋이 충분히 큰 경우에는 모든 계층을 학습해도 좋다.