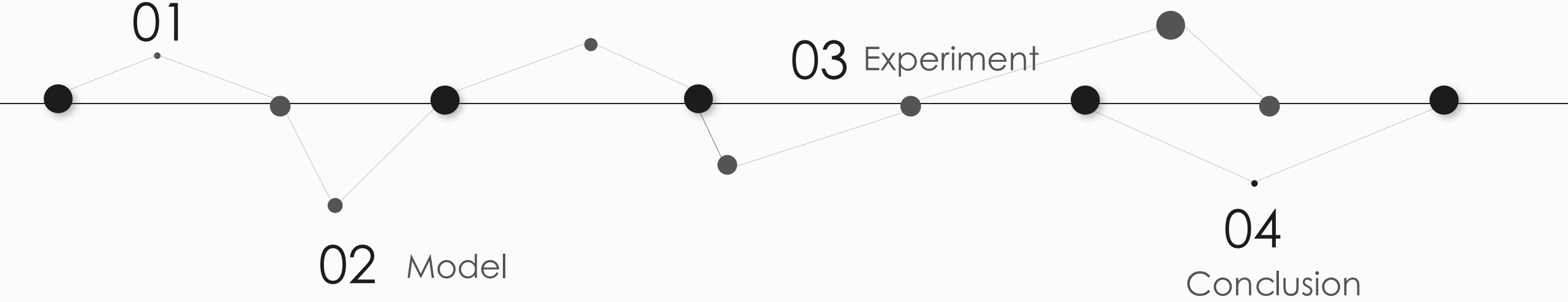
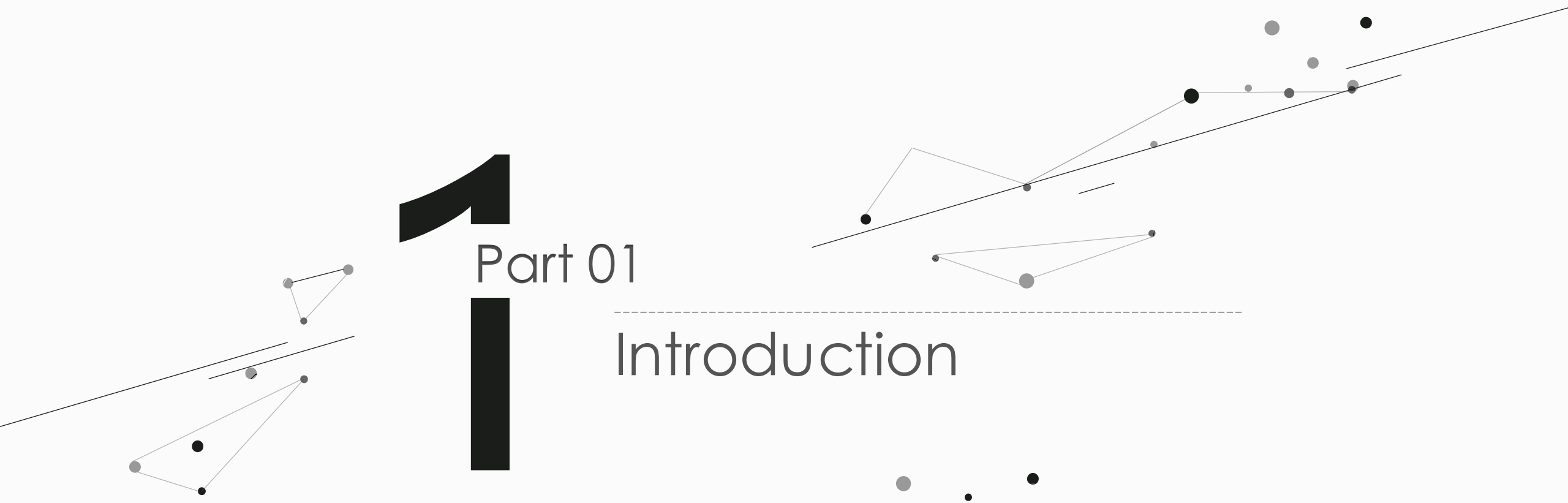
醫學影像專題

第二組

611410088 張馨予
611410144 張靖暄
611415028 楊雅竹
611415096 曾博晟

Outline



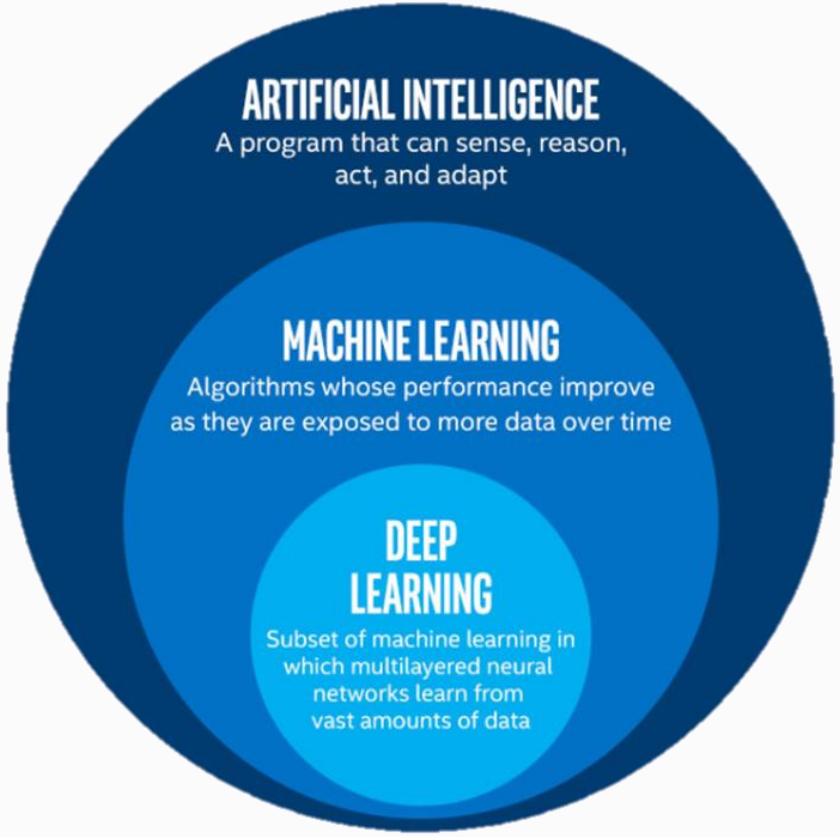


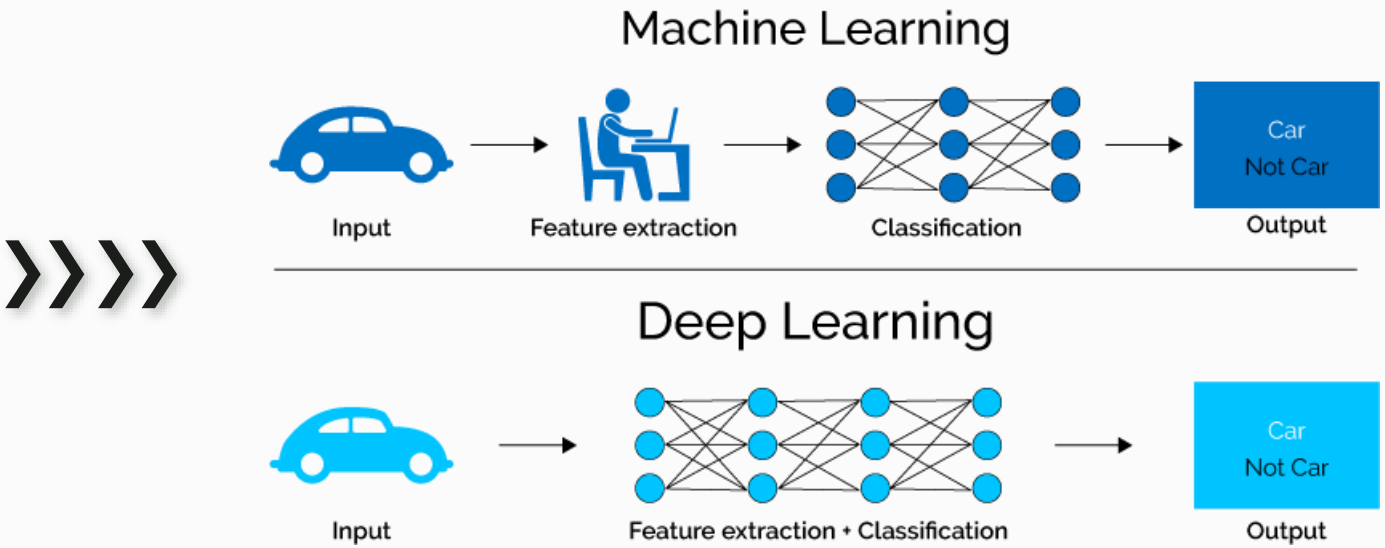
1

Part 01

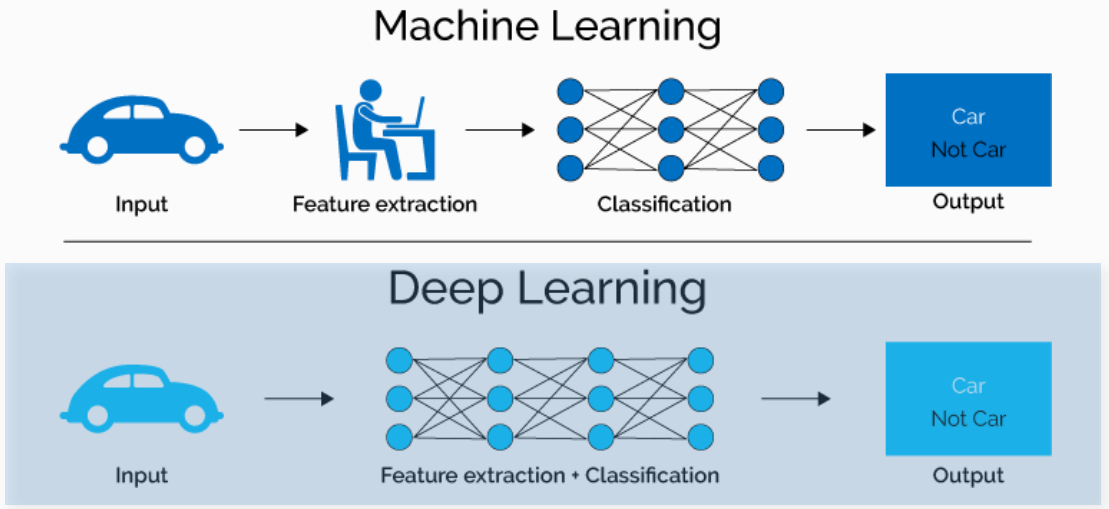
Introduction

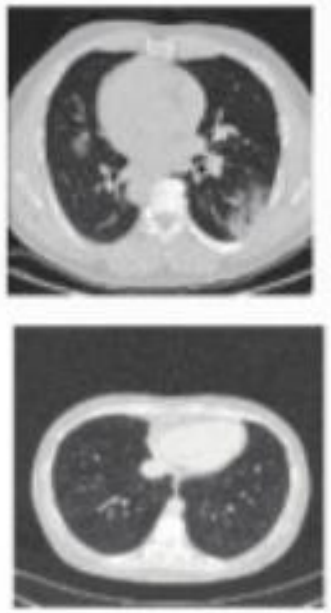
01

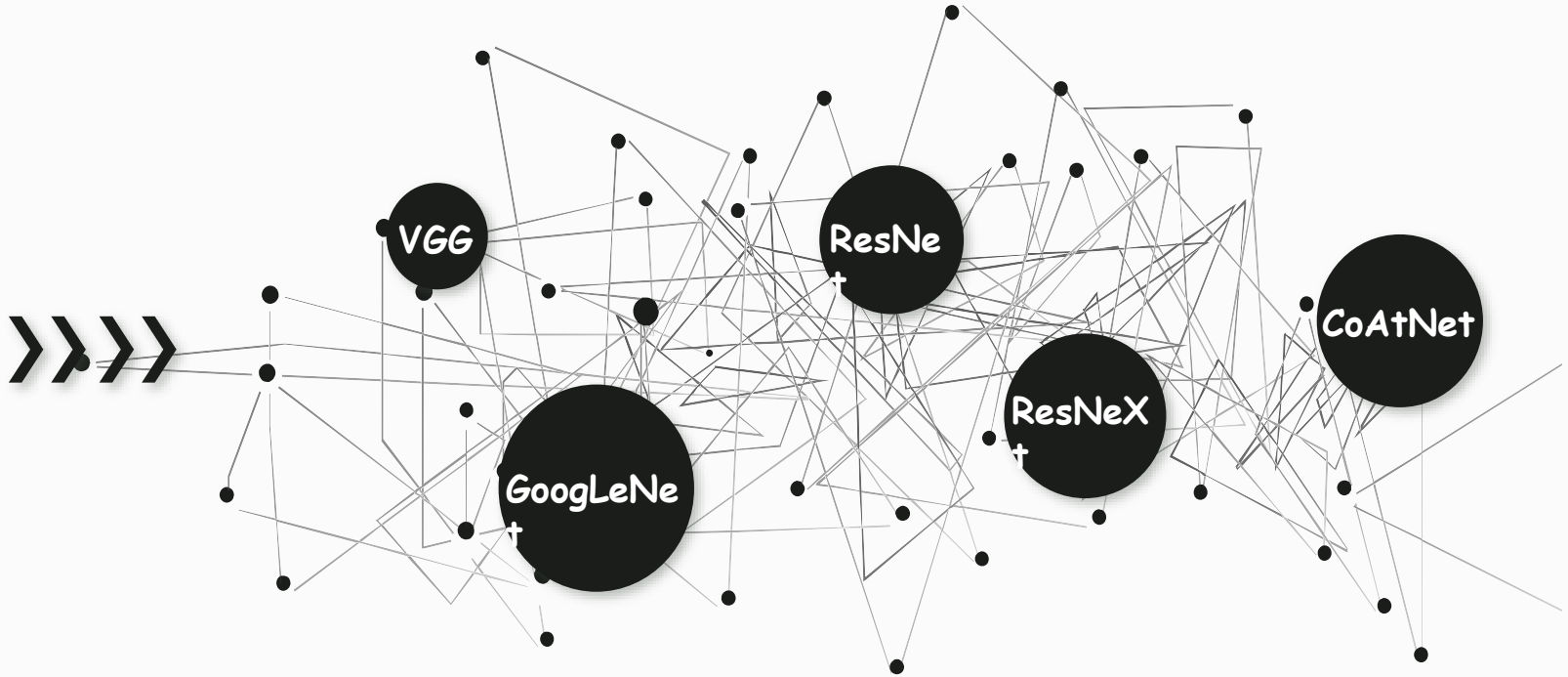

ARTIFICIAL INTELLIGENCE
A program that can sense, reason, act, and adapt
MACHINE LEARNING
Algorithms whose performance improve as they are exposed to more data over time
DEEP LEARNING
Subset of machine learning in which multilayered neural networks learn from vast amounts of data


Machine Learning
Input
Feature extraction
Classification
Car
Not Car
Output
Deep Learning
Input
Feature extraction + Classification
Car
Not Car
Output

01

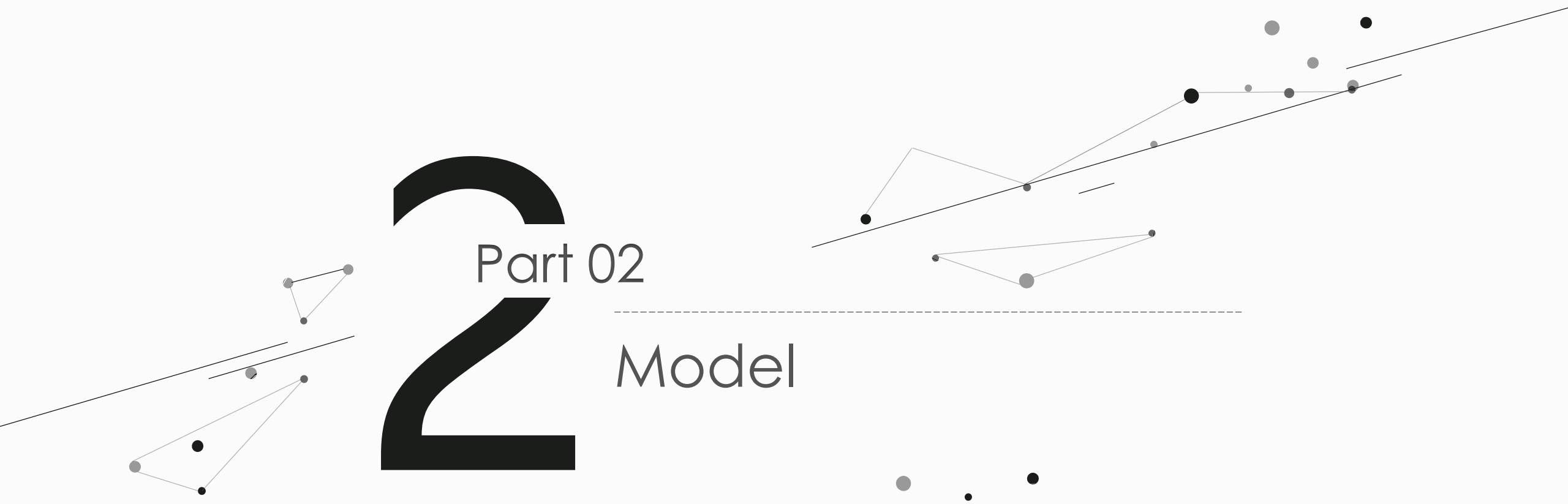






Normal

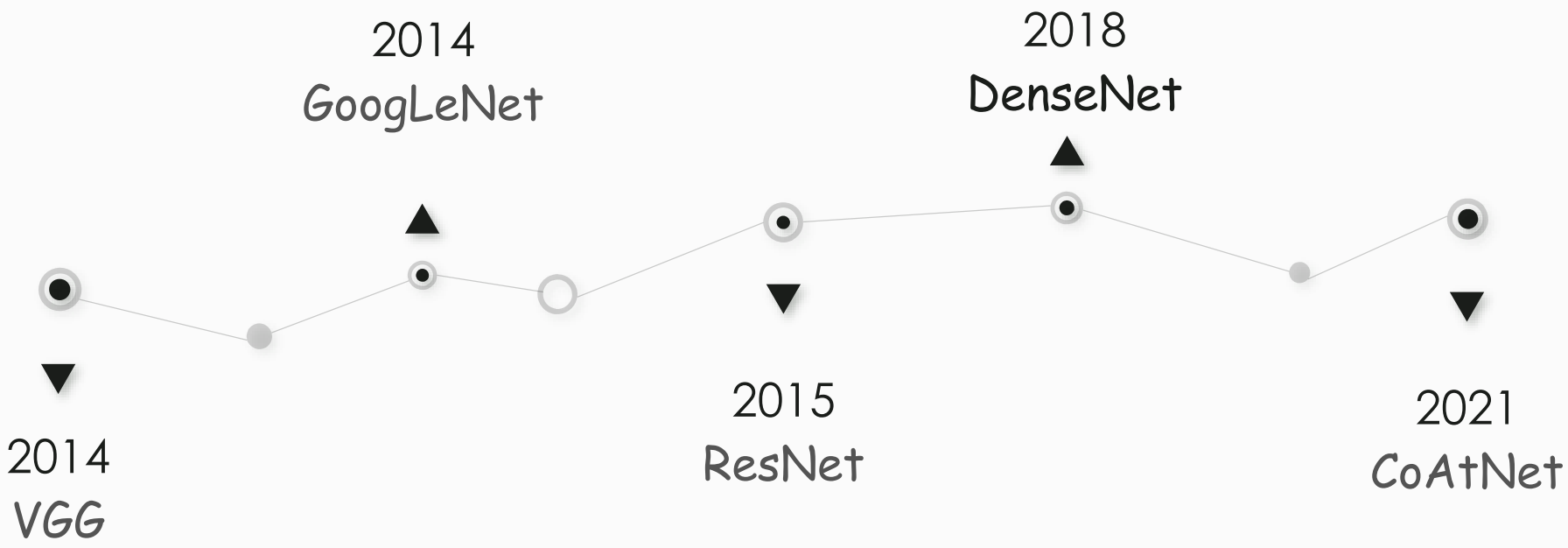
COVID-19



2 Part 02

Model

02


2014
VGG
2014
GoogLeNet
2015
ResNet
2018
DenseNet
2021
CoAtNet

02

VGG

Main hallmark

Deeper is better,

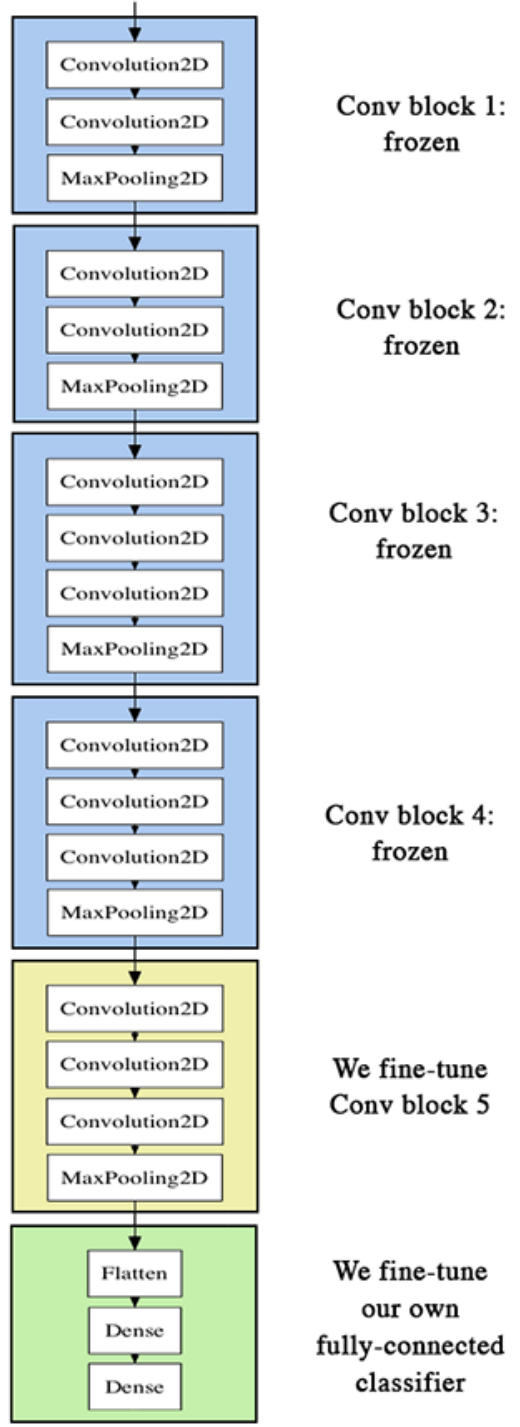
Steadily increase the depth

Conv

Small Conv is better

LRN useless

Batch normalization will fail when the Batch size is small



02

GoogLeNet

Main hallmark

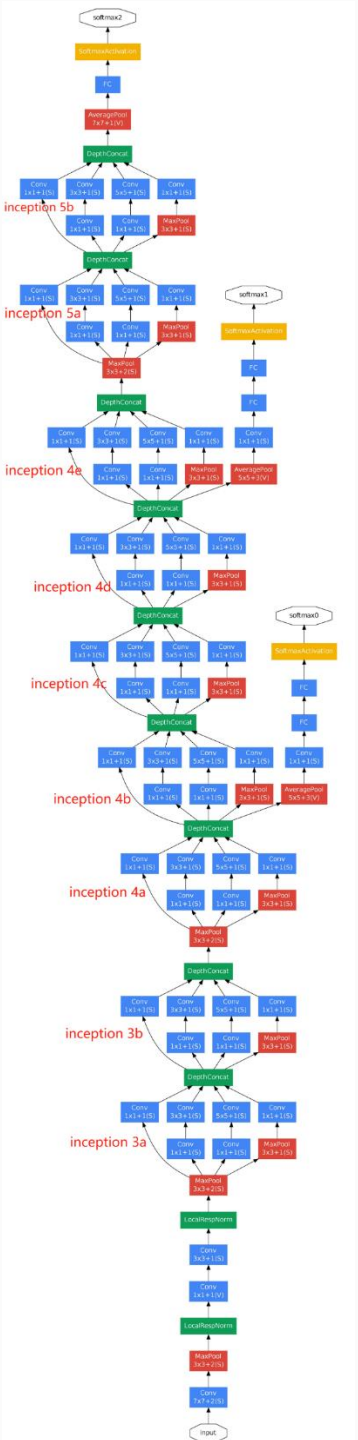
Improved utilization of the computing resources inside the network

Deep network

22 Layers

Parameter

Uses 12 times fewer parameters



02

ResNet

Main hallmark

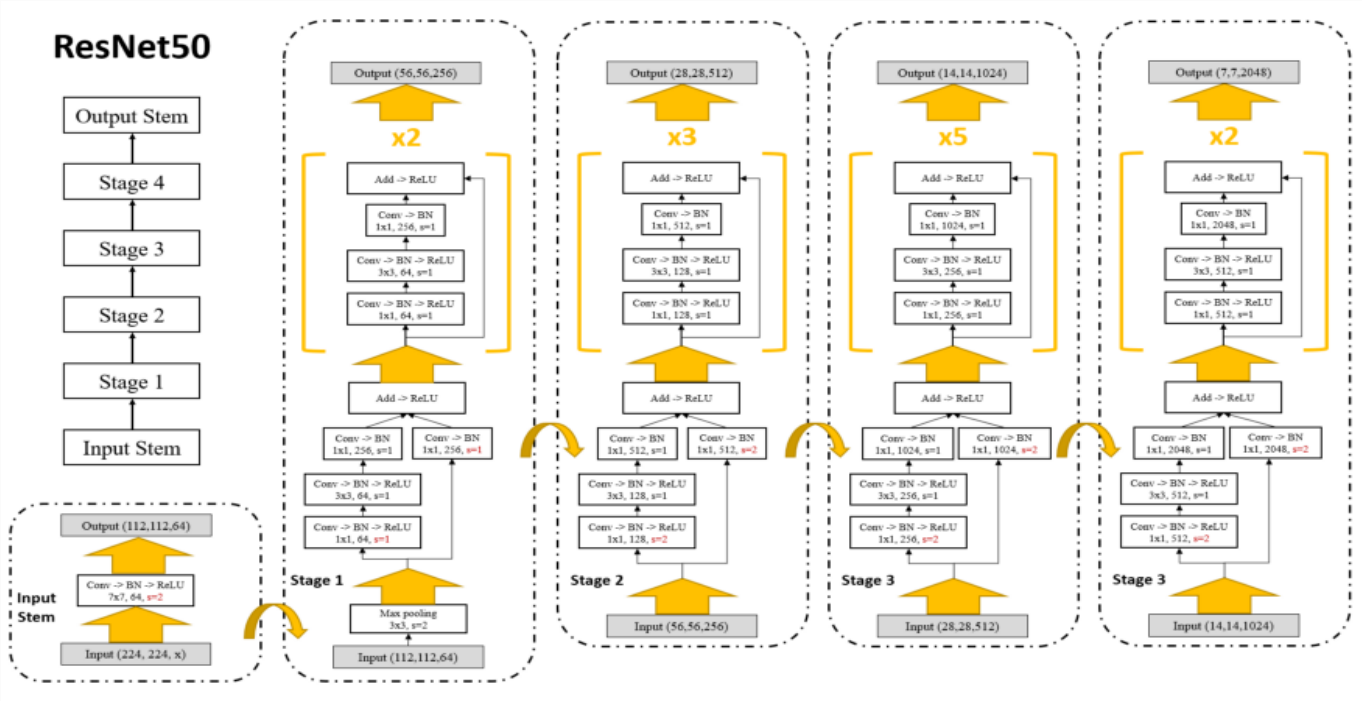
Solves the degradation problem through residual learning

Deep network

152 Layers

Inconsistent maintenance

1. zero-padding
2. projection shortcut



02

DenseNet

Main hallmark

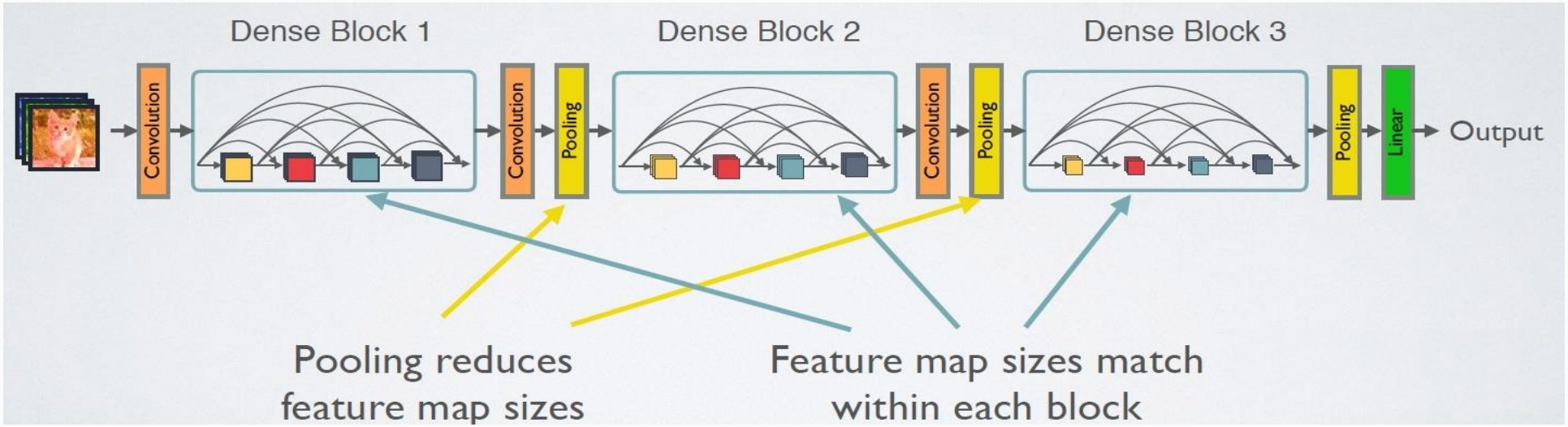
DenseBlock and Transition

Parameter

use of 1x1 convolutional layers reduces the dimensionality of feature maps

Prevention of Overfitting

Batch Normalization and Dropout are used to prevent overfitting and improve the model's generalization ability.



02

CoAtNet

Main hallmark

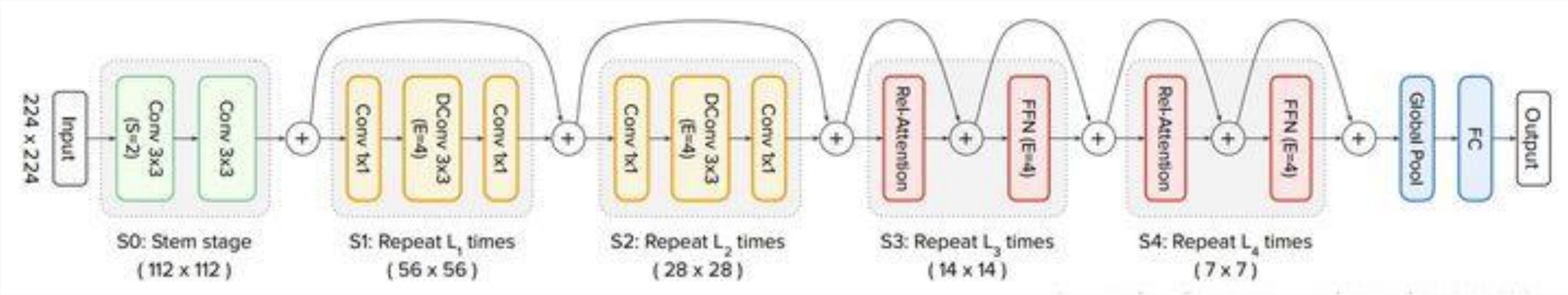
Merging Convolution and Self-Attention

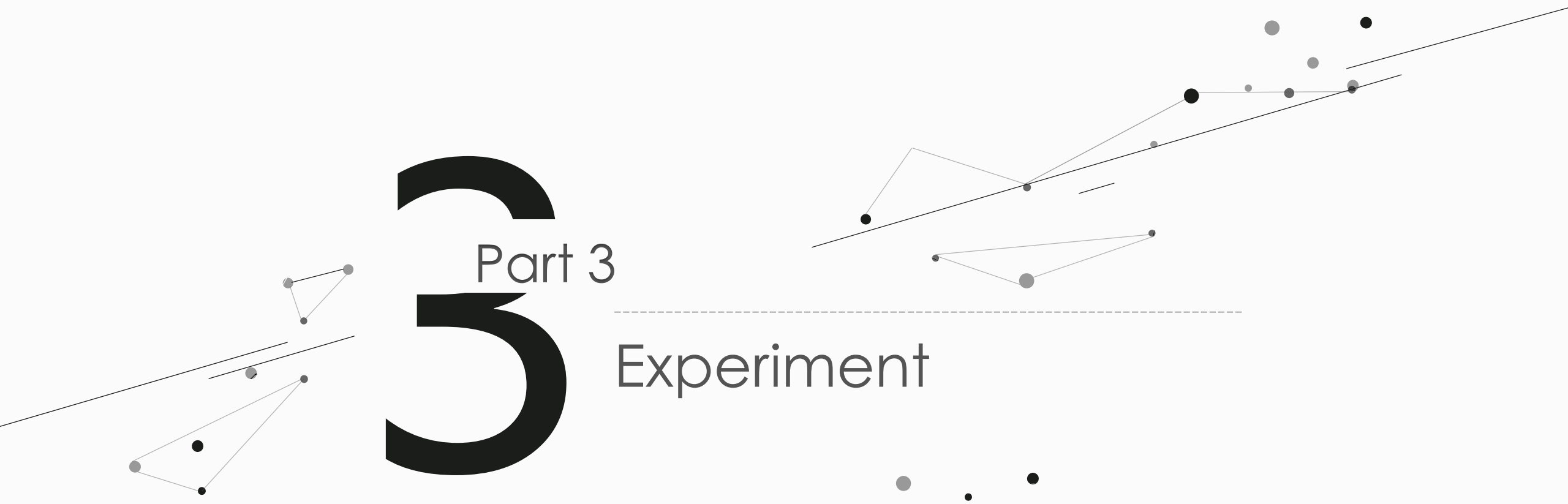
Lightweight Structure

reduces computation and storage costs by using shallow networks and downsampling

MBConv

1. Depthwise Convlution
2. inverted bottleneck





3 Part 3

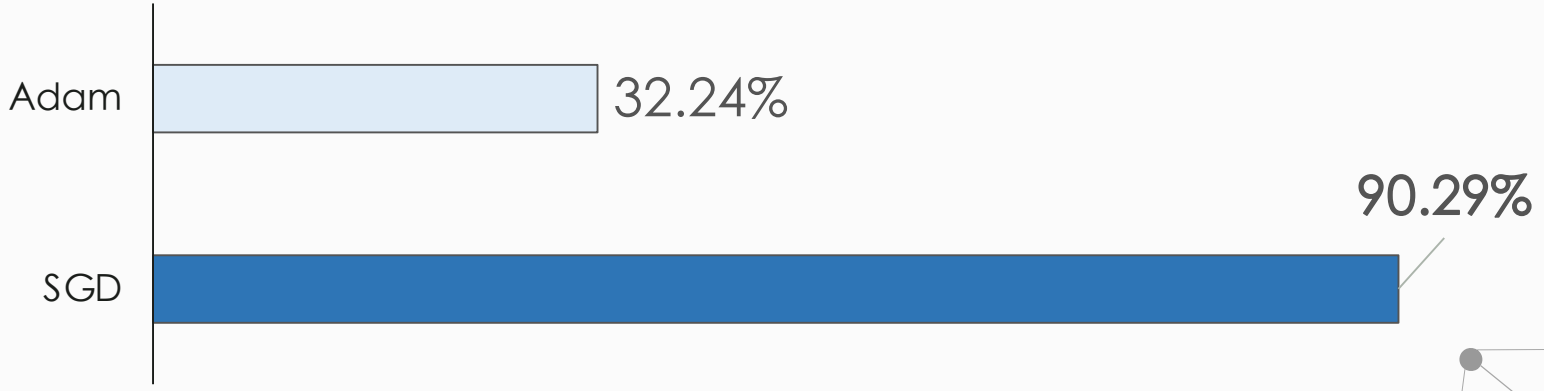
Experiment

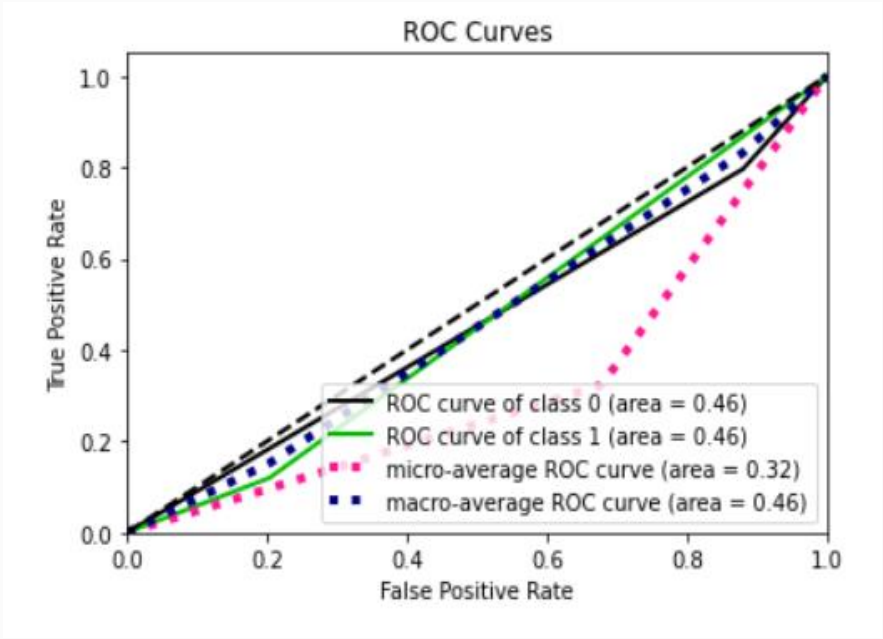
03

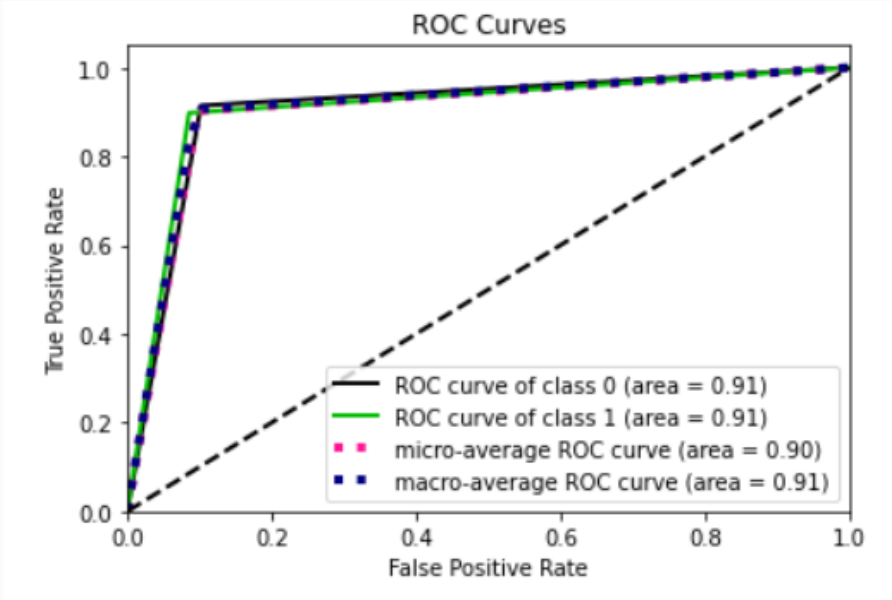
ResNet50

Hyperparameters

Optimizer



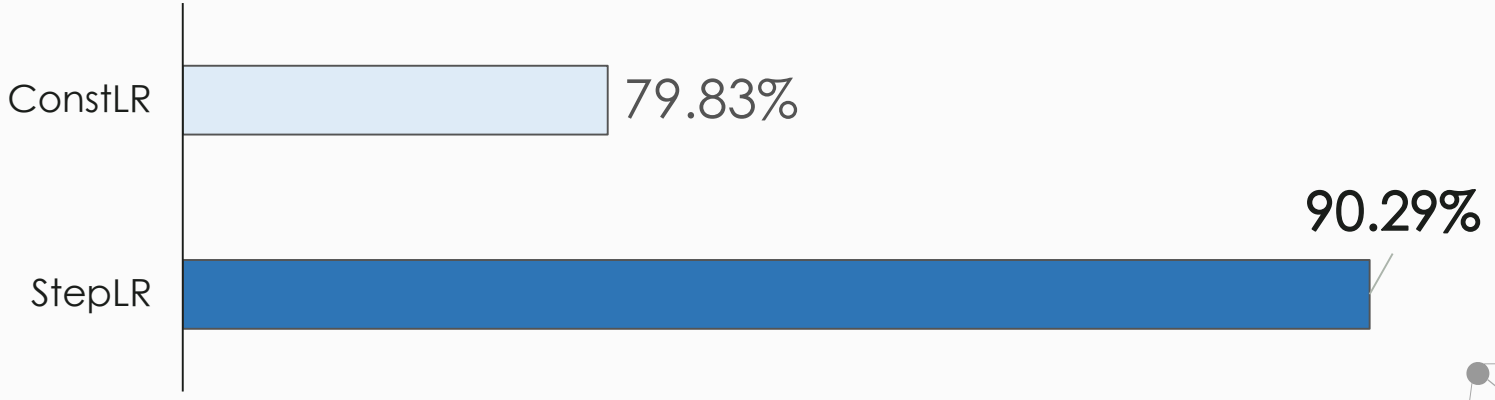


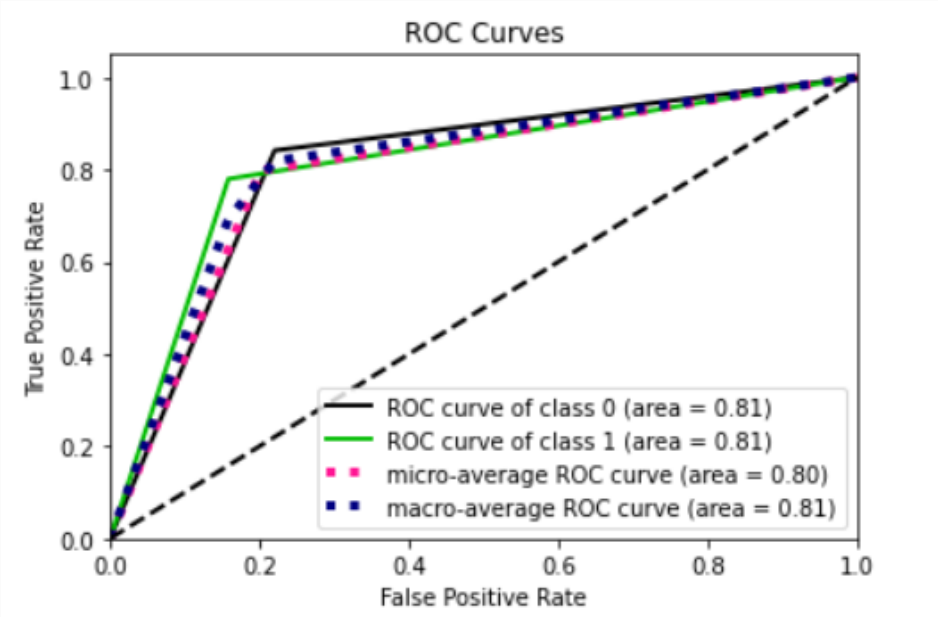


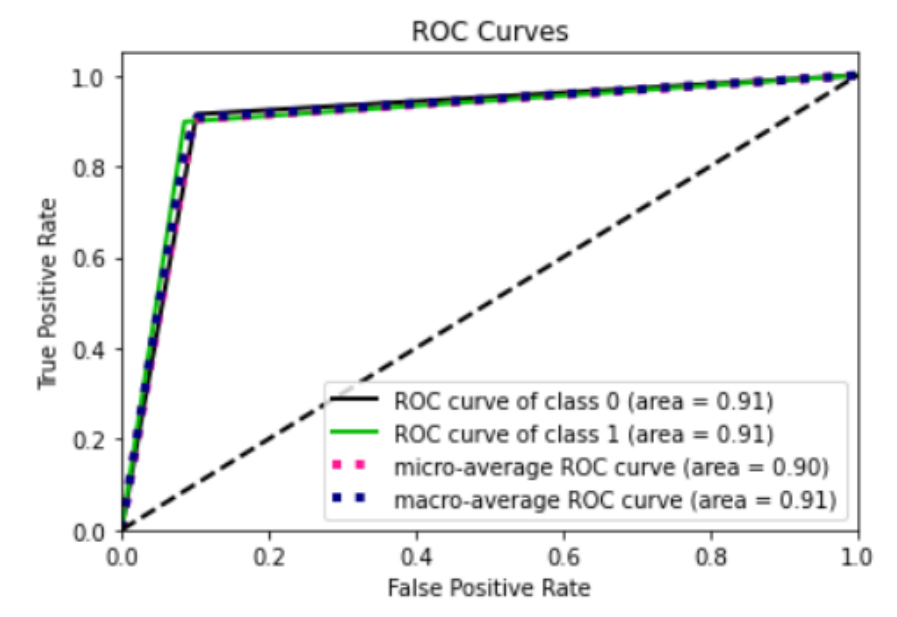
03

ResNet50

- Hyperparameters
- Learning rate





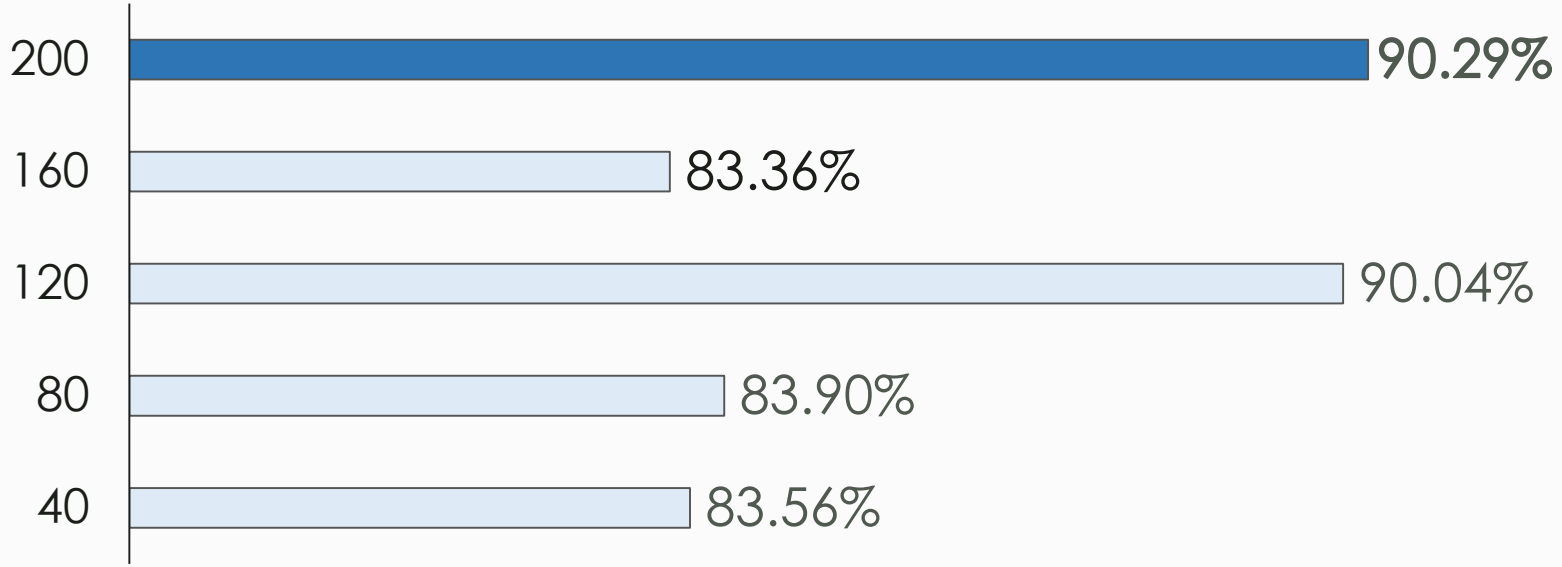


03

ResNet50

Hyperparameters

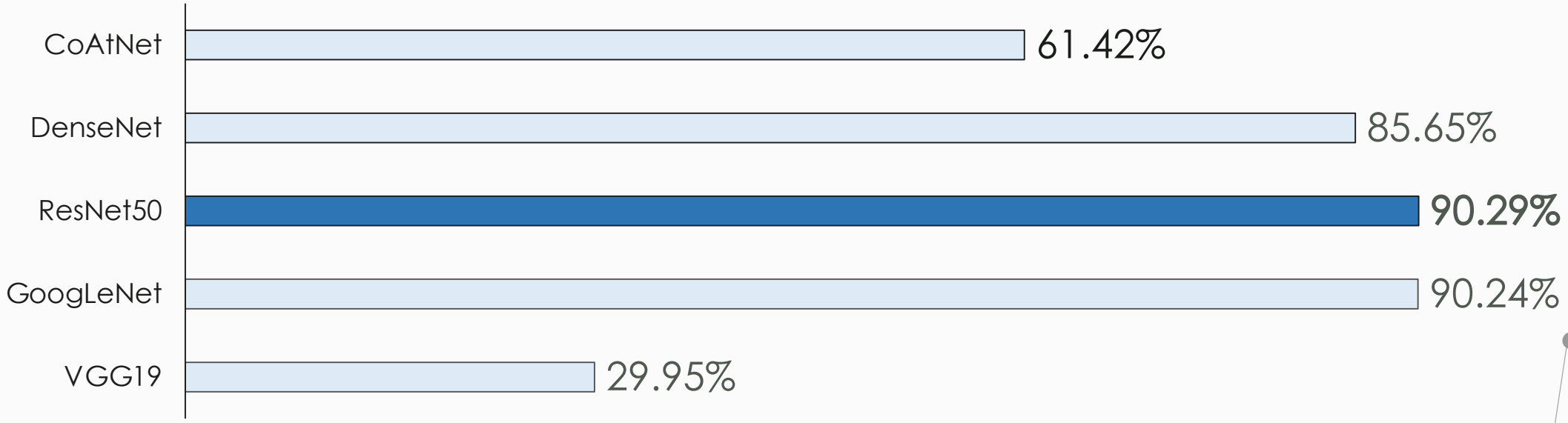
Epochs



03

Model

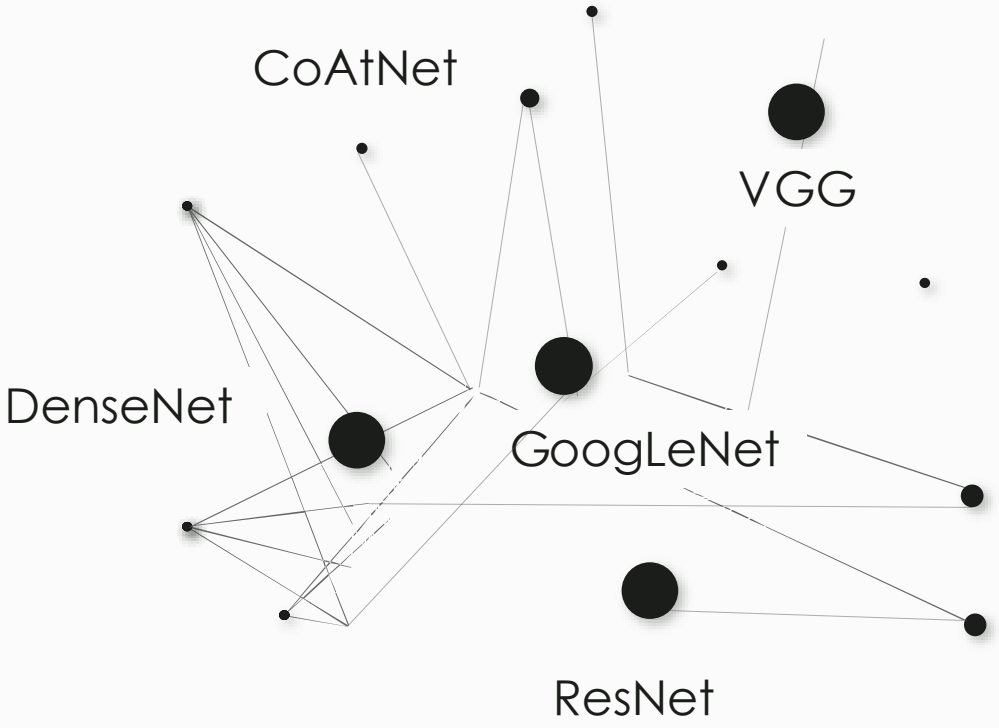
Test_Accuracy



Part 04

4 Conclusion

04



Conclusion

In this experiment, we study the effect of different models on this dataset.

We try to enhance the accuracy by using adjusting hyperparameters.

Constant learning rate vs step learning rate

Finally, we found that GoogLeNet and ResNet50 has a good balance between accuracy and generalization.

Reference

https://chih-sheng-huang821.medium.com/%E4%BB%80%E9%BA%BC%E6%98%AF%E4%BA%BA%E5%B7%A5%E6%99%BA%E6%85%A7-%E6%A9%9F%E5%99%A8%E5%AD%B8%E7%BF%92%E5%92%8C%E6%B7%B1%E5%BA%A6%E5%AD%B8%E7%BF%92-587e6a0dc72a

https://kknews.cc/zh-tw/code/xpaz689.html

https://cinnamonaitaiwan.medium.com/%E6%B7%B1%E5%BA%A6%E5%AD%B8%E7%BF%92-cnn%E5%8E%9F%E7%90%86-keras%E5%AF%A6%E7%8F%BE-432fd9ea4935

https://brohrer.mcknote.com/zh-Hant/how_machine_learning_works/how_convolutional_neural_networks_work.html

https://chih-sheng-huang821.medium.com/%E5%8D%B7%E7%A9%8D%E7%A5%9E%E7%B6%93%E7%B6%B2%E8%B7%AF-convolutional-neural-network-cnn-cnn%E9%81%8B%E7%AE%97%E6%B5%81%E7%A8%8B-ecaec240a631

https://zh.wikipedia.org/wiki/%E5%8D%B7%E7%A7%AF%E7%A5%9E%E7%BB%8F%E7%BD%91%E7%BB%9C

https://zhuanlan.zhihu.com/p/34443907

https://www.itread01.com/content/1546240696.html

https://danjtchen.medium.com/vgg-%E6%B7%B1%E5%BA%A6%E5%AD%B8%E7%BF%92-%E5%8E%9F%E7%90%86-d31d0aa13d88

https://www.twblogs.net/a/5bc11ba92b717711c9242c8c

https://arxiv.org/abs/1409.4842

https://www.easyatm.com.tw/wiki/GoogLeNet

https://iter01.com/537759.html

https://medium.com/%E8%BB%9F%E9%AB%94%E4%B9%8B%E5%BF%83/deep-learning-residual-leaning-%E8%AA%8D%E8%AD%98resnet%E8%88%87%E4%BB%96%E7%9A%84%E5%86%A0%E5%90%8D%E5%BE%8C%E7%B9%BC%E8%80%85resnext-resnest-6bedf9389ce

https://ithelp.ithome.com.tw/m/articles/10264843

https://zhuanlan.zhihu.com/p/31852747

https://medium.com/ching-i/%E5%8D%B7%E7%A9%8D%E7%A5%9E%E7%B6%93%E7%B6%B2%E7%B5%A1-cnn-%E7%B6%93%E5%85%B8%E6%A8%A1%E5%9E%8B-googlelenet-resnet-densenet-with-pytorch-code-1688015808d9

https://zhuanlan.zhihu.com/p/37189203

https://medium.com/%E5%AD%B8%E4%BB%A5%E5%BB%A3%E6%89%8D/dense-cnn-%E5%AD%B8%E7%BF%92%E5%BF%83%E5%BE%97-%E6%8C%81%E7%BA%8C%E6%9B%B4%E6%96%B0-8cd8c65a6f3f

https://paperswithcode.com/sota/image-classification-on-imagenet

https://www.gushiciku.cn/pl/gKlM/zh-tw

https://arxiv.org/abs/2106.04803

Thank You