Weapon detection

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Project

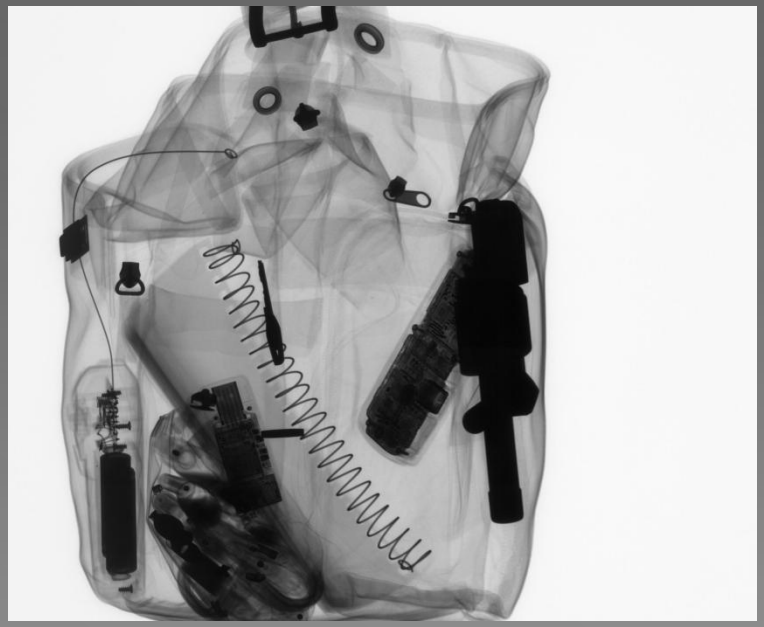
- Topic
- Input data
- Neural network
- Tensorflow

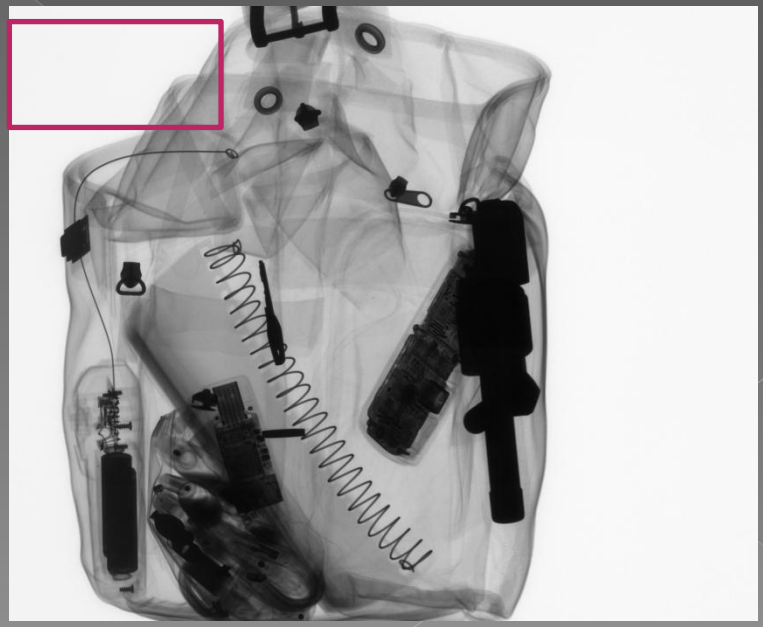
Topic

- The aim of the project is to detect weapons on images of x-ray scanned baggage.
- As the output we will get probability that image contains weapon.
- Using a neural network we will try to minimize the error of bad detection.

Input data

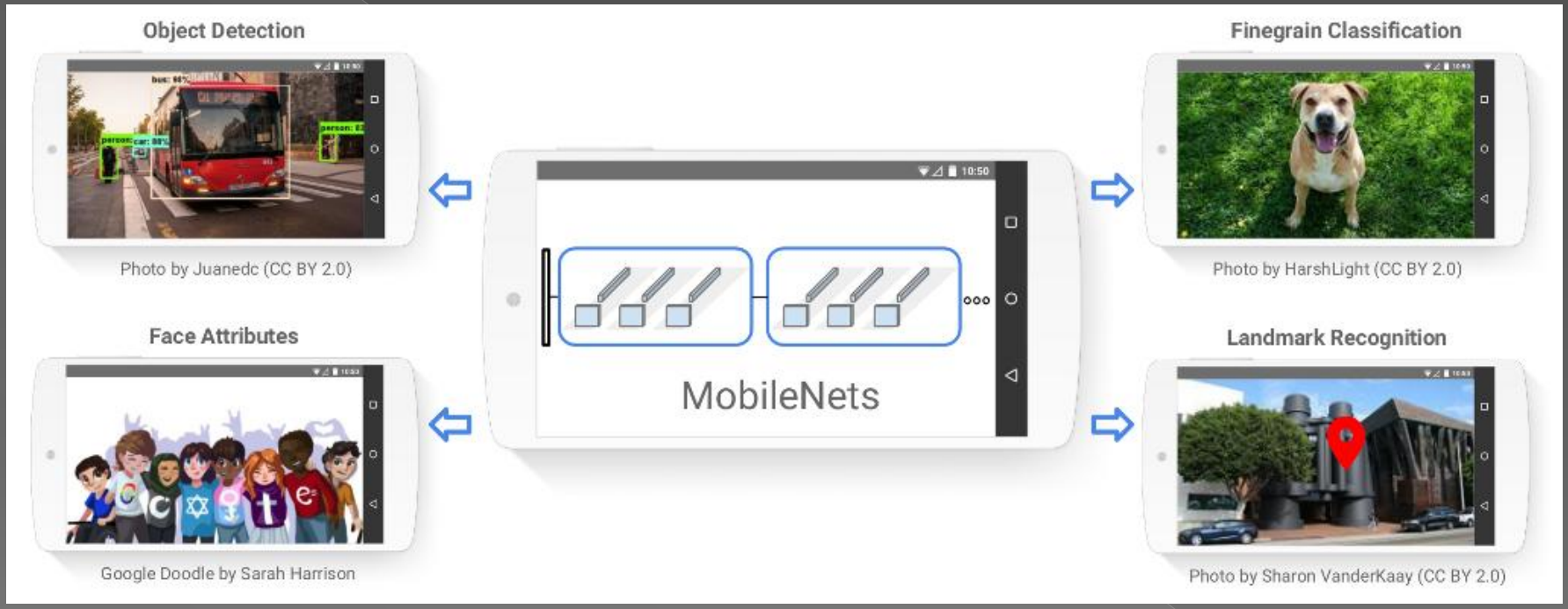
- Cropped image to process only fragment
- Image converted to grayscale
- Group images for train data and validation
- Keep correct image size

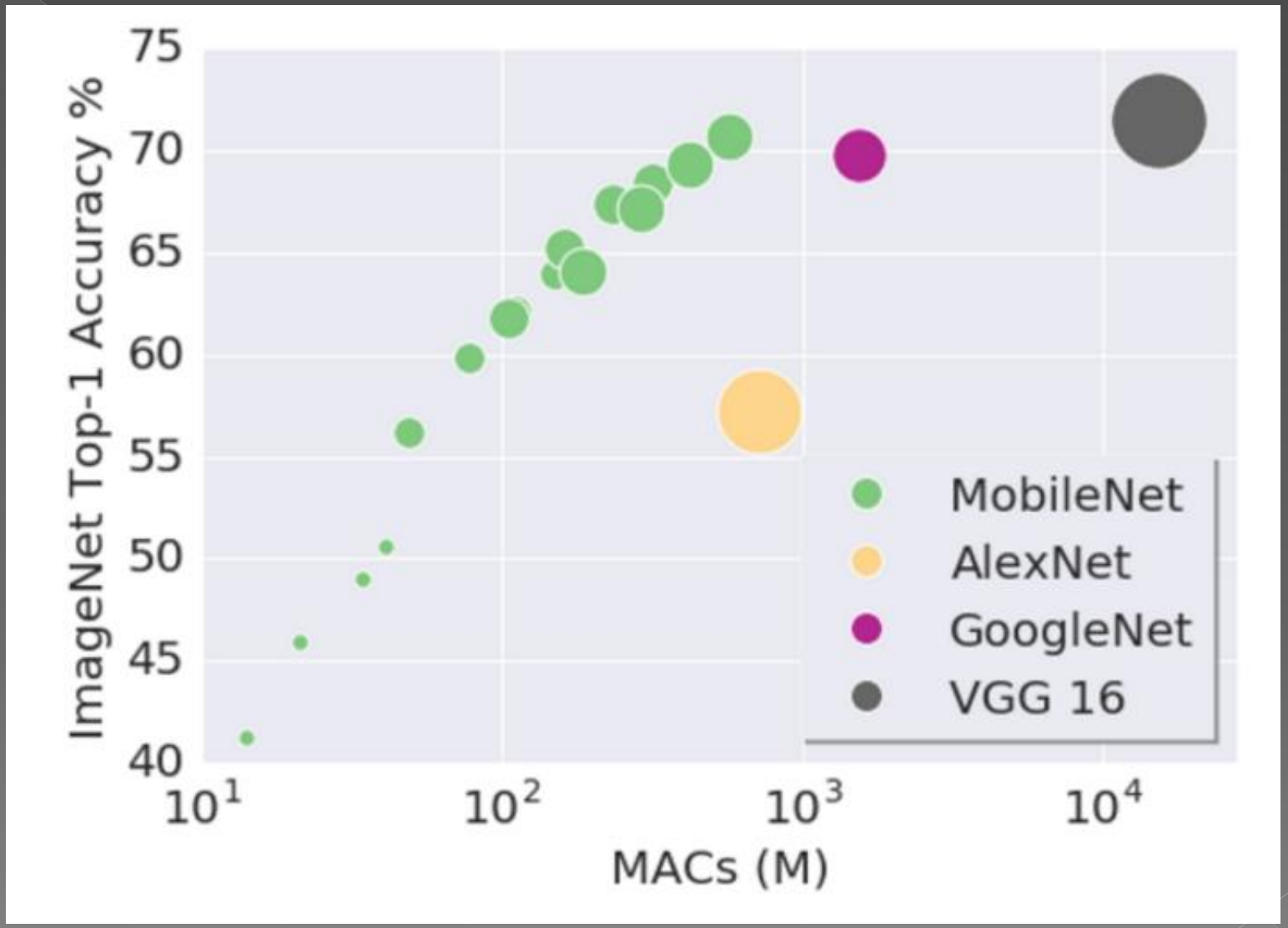


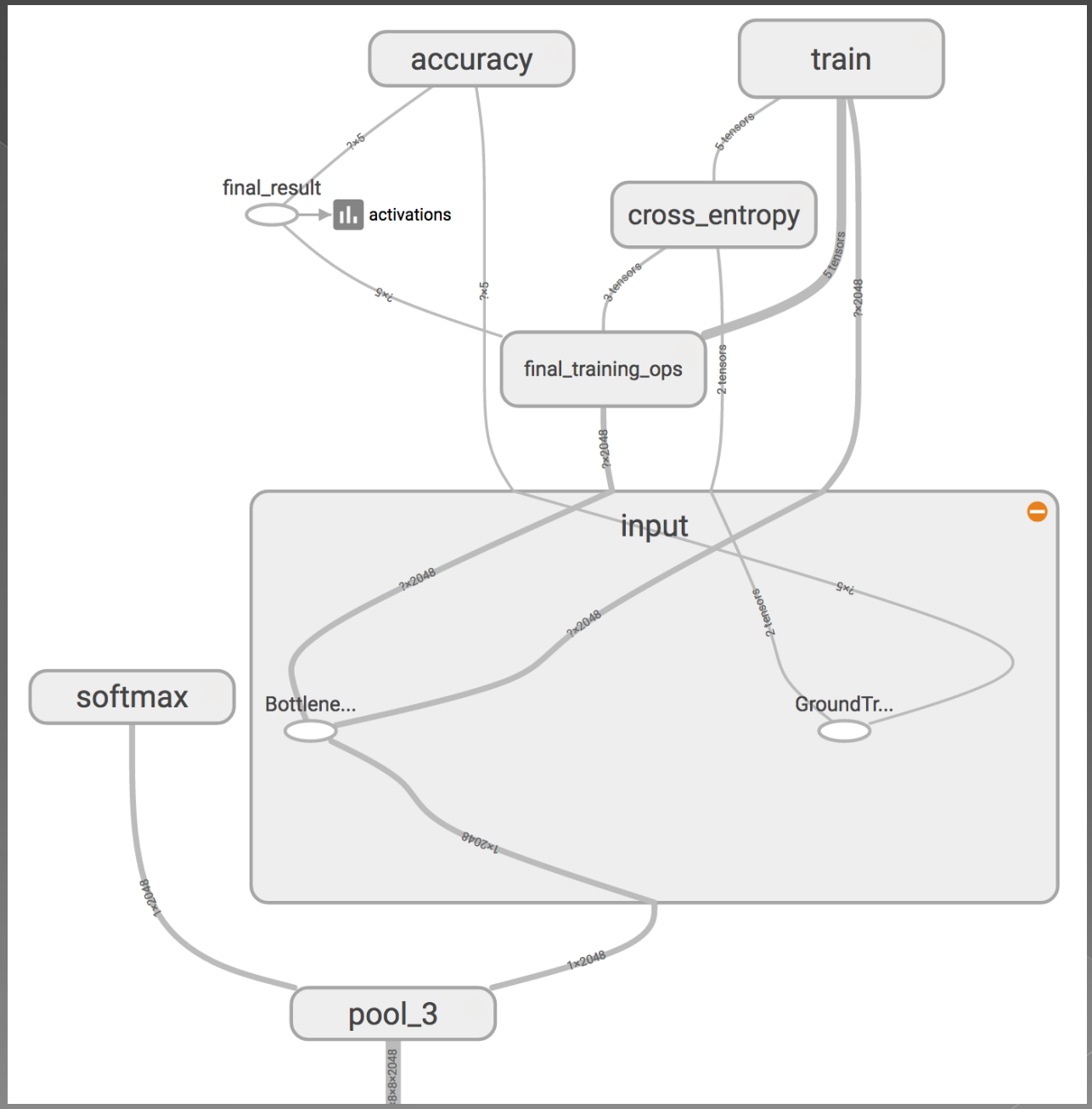


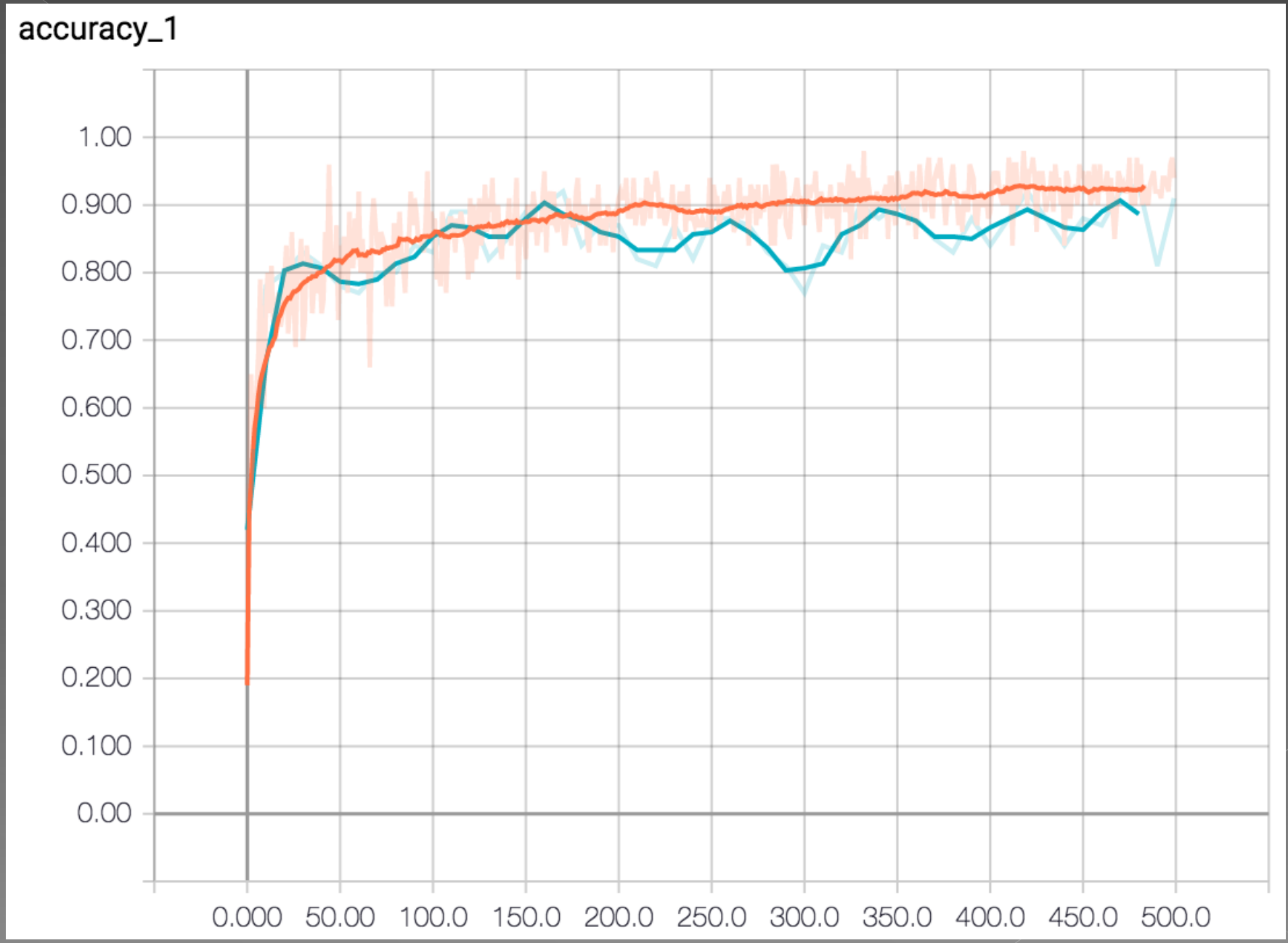
Tensorflow

- Open source software library for high performance numerical computation
- Using with MobileNET, small convolutional neural network (process same calculation on each place of image)
- MobileNet is ready neural network to recognize images, only need is to change algorithm and relearn it for new objects
- Transfer learning, retrain already trained model for similar problem


Object Detection
Photo by Juanedc (CC BY 2.0)
Finegrain Classification
Photo by HarshLight (CC BY 2.0)
MobileNets
Face Attributes
Google Doodle by Sarah Harrison
Landmark Recognition
Photo by Sharon VanderKaay (CC BY 2.0)


ImageNet Top-1 Accuracy %
75
70
65
60
55
50
45
40
10^1
10^2
10^3
10^4
MACs (M)
MobileNet
AlexNet
GoogleNet
VGG 16


accuracy
train
final_result
activations
cross_entropy
final_training_ops
input
softmax
Bottlene...
GroundTr...
pool_3
?×5
5 tensors
?×2048
3 tensors
2 tensors
1×2048
1×8×8×2048


accuracy_1
1.00
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.00
0.000
50.00
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0