Challenge 2: Face Recognition

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• Task 1: Beat TA's Baseline

Introduction

In this section, we have tried modifying VGG16 and Inception_v3[1], and finally choose Inception_v3 to meet our goal. The implementation detail and results are shown as below.

Implementation Detail

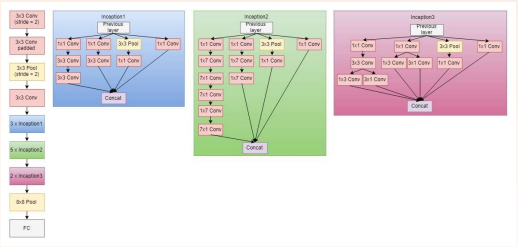

Fig. 1 The structure of Inception_v3

We train this model using Adam optimizer for the first 50 epochs, and then use SGD with learning rate equal to 1e-5 keep training for 10 epochs. After that we implement data augmentation.

Result & Discussion

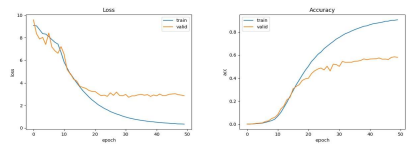

Fig 2. Loss and Accuracy trajectories before data augmentation

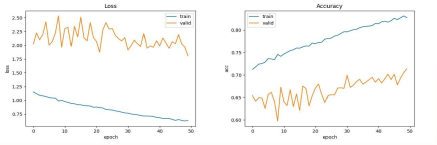

Fig 3. Loss and Accuracy trajectories after data augmentation

	Train	Valid	Test
Inception_v3	0.935	0.543	0.552
Inception_v3 with aug.	0.953	0.715	0.716

Table 1. Accuracy on training/validation/testing set

• Task 2: Squeeze Your Model

Introduction

In this section, we have tried several models to minimize the size of our models, including Xception[2], MobileNet[3], and ShuffleNet[4]. The implementation detail and results are shown as below.

Implementation Detail

We train this model using Adam optimizer in assistance with data augmentation.

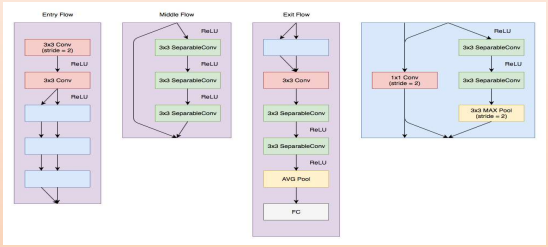

Fig. 4. The structure of Xception

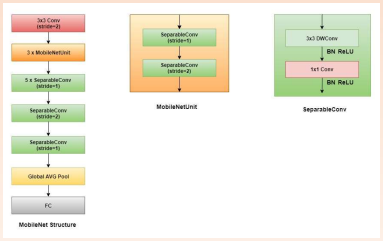

Fig. 5 The structure of MobileNet

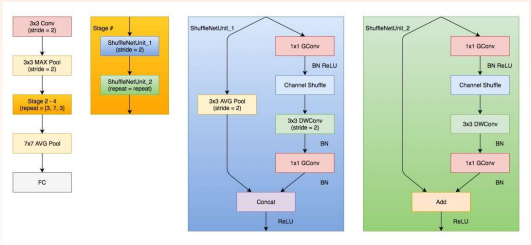

Fig. 6 The structure of ShuffleNet

Result & Discussion

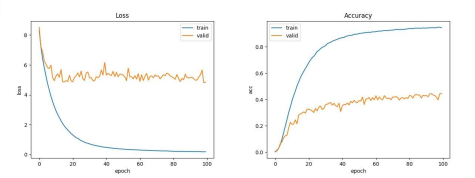

Fig. 7. Loss and Accuracy trajectories

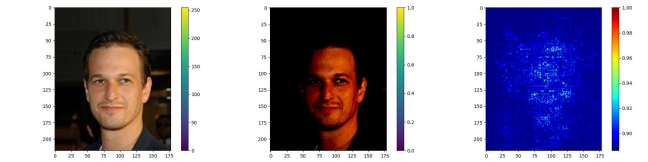

Fig. 8. Heat Map of ShuffleNet

	Train	Valid	Test
Xception	0.865	0.630	0.639
MobileNet	0.990	0.641	0.611
ShuffleNet	0.978	0.457	0.452
Ours	0.911	0.615	0.629

Table 2. Accuracy on training/validation/testing set

	# of Parameters	Time for TestingSet
Inception_v3	56M	15s
Xception	55M	22s
MobileNet	33M	15s
ShuffleNet	29M	6s
Ours	1M	11s

Table 3. Comparison of computational effort between models

Reference

[1] Christian Szegedy, Vincent Vanhoucke, Sergey Ioffe, Jon Shlens, Zbigniew Wojna. Rethinking the Inception Architecture for Computer Vision. The IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pages 2818-2826, 2016.

2Francois Chollet. Xception: Deep Learning with Depthwise Separable Convolutions. arXiv preprint arXiv: 1610.02357v3, 2017.

3Andrew G. Howard, Menglong Zhu, Bo Chen, Dmitry Kalenichenko, Weijun Wang, Tobias Weyand, Marco Andreetto, Hartwig Adam. MobileNets: Efficient Convolutional Neural Networks for Mobile Vision Applications. arXiv preprint arXiv: 1704.04861, 2017.

[4] Xiangyu Zhang, Xinyu Zhou, Mengxiao Lin, Jian Sun. ShuffleNet: An Extremley Efficient Convolutional Neural Network for Mobile Devices. arXiv preprint: arXiv: 1707.01083v2, 2017.