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DISTRACTED DRIVER DETECTION USING MOBILEVGG NETWORK

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION

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PROBLEM STATEMENT

Road accidents have increased significantly in recent years as a result of driver distraction from various activities including talking on the phone or drinking while driving.Despite extensive research, the projected solutions are either computationally expensive or have a slow reaction time.

ABSTRACT

In order to address this issue, we will first train a Deep Learning model that is computationally more affordable and has a faster response time. We will then deploy this model on the web using Django to obtain a realistic experience.

DATASET USED

- Stateafarm dataset Of kaggle
- It contains 22424 Images
- 15692 are used as training and 2237 as a test images
- image size of 640*480*3
- Dataset was of 10 classes
- different classes are Safe driving, texting-right , talking on phone-right, texting left, talking on phone-left,Operating radio , Drinking , Reaching Behind, Hair and makeup , talking to passenger

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DATA AUGMENTATION

Preprocessing

Each image in the dataset has been downsized to 224*224*3 pixels, after which the photos have been subjected to transforms like vertical shift, horizontal shift, random zoom, and shear with 0.2 range.

Normalization

To ensure that each input (in this case, each pixel value) comes from a standard distribution, normalisation has been done. In other words, the pixel value range in one input image matches the pixel value range in another image.

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VGG 16 ARCHITECTURE

01

Andrew Zisserman and Karen Simonyan first proposed the VGG model in 2013 and created a prototype for the 2014 ImageNe

02

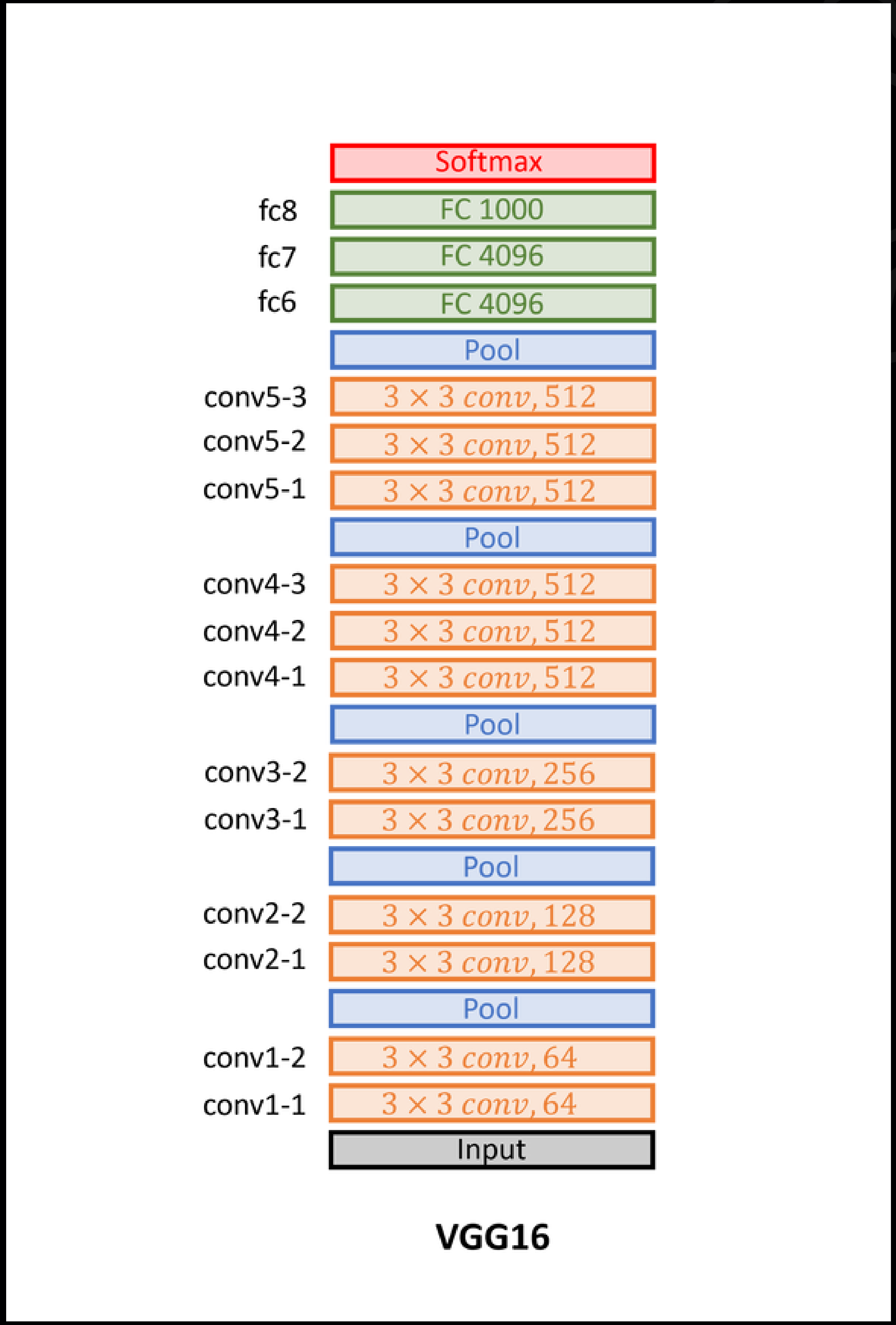
They concentrated on having 3x3 convolution layers with stride 1, and they consistently employed the same padding and maxpool layer with stride 2.

03

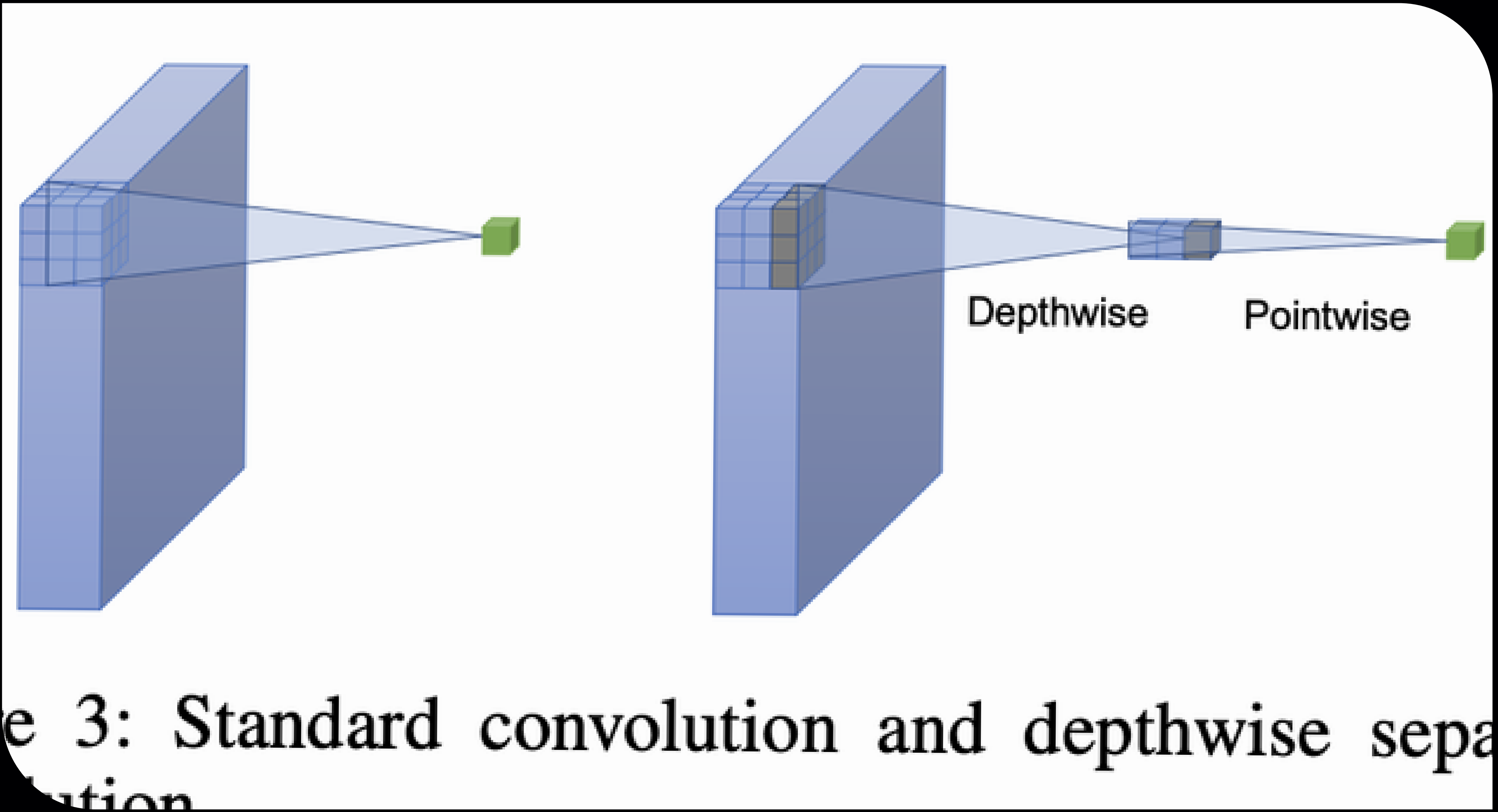
Conv-1 Layer has 64 number of filters, Conv-2 has 128 filters, Conv-3 has 256 filters, Conv 4 and Conv 5 has 512 filters.

04

VGG16 has a total of 138 million parameters.



SEPARABLE CONV



A SEPARABLE CONVOLUTION IS A PROCESS IN WHICH A SINGLE CONVOLUTION CAN BE DIVIDED INTO TWO OR MORE CONVOLUTIONS TO PRODUCE THE SAME OUTPUT. A SINGLE PROCESS IS DIVIDED INTO TWO OR MORE SUB-PROCESSES TO ACHIEVE THE SAME EFFECT.

MAINLY THERE ARE TWO TYPES OF SEPARABLE CONVOLUTIONS

- SPATIALLY SEPARABLE CONVOLUTIONS.
- DEPTH-WISE SEPARABLE CONVOLUTIONS.

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01 Optimizer

With beta 1 = 0.9 and beta 2 = 0.999, we employed the Adam as an optimizer.

02 Loss function

Here, we utilise a categorical cross entropy loss function to assess how well the model is performing.

03 Learning Rate

We tested different learning rates in order to prevent overfitting, and when the learning rate was equal to 0.0001, the model performed well.

04 Epochs

The best version of the model was at 55 epochs after we trained the model for 55 no epochs over 55 epochs because we discovered the model was overfitting.

05 Activation Function

When applying the dense layer, we used leakyRelu as the activation function between the hidden layers and softmax.

06 Evaluation metrics

Accuracy is one of the measures we used to gauge how well our model performed.

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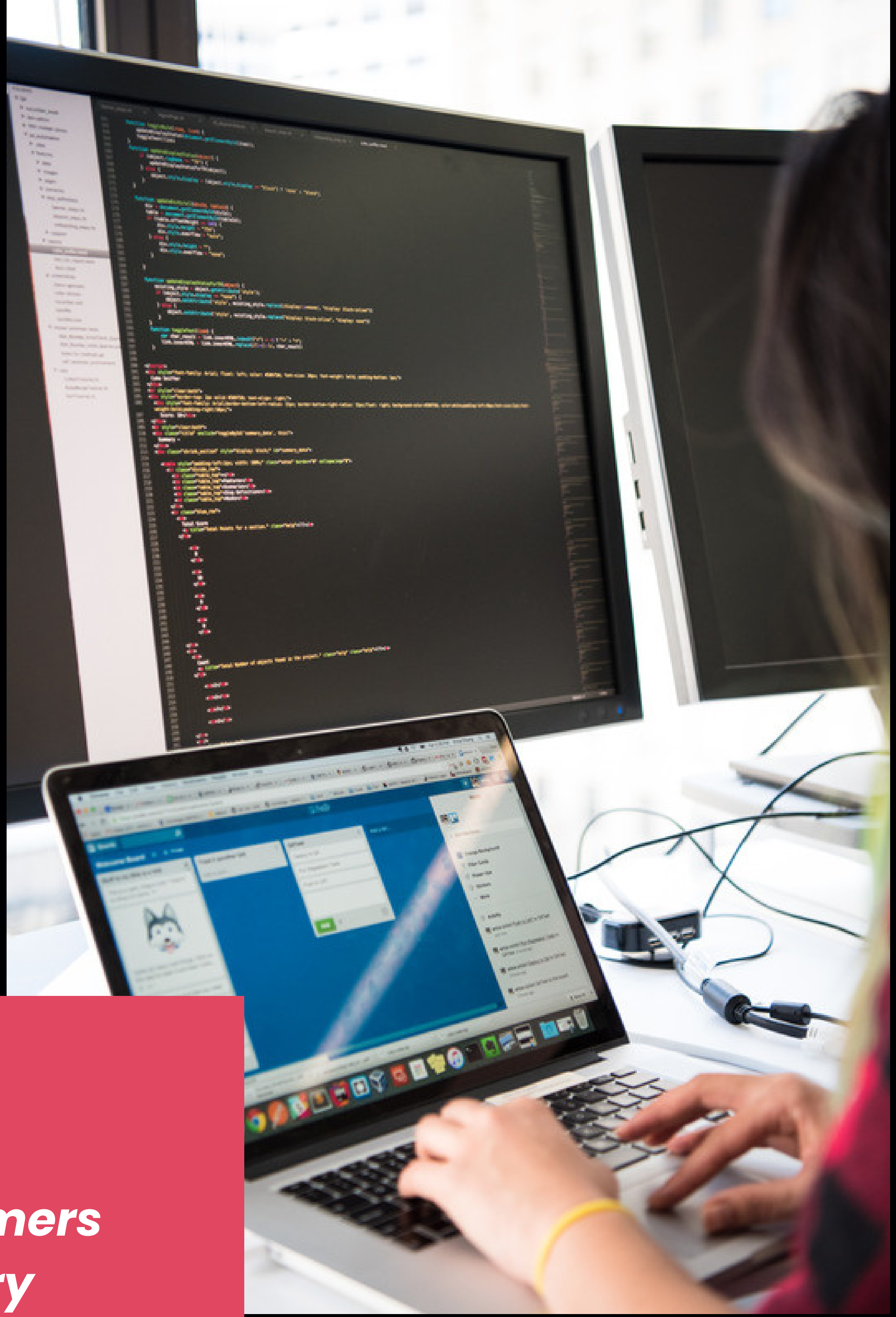
DEPLOYING THE MODEL

81%

Streamlit APi

To obtain a true sense of the model, we deployed it using the Streamlit api.

LEARN MORE



Programmers are very important.

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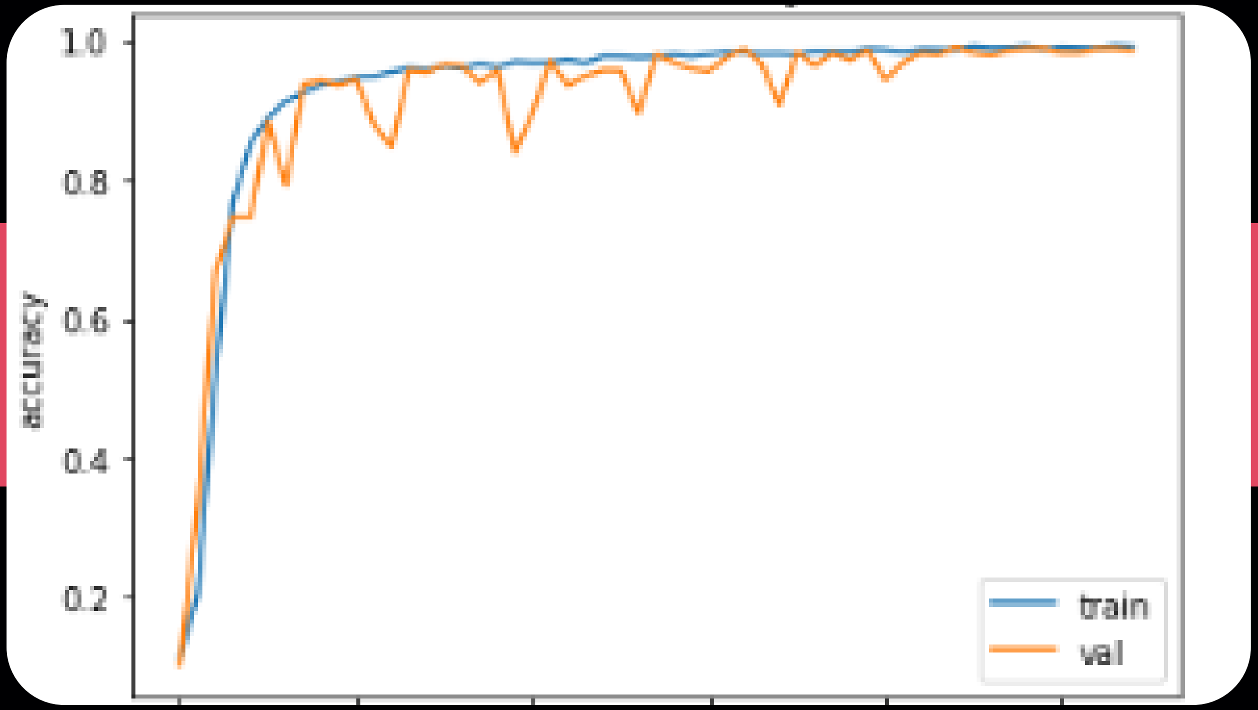
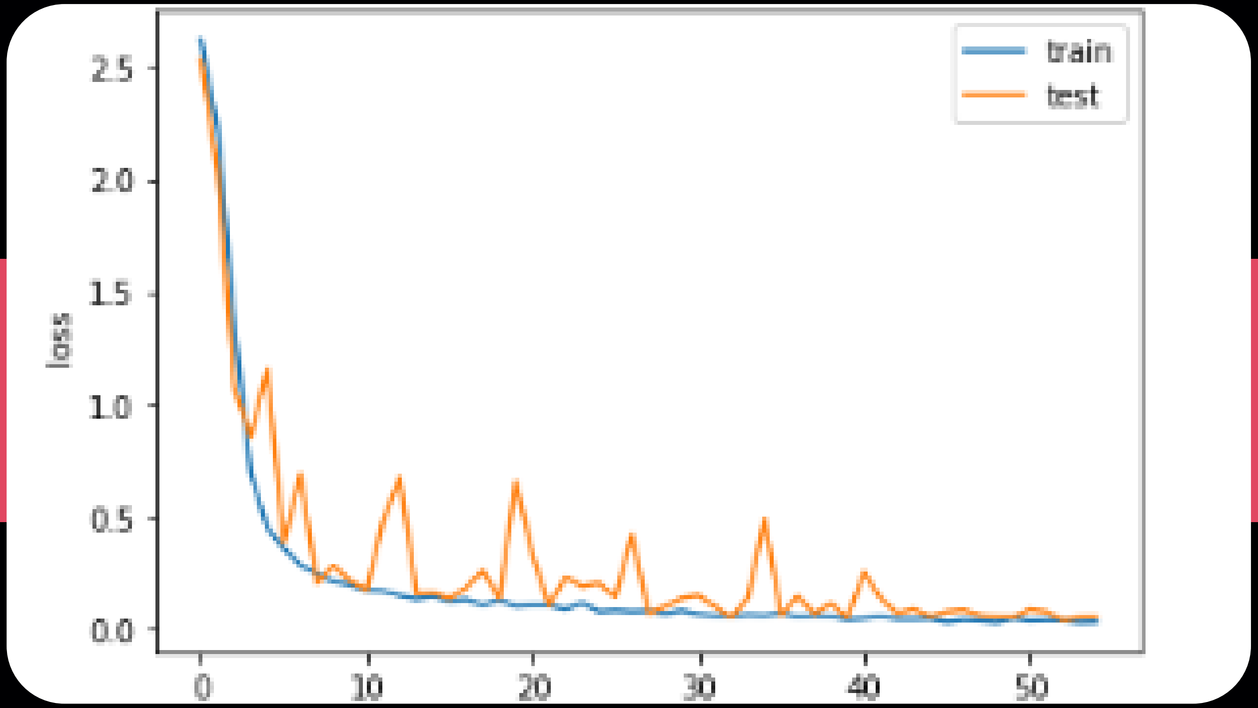
RESULTS



Accuracy

After 55 epochs, we obtained the training accuracy to be equal to 99.15 and the test accuracy to be equal to 98.66.



Loss

After 55 epochs, we obtained the training loss to be equal to 0.0282 and the test loss to be equal to 0.0356.

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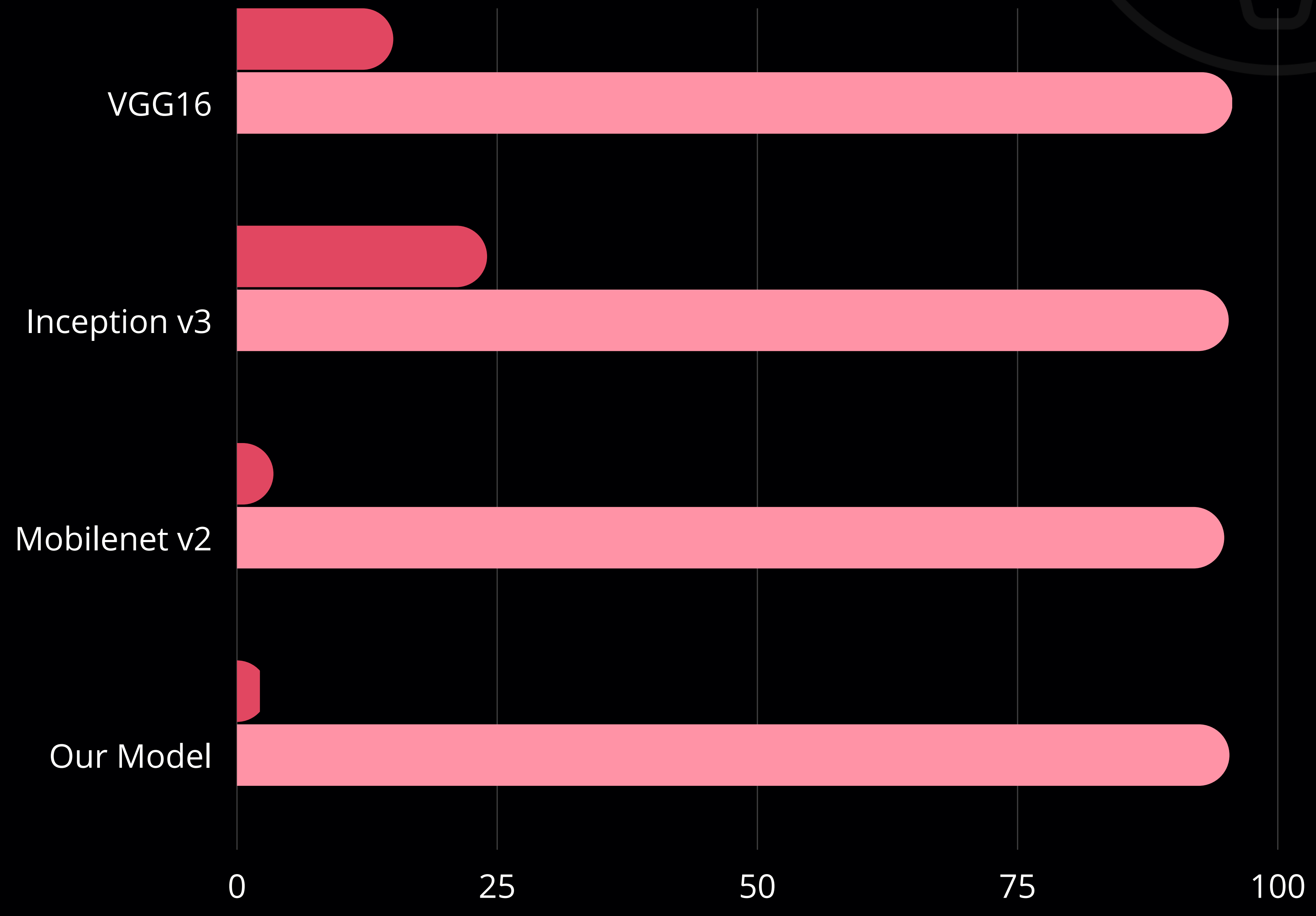
EVALUATION

Description

Here, following the experiment, the test accuracy was 98.66 and the training accuracy was 99.15, which is slightly better than other algorithms and requires fewer parameters.



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THANK YOU