LAB Logbook

Lab 1

A graph with orange dots

Description automatically generated

Lab 2

Task 1

Test accuracy: 0.940

A screenshot of a computer

Description automatically generated

A graph of a graph showing a line

Description automatically generated with medium confidence

A graph showing the growth of a number of people

Description automatically generated

Task 2

A diagram of a network

Description automatically generated

**Step 1: Calculate Input Values**

Given:

* SID = 2353465
* x1 = (SID / 8964879) \* 23
* x2 = (SID / 8964879) \* 32
* x3 = (SID / 8964879) \* 56
* x4 = (SID / 8964879) \* 48

First, compute the value of SID / 8964879:

SID/8964879 = 2353465/8964879

≈ 0.2625

Now, calculate the input values:

x1 = 0.2625∗23 ≈ 6.0375

x2 = 0.2625∗32 ≈ 8.4

x3 = 0.2625∗56 ≈ 14.7

x4 = 0.2625∗48 ≈ 12.6

**Step 2: Calculate Hidden Layer 1 (H1 and H2)**

We will use the perceptron formula:

Z = b+∑(wi∗xi)

For H1:

zH1 = w1∗x1+w3∗x2+w5∗x3+w7∗x4

zH1 = 0.2∗6.0375+0.2∗8.4+0.2∗14.7+0.2∗12.6

zH1 = 8.3475

Apply ReLU activation:

H1 = max (0, zH1) = max (0, 8.3475) = 8.3475

For H2:

zH2 = *w*2∗*x*1+*w*4∗*x*2+*w*6∗*x*3+*w*8∗*x*4

zH2 = 0.2∗6.0375+0.2∗8.4+0.2∗14.7+0.2∗12.6

zH2 = 8.3475

Apply ReLU activation:

H2 = max (0, zH2) = max (0, 8.3475) = 8.3475

**Step 3: Calculate Hidden Layer 2 (H3 and H4)**

For H3:

zH3 = w9∗H1+w11∗H2

zH3 = 0.1∗8.3475+0.1∗8.3475

zH3 = 1.6695

Apply ReLU activation:

H3 = max (0, zH3) = max (0, 1.6695) = 1.6695

For H4:

zH4 = *w*10∗*H*1+*w*12∗*H*2

zH4 = 0.1∗8.3475+0.1∗8.3475

zH4 = 1.6695

Apply ReLU activation:

H4 = max (0, *zH*4​) = max (0, 1.6695) = 1.6695

**Step 4: Calculate Output Layer (O1 and O2)**

For O1:

zO1 = w13∗H3+w15∗H4+0.5

*zO*1 ​=0.50085+0.50085+0.5

zO1 ​= 1.5017

Apply Sigmoid activation:

O1 = 1/1+*e^(*−*zO*1​)​ = 1/1+*e^ (*−1.50171) ​≈ 0.8176

For O2:

zO2 = w14∗H3+w16∗H4+0.5

zO2 ​= 0.3∗1.6695+0.3∗1.6695+0.5

zO2 = 0.50085+0.50085+0.5

zO2 = 1.5017

Apply Sigmoid activation:

O2 = 1/1+*e^(*−*zO*1​)​ = 1/1+*e^ (*−1.50171) ​≈ 0.8176

**Final Output**

The final output of the neural network is:

O1 ≈ 0.8176

O2 ≈ 0.8176

This means that the neural network, given the inputs and weights, produces outputs O1 and O2 both equal to 0.8176.

Lab 3

Model's Test Accuracy: 91.24%

A screenshot of a computer

AI-generated content may be incorrect.

Lab 4

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

A graph with red and blue lines

AI-generated content may be incorrect.

Lab 5

1. Plot of the model's summary

A black screen with white text and green text

AI-generated content may be incorrect.

A computer screen shot of a black screen

AI-generated content may be incorrect.

A black screen with white text

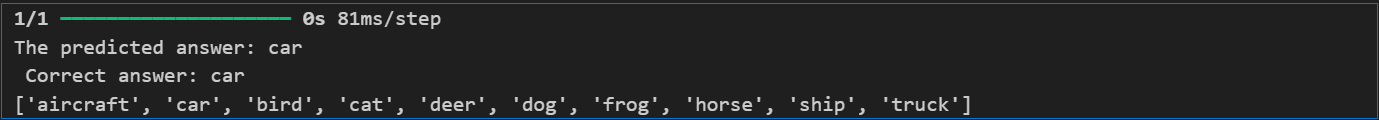
AI-generated content may be incorrect.

2. A graphical representation depicting the train loss and validation loss trends.

A graph of training and validation loss

AI-generated content may be incorrect.

3. Based on this analysis, determine the optimal number of epochs for training your model.

Optimal number of epochs: 11A blurry image of a car driving on a road

AI-generated content may be incorrect.A graph with green bars and numbers

AI-generated content may be incorrect.

Lab 6

1.A screenshot of a computer

AI-generated content may be incorrect.

2

2.1

A screen shot of a computer program

AI-generated content may be incorrect.

2.2

A screenshot of a computer

AI-generated content may be incorrect.

3.

A graph with a line graph and a chart with a line graph and a chart with a line graph and a chart with a line graph and a chart with a line graph and a chart with a

AI-generated content may be incorrect.

4.

A screen shot of a computer code

AI-generated content may be incorrect.

Lab 7

1. Plot graphs for Accuracy and Loss Function for VGG16 and VGG19 (4 graphs in total).

A graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of

AI-generated content may be incorrect.

A graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of a graph of

AI-generated content may be incorrect.

A graph of a number of red and blue lines

AI-generated content may be incorrect.

2. Based on this analysis, determine the optimal number of epochs for training your VGG16 model.

A screen shot of a computer code

AI-generated content may be incorrect.

3. Add the final Performance Table

A screen shot of a computer

AI-generated content may be incorrect.

4. Plot the performance comparing histogram of VGG16 and VGG19

A graph of error statistics

AI-generated content may be incorrect.

Lab 8

1 - LSTM architecture using model.summary()

A screenshot of a computer

AI-generated content may be incorrect.

2 - code and training result using model.fit()

A screen shot of a computer program

AI-generated content may be incorrect.

A black screen with white text

AI-generated content may be incorrect.

3 - the resulting test MSE & MAE and

A graph with blue and orange lines

AI-generated content may be incorrect.

A graph with orange and blue lines

AI-generated content may be incorrect.

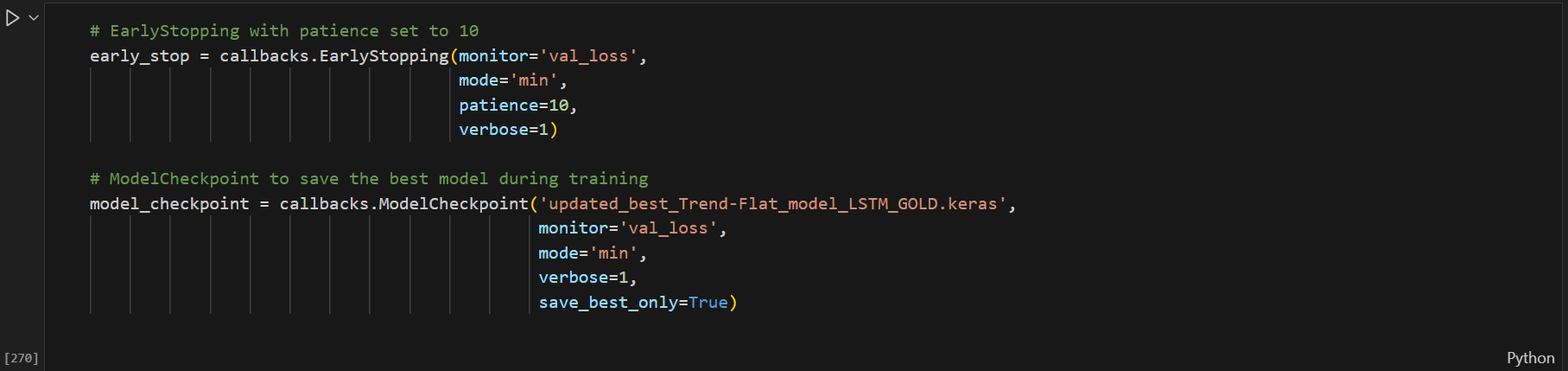
4 - MAE detailed graph.

A graph with a line graph and numbers

AI-generated content may be incorrect.

Lab 9

1 - code your Use EarlyStopping() and ModelCheckpoint() functions



2 - code and training result using model.fit()

A computer screen with text on it

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

3 - the resulting test Accuracy and other error metrics for the classification task using classification\_report().

A screenshot of a computer program

AI-generated content may be incorrect.

4 - Accuracy detailed graph

A graph with red blue and green lines

AI-generated content may be incorrect.

Lab 10

Task 1

- Encoder, Decoder and Basic Autoencoder models using summary()

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

Task – 2

- Table of your model autoencoder.summary()

A screenshot of a computer program

AI-generated content may be incorrect.

- Code of your autoencoder.fit()

A screen shot of a computer

AI-generated content may be incorrect.

- Accuracy detailed graph

A graph with blue dots

AI-generated content may be incorrect.

- Document the plot of the decoded images for task 2. Change the colour, appearance, and shape of the plot according to your own choice (see plt.figure() parameters).

A group of yellow and blue numbers

AI-generated content may be incorrect.

Lab 11

A screenshot of a computer

AI-generated content may be incorrect.

Lab 12

- calculation of your parameters

A black screen with green text

AI-generated content may be incorrect.

- your code of using EarlyStopping() and ModelCheckpoint() functions

A screen shot of a computer program

AI-generated content may be incorrect.

- your code and training result using model.fit()

A screenshot of a computer program

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

- received loss for train and test datasets

A screen shot of a computer

AI-generated content may be incorrect.

- Loss (MSE) graph for the 3 models together during the training process

A graph of a training graph

AI-generated content may be incorrect.

- performance histogram for train and test loss (MSE) of the 3 models together

A graph of blue and orange bars

AI-generated content may be incorrect.