Code: 2023FS-COMP_SCI-5567-0001_Deep Learning

Mini_project-2

Name: Ramya Kumari Thambabattula

Student ID: 16342145

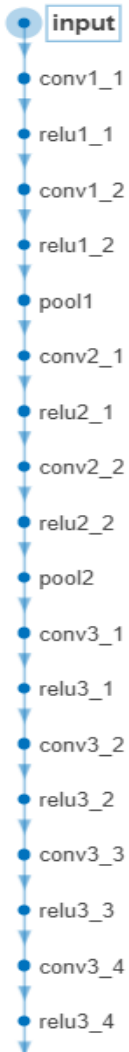
Deep Learning Network Analyzer

Analysis for trainNetwork usage

Name: net

Analysis date: 01-Dec-2023 17:30:27

143.6M	47	0	0
total learnables	layers	warnings	errors



ANALYSIS RESULT

	Name	Type	Activations	Learnable Proper...	St
1	input 224x224x3 images with 'zerocenter' nor...	Image Input	224(S) × 224(S) × 3(C) × 1(B)	-	-
2	conv1_1 64 3x3x3 convolutions with stride [1 1] a...	2-D Convolution	224(S) × 224(S) × 64(C) × 1(B)	Weig... 3 × 3 × 3 ... Bias 1 × 1 × 64	-
3	relu1_1 ReLU	ReLU	224(S) × 224(S) × 64(C) × 1(B)	-	-
4	conv1_2 64 3x3x64 convolutions with stride [1 1] ...	2-D Convolution	224(S) × 224(S) × 64(C) × 1(B)	Weig... 3 × 3 × 64... Bias 1 × 1 × 64	-
5	relu1_2 ReLU	ReLU	224(S) × 224(S) × 64(C) × 1(B)	-	-
6	pool1 2x2 max pooling with stride [2 2] and pa...	2-D Max Pooling	112(S) × 112(S) × 64(C) × 1(B)	-	-
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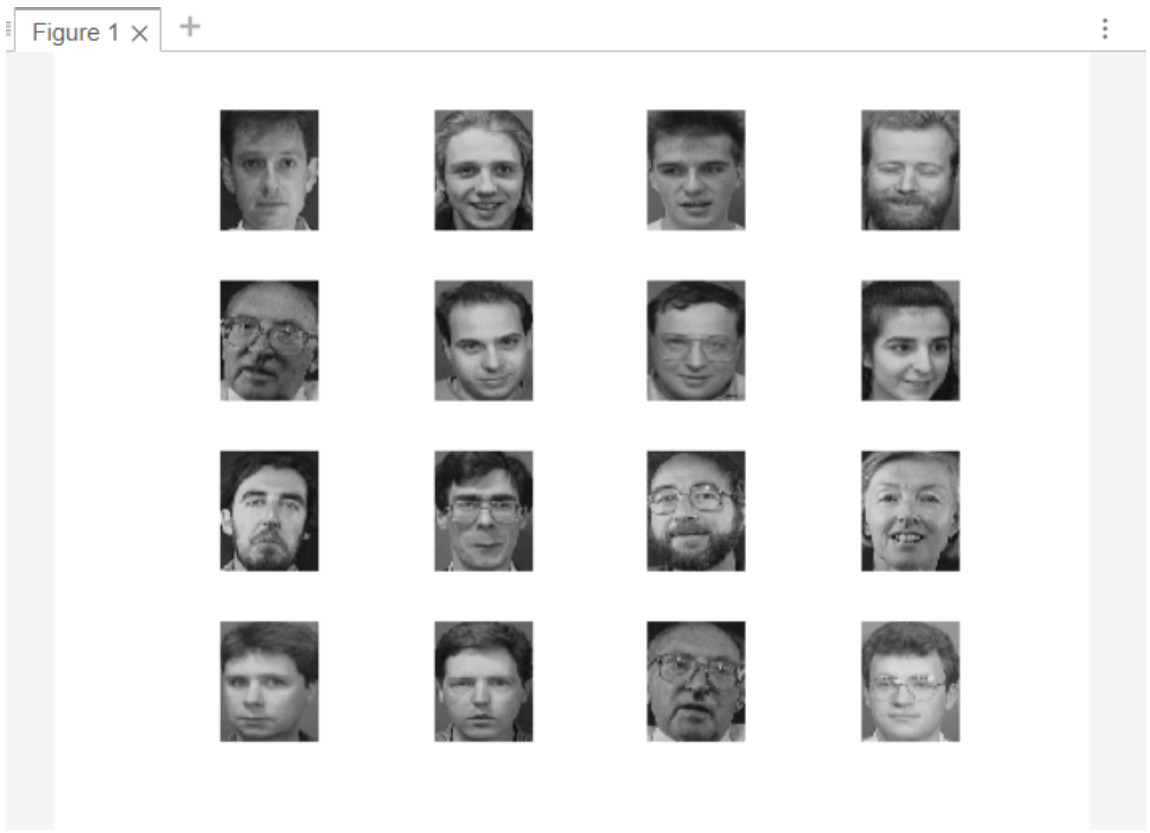
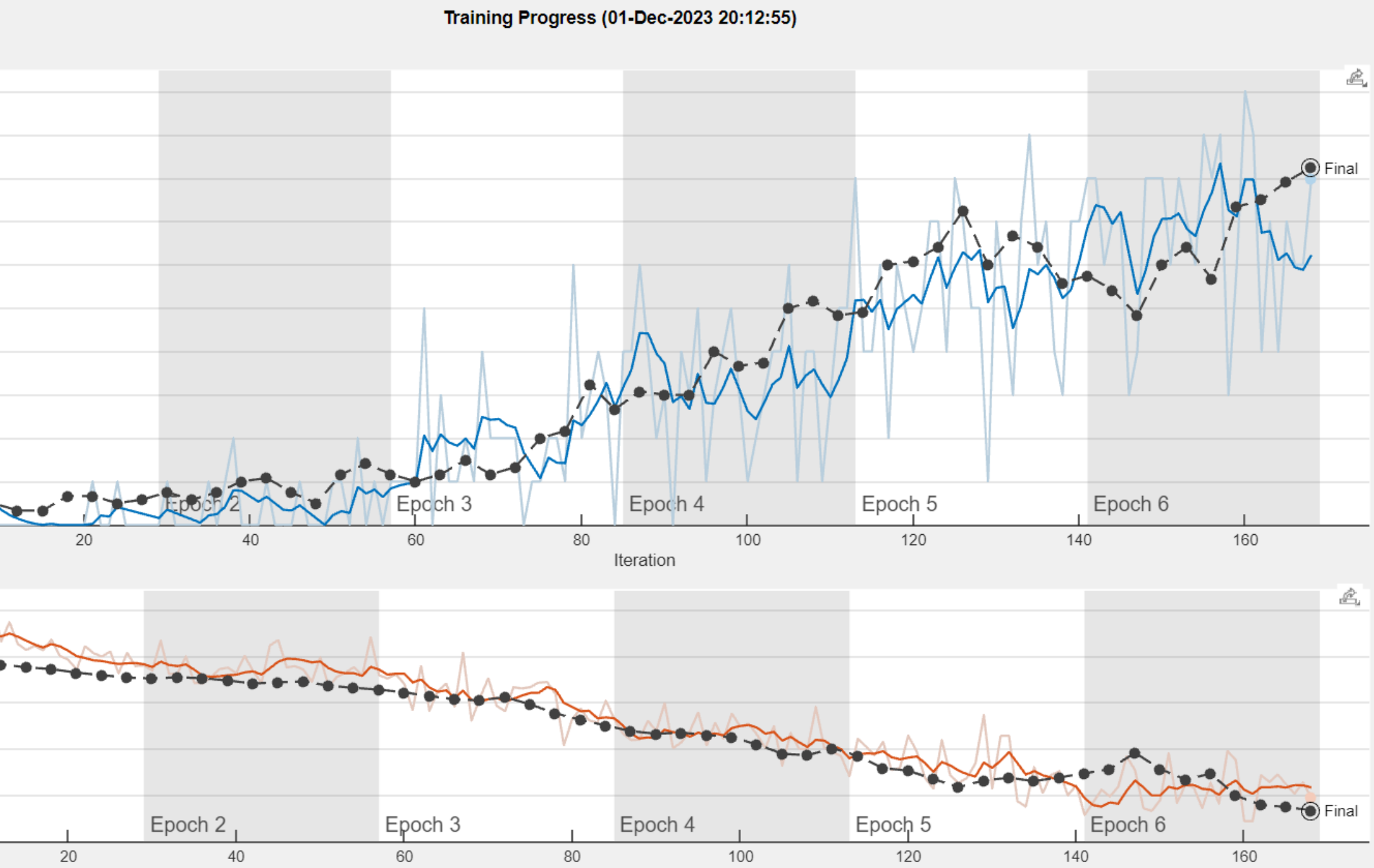
8	relu2_1 ReLU	ReLU	112(S) × 112(S) × 128(C) × 1(B)	-	-
9	conv2_2 128 3x3x128 convolutions with stride [1 ...	2-D Convolution	112(S) × 112(S) × 128(C) × 1(B)	Wei... 3 × 3 × 128... Bias 1 × 1 × 128	-
10	relu2_2 ReLU	ReLU	112(S) × 112(S) × 128(C) × 1(B)	-	-
11	pool2 2x2 max pooling with stride [2 2] and pa...	2-D Max Pooling	56(S) × 56(S) × 128(C) × 1(B)	-	-
12	conv3_1 256 3x3x128 convolutions with stride [1 ...	2-D Convolution	56(S) × 56(S) × 256(C) × 1(B)	Wei... 3 × 3 × 128... Bias 1 × 1 × 256	-
13	relu3_1 ReLU	ReLU	56(S) × 56(S) × 256(C) × 1(B)	-	-
14	conv3_2 256 3x3x256 convolutions with stride [1 ...	2-D Convolution	56(S) × 56(S) × 256(C) × 1(B)	Wei... 3 × 3 × 256... Bias 1 × 1 × 256	-
15	relu3_2	ReLU	56(S) × 56(S) × 256(C) × 1(B)	-	-

Download the Vgg19 On Addons. Get Face Recognition using AlexNet

'MiniBatchSize', 10, ...
'MaxEpochs', 6, ...
'InitialLearnRate', 1e-4, ...
'Shuffle', 'every-epoch', ...
'ValidationData', augimdsValidation, ...
'ValidationFrequency', 3, ...
'Verbose', false, ...
'Plots', 'training-progress');



01-Dec-2023 20:12:55)



Results

Validation accuracy:	82.50%
Training finished:	Max ep

Training Time

Start time:	01-Dec-
Elapsed time:	20 min

Training Cycle

Epoch:	6 of 6
Iteration:	168 of 1
Iterations per epoch:	28
Maximum iterations:	168

Validation

Frequency:	3 iterati

Other Information

Hardware resource:	Single C
Learning rate schedule:	Constar
Learning rate:	0.0001

Learn more

Accuracy

Training (smooth

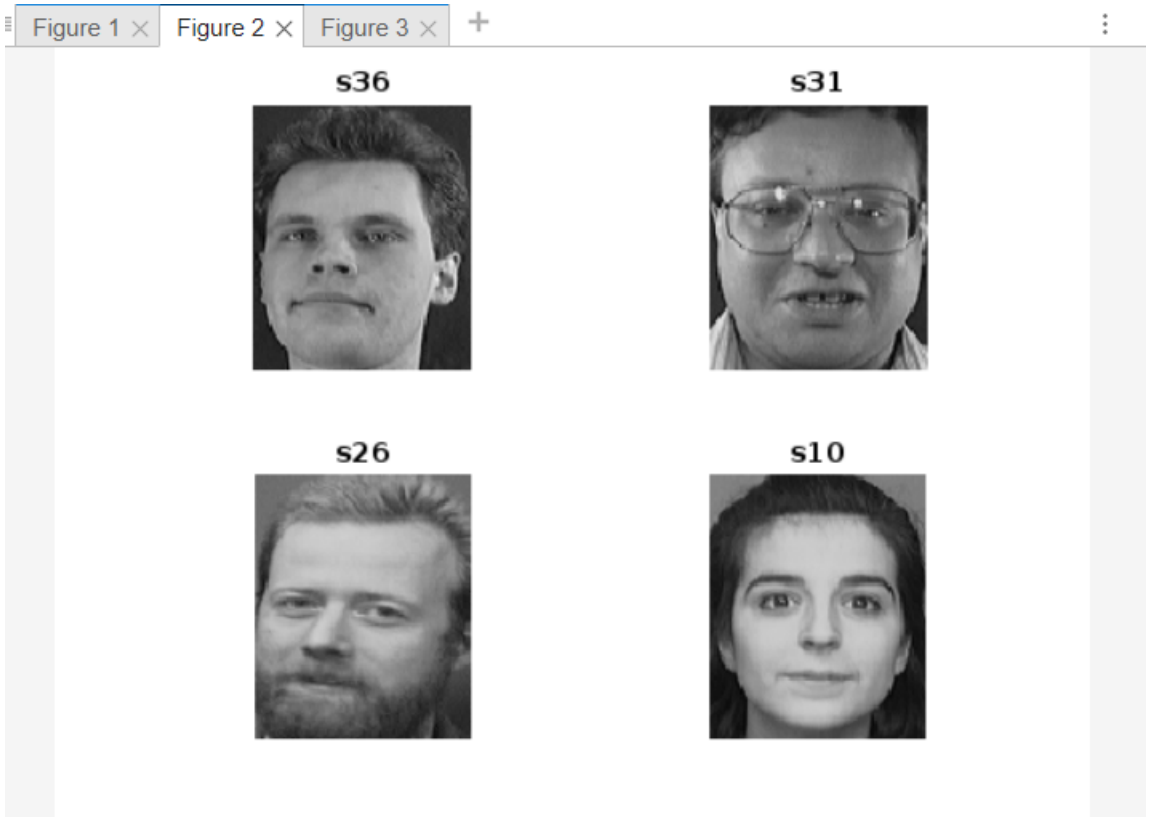
Training

Validation

Loss

Training (smooth

Face Recognition using AlexNet: Validated Images



Results

Validation accuracy:	82.50%
Training finished:	Max epochs completed

Training Time

Start time:	01-Dec-2023 20:12:55
Elapsed time:	20 min 41 sec

Training Cycle

Epoch:	6 of 6
Iteration:	168 of 168
Iterations per epoch:	28
Maximum iterations:	168

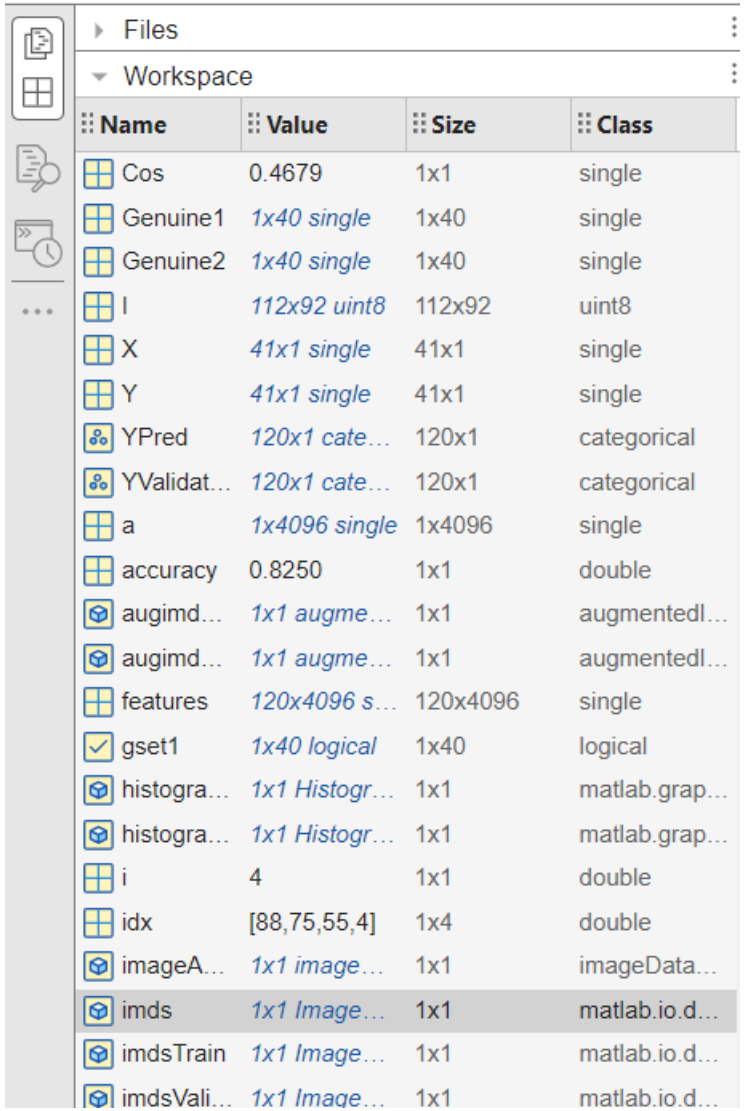
Validation

Frequency:	3 iterations

Other Information

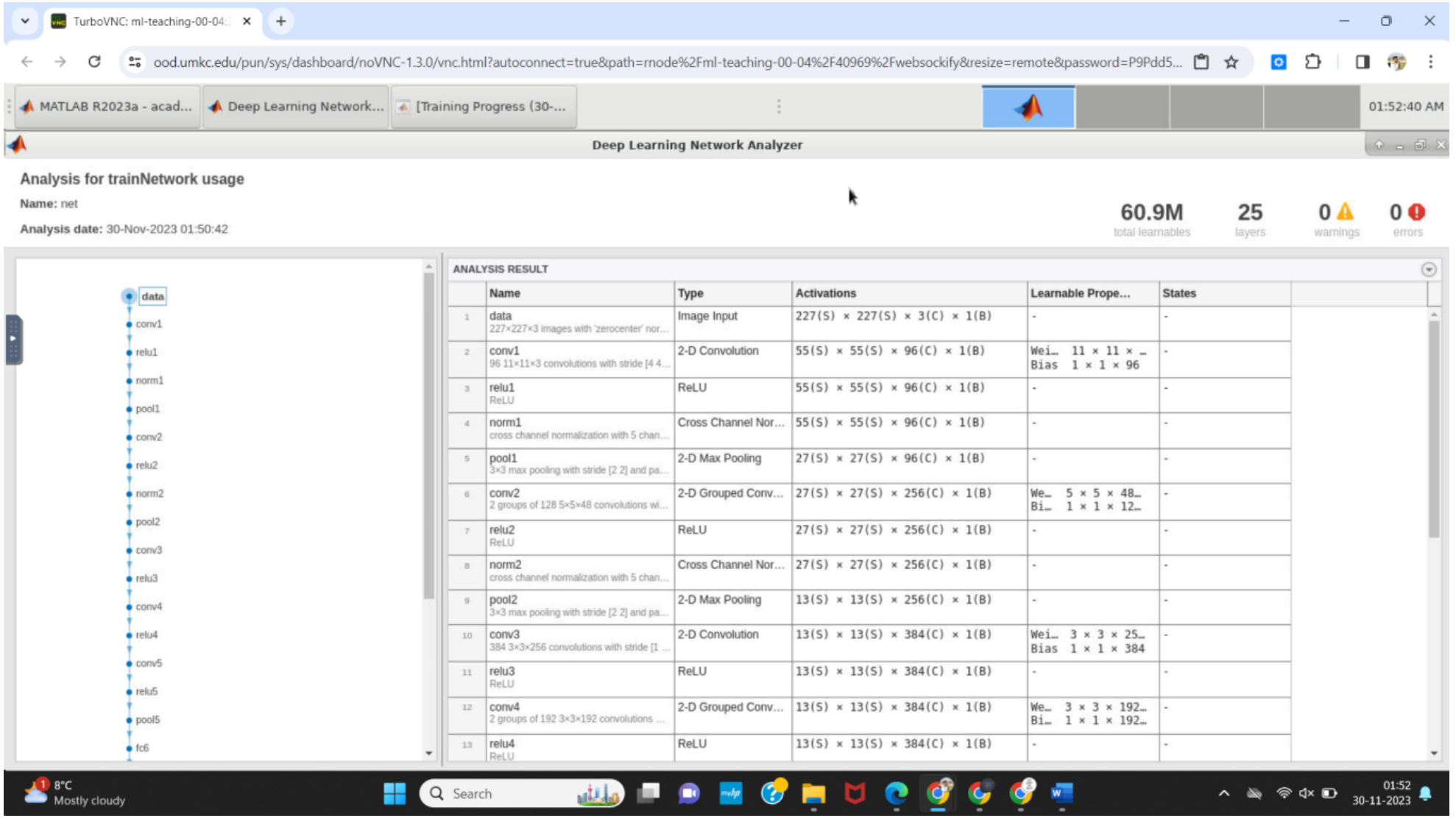
Hardware resource:	Single CPU
Learning rate schedule:	Constant
Learning rate:	0.0001

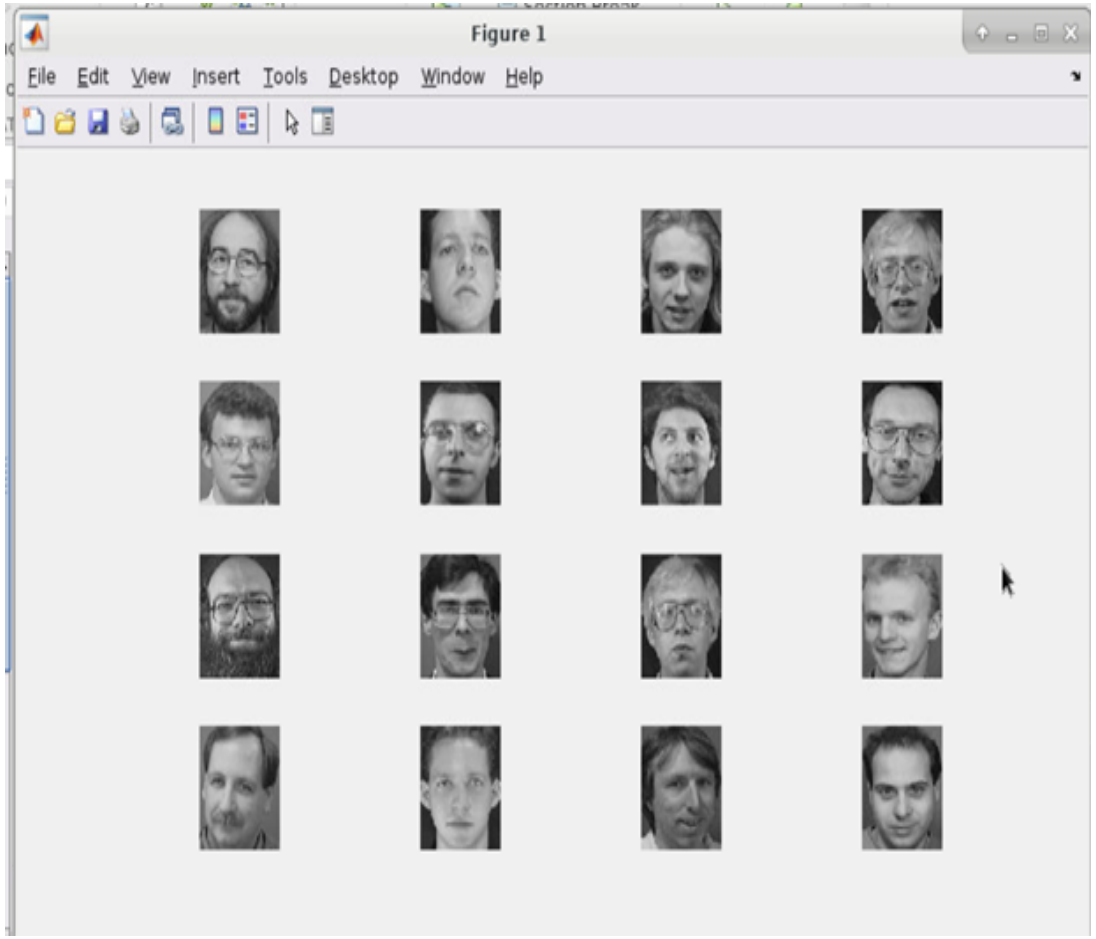
Workspace


Files
Workspace
Name
Value
Size
Class
Cos 0.4679 1x1 single
Genuine1 1x40 single 1x40 single
Genuine2 1x40 single 1x40 single
I 112x92 uint8 112x92 uint8
X 41x1 single 41x1 single
Y 41x1 single 41x1 single
YPred 120x1 cate... 120x1 categorical
YValidat... 120x1 cate... 120x1 categorical
a 1x4096 single 1x4096 single
accuracy 0.8250 1x1 double
augimd... 1x1 augme... 1x1 augmentedI...
augimd... 1x1 augme... 1x1 augmentedI...
features 120x4096 s... 120x4096 single
gset1 1x40 logical 1x40 logical
histogra... 1x1 Histogr... 1x1 matlab.grap...
histogra... 1x1 Histogr... 1x1 matlab.grap...
i 4 1x1 double
idx [88,75,55,4] 1x4 double
imageA... 1x1 image... 1x1 imageData...
imds 1x1 Image... 1x1 matlab.io.d...
imdsTrain 1x1 Image... 1x1 matlab.io.d...
imdsVali... 1x1 Image... 1x1 matlab.io.d...


Workspace
Name
Value
Size
Class
imposter1 1x40 single 1x40 single
imposter2 1x40 single 1x40 single
inputSize [224,224,3] 1x3 double
label s10 1x1 categorical
layering 'fc7' 1x3 char
layers 47x1 Layer 47x1 nnet.cnn.la...
layersTr... 44x1 Layer 44x1 nnet.cnn.la...
na 70.8954 1x1 single
net 1x1 Series... 1x1 SeriesNetw...
netTran... 1x1 Series... 1x1 SeriesNetw...
numCla... 40 1x1 double
numTrai... 280 1x1 double
nz 65.1566 1x1 single
options 1x1 Trainin... 1x1 nnet.cnn.Tr...
pixelRa... [-30,30] 1x2 double
set1 40x4096 si... 40x4096 single
set2 40x4096 si... 40x4096 single
set3 40x4096 si... 40x4096 single
t 0.7000 1x1 double
threshold 0.8000 1x1 double
z 1x4096 single 1x4096 single
za 2.1613e+03 1x1 single

Analysis Face Recognition using AlexNet. Training the network with modified data, Training Parameters 9 Epochs, Mini batch size 12



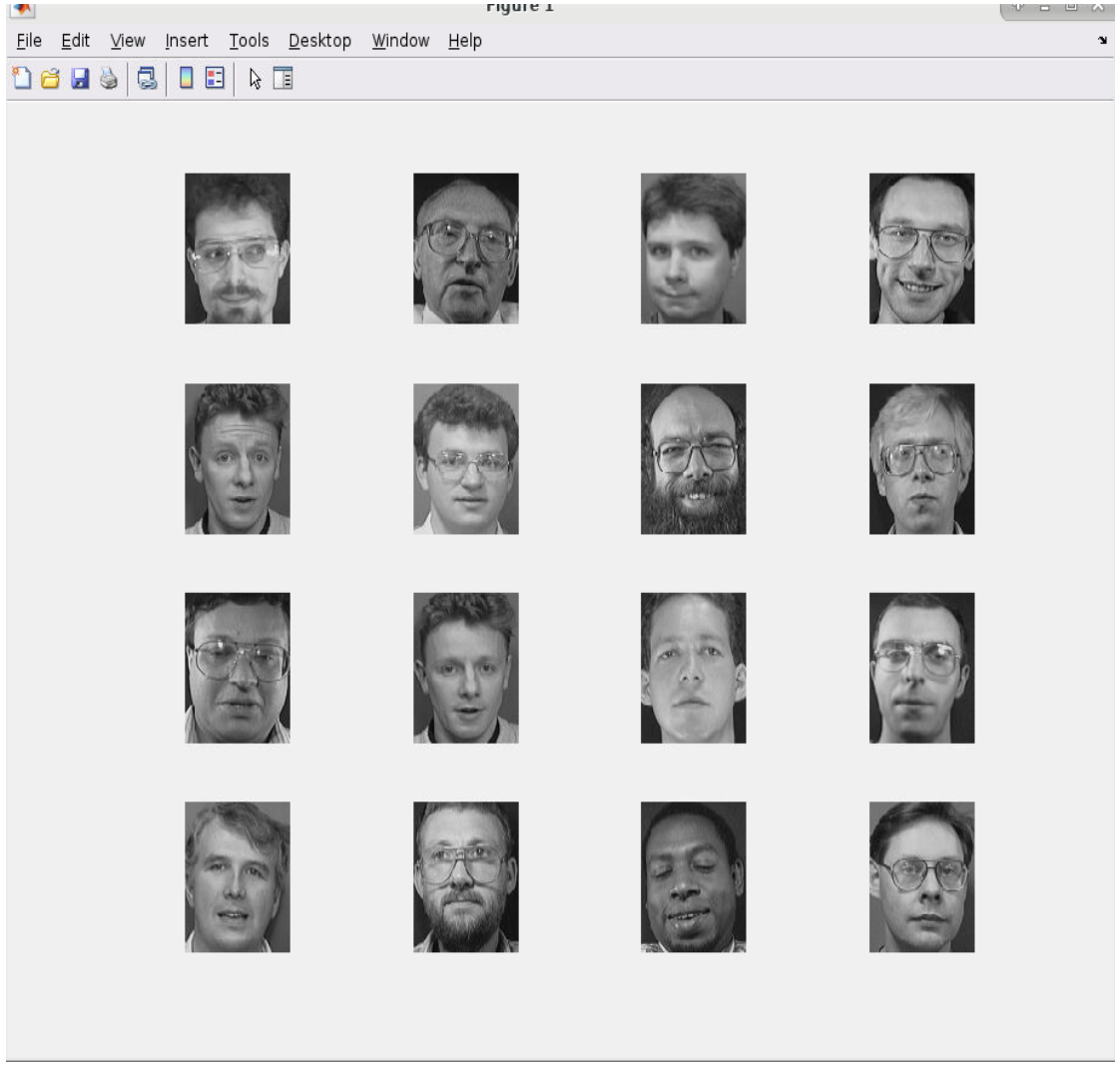


Training the network with modified settings

Epochs: 6 ; Batch size: 10; Validation accuracy: 71.67%. And default settings indicate the model achieved 71.67% accuracy on the validation set with limited training epochs and a moderate batch size.

Modified data Epochs: 9 ; Batch size: 12; Validation accuracy: 85%

Changing the settings to 9 epochs and a batch size of 12 resulted in a substantial increase in validation accuracy to 85%. The improvement from 71.67% to 85% in validation accuracy highlights the effectiveness of the changes.



Second Part: VGG19 Face Recognition

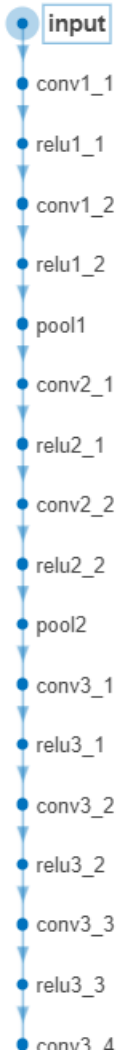
Deep Learning Network Analyzer

Analysis for trainNetwork usage

Name: net

Analysis date: 01-Dec-2023 21:41:56

143.6M	47	0	0
total learnables	layers	warnings	errors



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nes ; Mini
10

Histogram

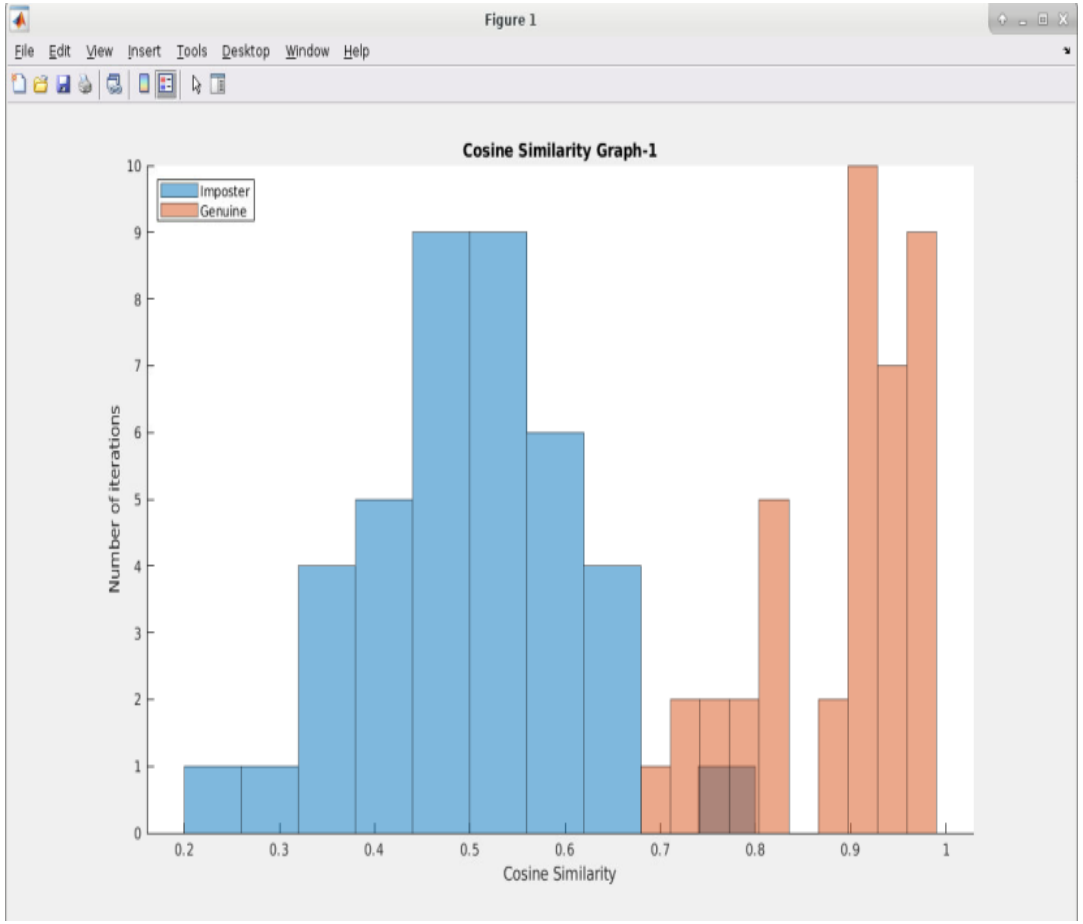
Figure 1
File Edit View Insert Tools Desktop Window Help
Cosine Similarity Graph-1
Imposter
Genuine
Number of iterations
Cosine Similarity
0 1 2 3 4 5 6 7 8 9 10
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

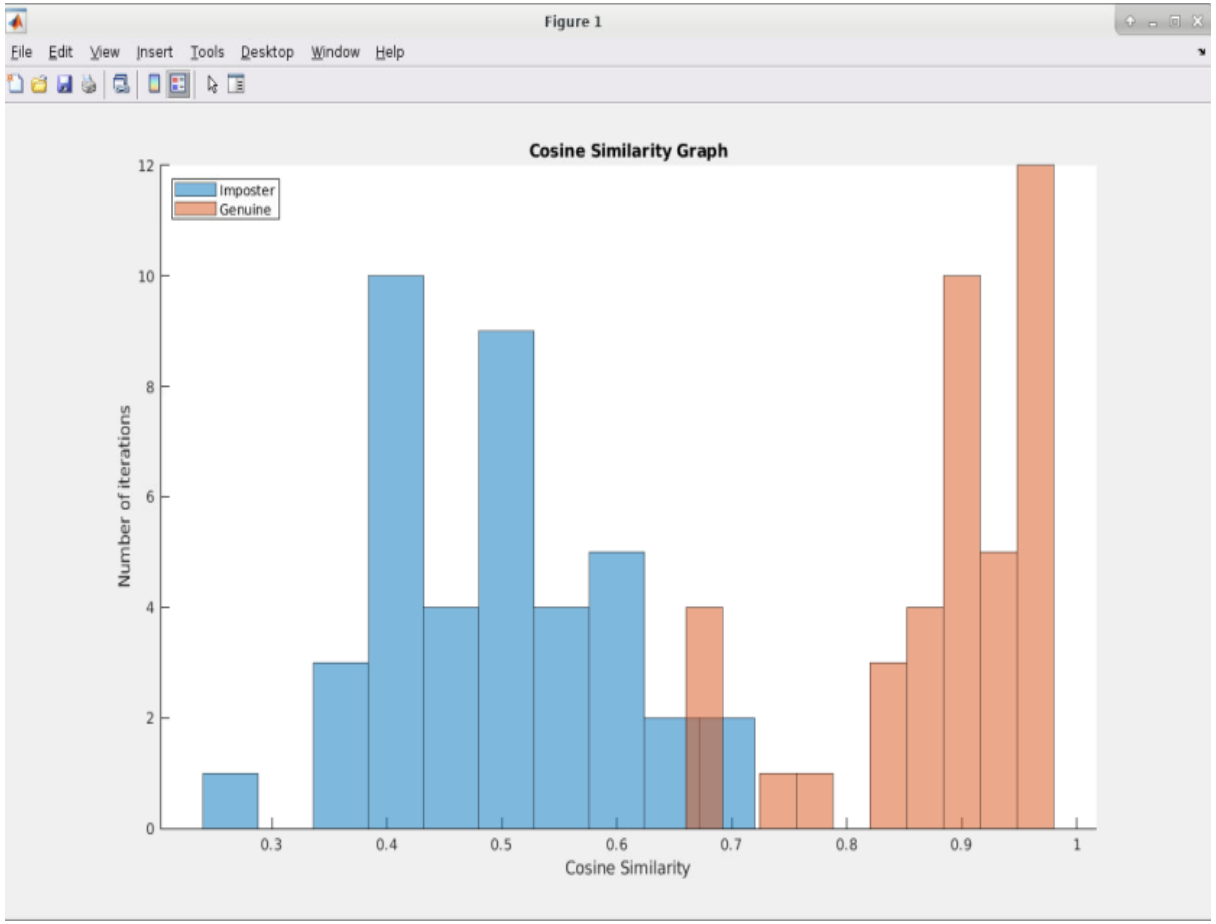
Figure 1
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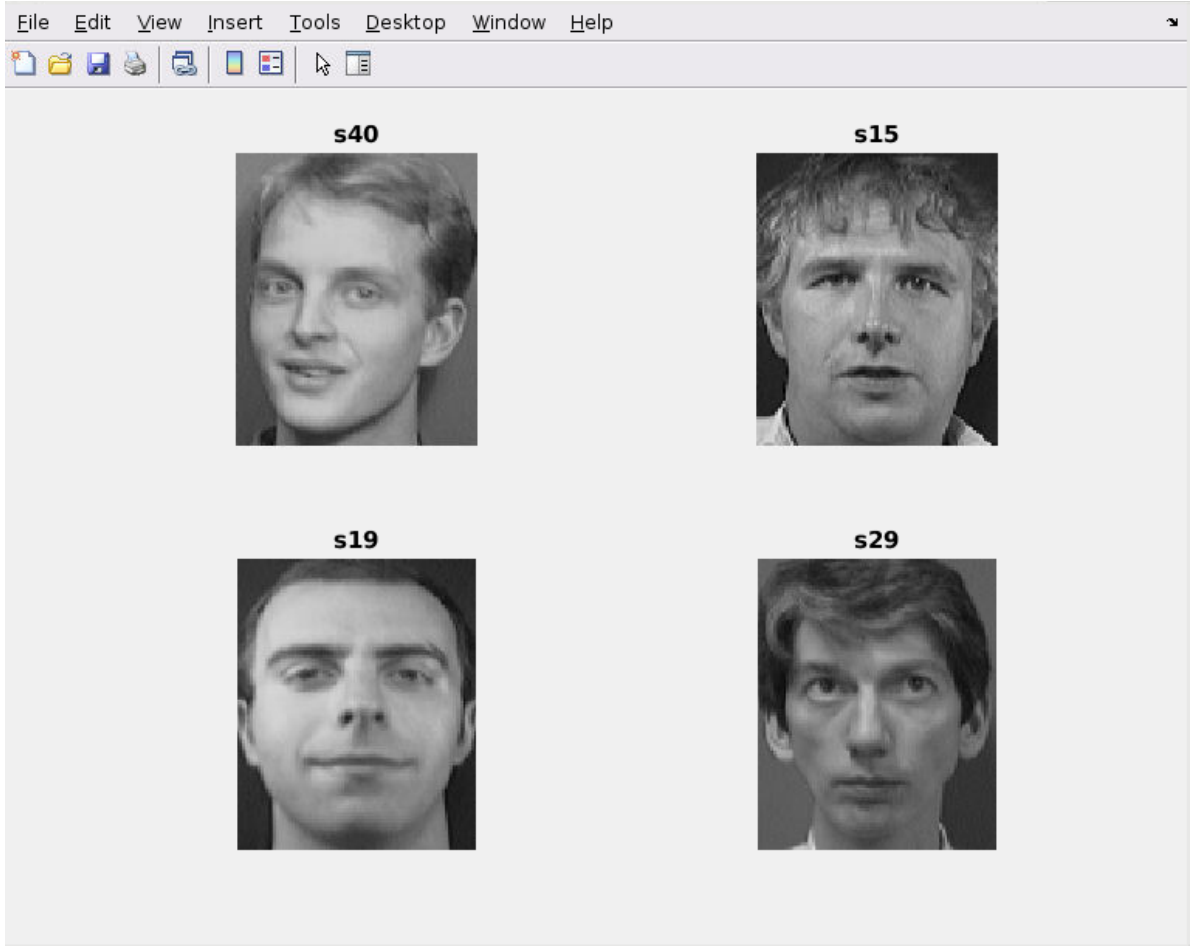
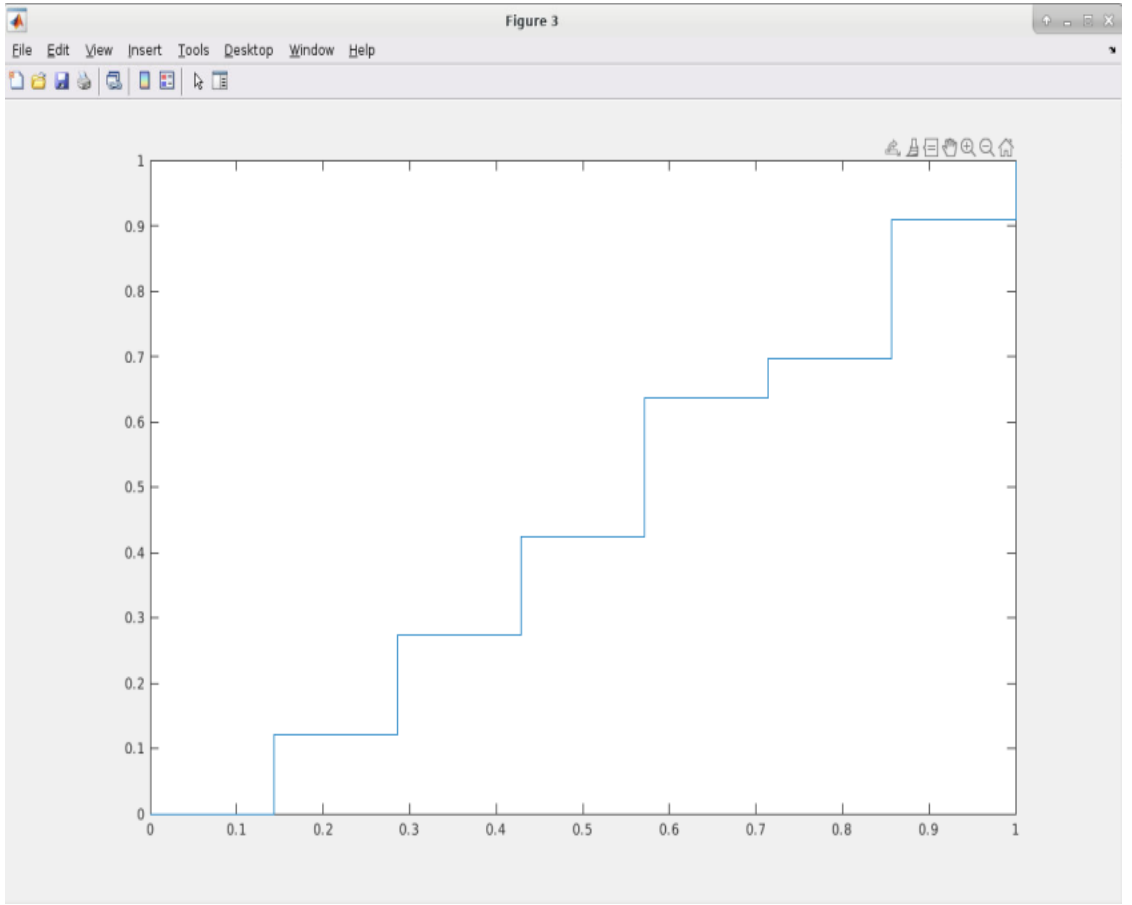
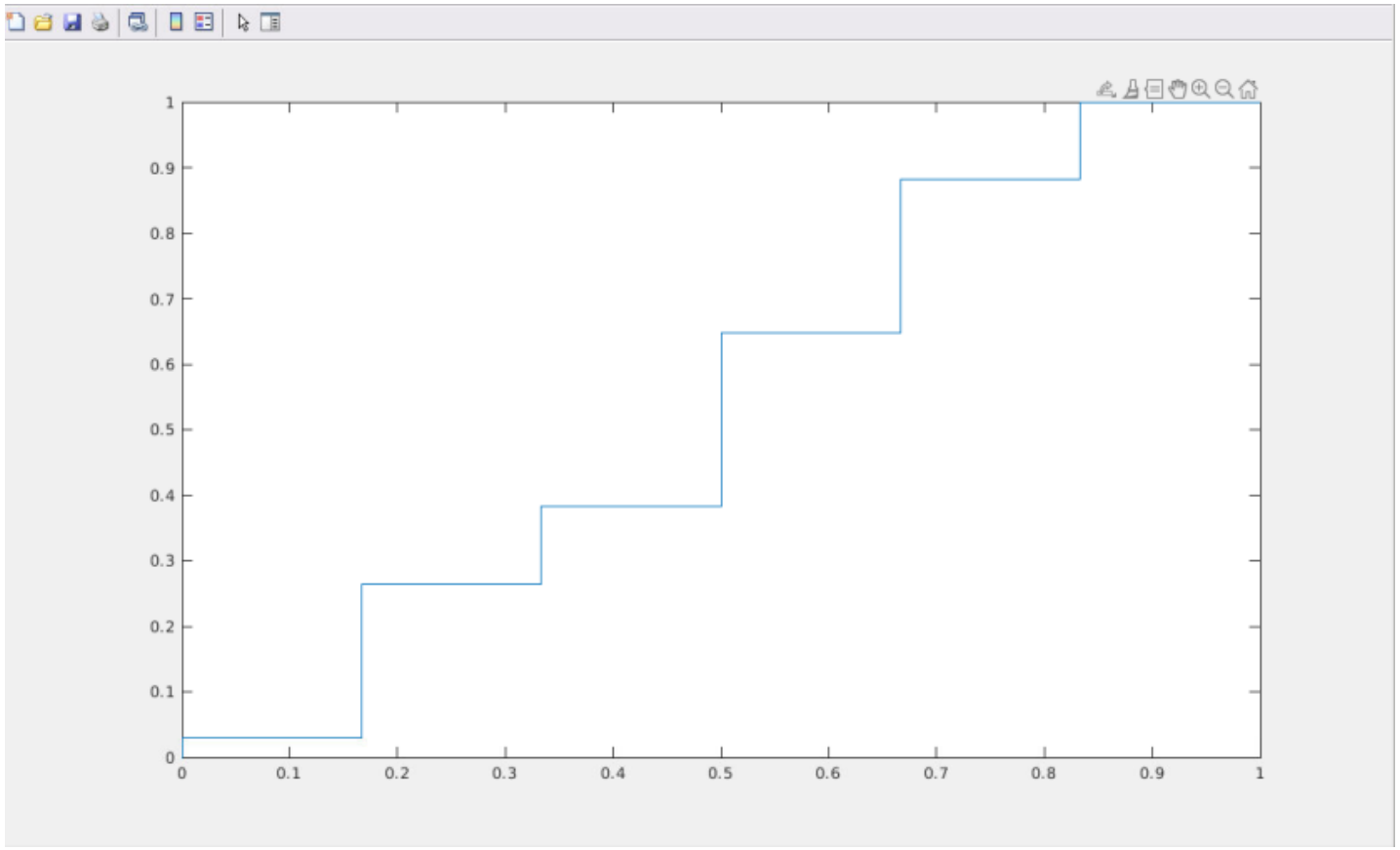
Cosine Similarity Graph
Imposter
Genuine
Number of iterations
Cosine Similarity
0 2 4 6 8 10 12
0.3 0.4 0.5 0.6 0.7 0.8 0.9 1





Roc curve verificatgion



Connect VGG-19 network ;Max epochs 6; Mini batch size 10; Validation accuracy: 89.16%; VGG-19 network achieved an 89.16% validation accuracy.

The Analyzing histograms: The cosine similarity between genuine and imposter scores for certain image pairs and showed more overlap compared to others.

The ROC curve observations: Among different verification scenarios, the ROC curve for the second verification exhibited the highest AUC score when compared to the ROC curve of the first verification