Helwan University

كلية الحاسبات والذكاء الإصطناعي
Faculty of Computers & Artificial Intelligence

Faculty of Computers and Artificial Intelligence

Computer Science Department

2021/2022

CS 395 Selected Topics in CS-1

Research Project

Report Submitted for Fulfillment of the Requirements and ILO's for Selected Topics in CS-1 course for Fall 2021

Team No. 7

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I. NUMERICAL DATASET

1. Project Introduction

a. Dataset Name

Mobile App Statistics (Apple iOS app store)

b. Number of classes and their labels

(Specify number of classes and their labels.)

2 classes:{0: “ didn`t get license”,1: “ got license ”}

c. Dataset Samples Numbers

(The total number of samples in dataset)

7198 record

d. Training, Validation and Testing

(The number of samples used in training, validation and testing.)

5759 record for training , 1439 for validation and testing.

2. Implementation Details

a. Extracted Features

11 features.

b. Cross-validation

(Is cross-validation is used in any of implemented models? If yes, specify the number of fold and ratio of training/validation)

NO.

c. Artificial Neural Network (ANN)

℘ Hyper-parameters

(Specify all the hyper-parameters (initial learning rate, optimizer, regularization, batch size, no. of epochs…) with their specified value in implementation)

Before optimization	After optimization
Initaial learning rate: 0.001	Initaial learning rate: 0.001
Optimizer:Adam	Optimizer:Adam
Regularization: 0.0001	Regularization: 0.0001
batch size: 500	batch size: 32
no. of epochs:20	no. of epochs:50
No. of layers:2 without input layer	No. of layers:4 without input layer
(layers) [units : Activation function] (3: tanh,1: swish)	(layers) [units : Activation function] (8: sigmoid,6: relu,8: relu,1: sigmoid)

d. Support Vector Machine (SVM)

℘ Hyper-parameters

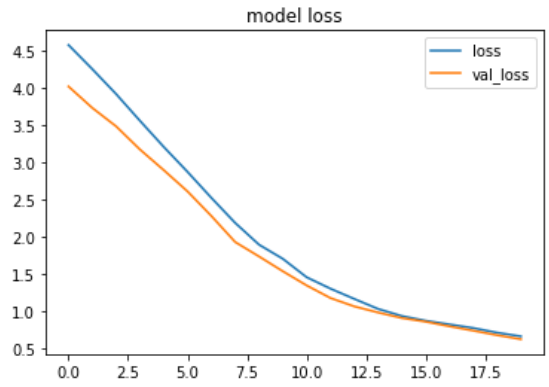
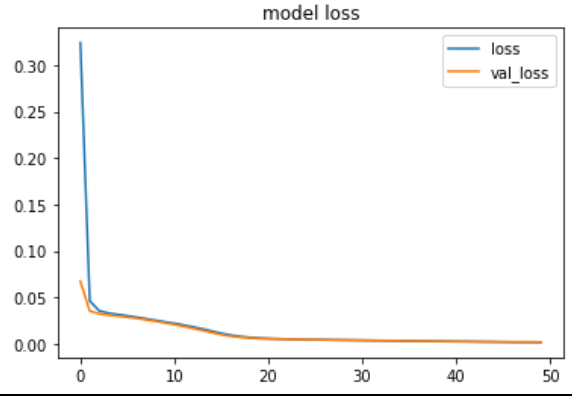
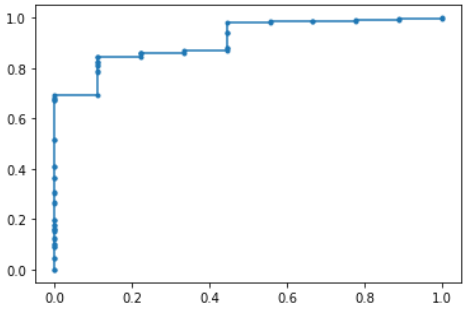
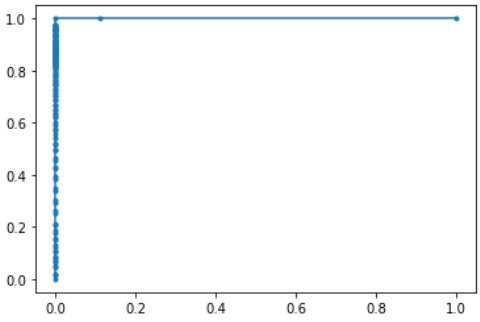
(Specify all the hyper-parameters (optimizer, regularization, …) with their specified value in implementation)

Before optimization	After optimization
kernel=" poly " degree = 40	kernel="sigmoid"
C=10e+10	coef0=2.5
Regularization:1.0	Regularization:1.0

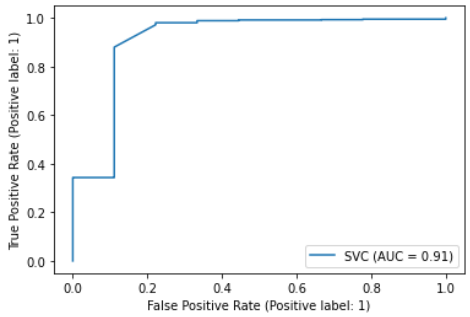
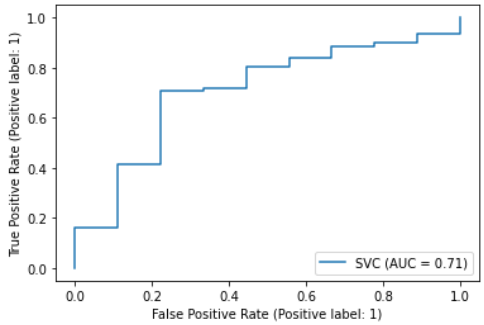
3. Models Results

For each model you should show all these results for your model on testing data (loss curve, accuracy, confusion matrix, ROC curve)

a. ANN Results

	before optimization	After optimization
Loss curve		
Roc curve		
Accuracy	0.7194444444444444	0.9993055555555556
confusion matrix	Predicted: 0 / 1 Actual 0: 8 / 1 Actual 1: 403 / 1028	Predicted: 0 / 1 Actual 0: 8 / 1 Actual 1: 0 / 1431

b.SVM Results

<table>
<tr><th></th><th>before optimization</th><th>After optimization</th></tr>
<tr><td>Roc curve</td><td> 
</td><td> 
</td></tr>
<tr><td>Accuracy</td><td>0.9881944444444445</td><td>0.9902777777777778</td></tr>
<tr><td>confusion matrix</td><td>
<table>
<tr><th></th><th></th><th>Predicted</th><th></th></tr>
<tr><th></th><th></th><th>0</th><th>1</th></tr>
<tr><td rowspan="2">Actual</td><td>0</td><td>2</td><td>7</td></tr>
<tr><td>1</td><td>10</td><td>1421</td></tr>
</table>
</td><td>
<table>
<tr><th></th><th></th><th>Predicted</th><th></th></tr>
<tr><th></th><th></th><th>0</th><th>1</th></tr>
<tr><td rowspan="2">Actual</td><td>0</td><td>0</td><td>9</td></tr>
<tr><td>1</td><td>5</td><td>1426</td></tr>
</table>
</td></tr>
</table>

II. IMAGE DATASET

1. Project Introduction

a. Dataset Name :

Brain Tumor Classification (MRI)

b. Number of classes and their labels:

2 classes:{0: “ no_tumor ”,1: “ pituitary_tumor ”}

c. Dataset Images Numbers and size

(The total number of images in dataset and the size of each.)

1222 image (200px * 200px)

d. Training, Validation and Testing

(The number of images used in training, validation and testing.)

977 image for training , 245 image for validation and testing.

2. Implementation Details

a. Extracted Features

In preprocessing phase we convert each image into 40000 feature (it`s pixels 200*200).

b. Cross-validation

(Is cross-validation is used in any of implemented models? If yes, specify the number of fold and ratio of training/validation)

NO.

c. Artificial Neural Network (ANN)

℘ Hyper-parameters

(Specify all the hyper-parameters (initial learning rate, optimizer, regularization, batch size, no. of epochs…) with their specified value in implementation)

Before optimization	After optimization
Initaial learning rate: 0.001	Initaial learning rate: 0.001
Optimizer:Adam	Optimizer:Adam
Regularization: 0.0001	Regularization: 0.0001
batch size: 20	batch size: 60
no. of epochs:50	no. of epochs:100
No. of layers:3 without input layer	No. of layers:3 without input layer
(layers) [units : Activation function] (6: sigmoid,6: sigmoid,1: sigmoid)	(layers) [units : Activation function] (6: sigmoid,6: relu,1: sigmoid)

d. Support Vector Machine (SVM)

℘ Hyper-parameters

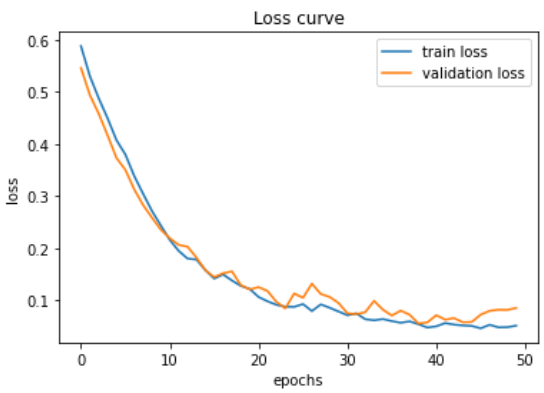
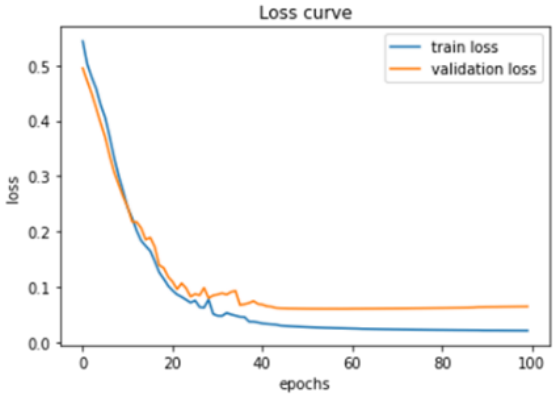
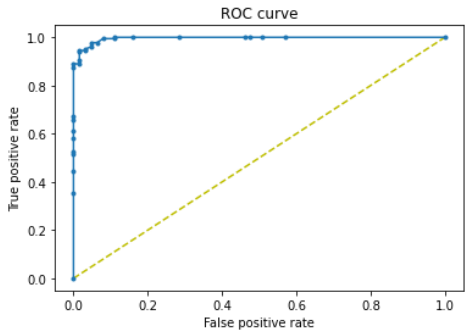
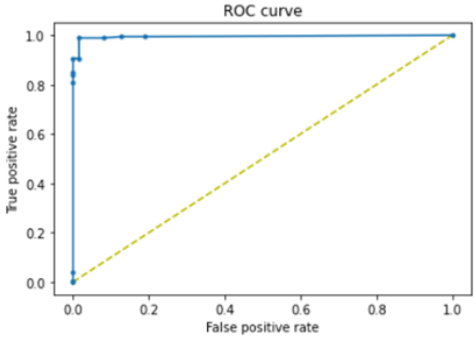
(Specify all the hyper-parameters (optimizer, regularization, …) with their specified value in implementation)

Before optimization	After optimization
kernel="sigmoid"	kernel="poly" , degree=2
coef0=0.0	coef0=20
Regularization:1.0	Regularization:1.0

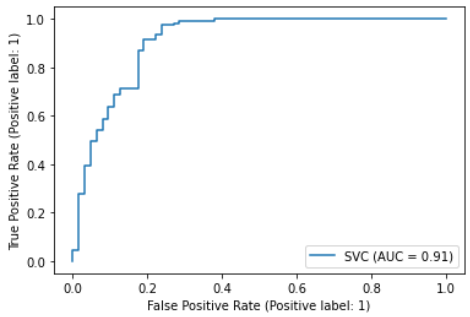
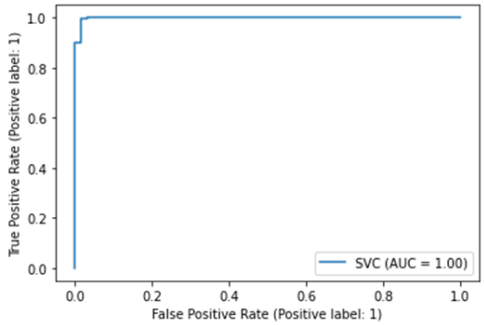
3. Models Results

For each model you should show all these results for your model on testing data (loss curve, accuracy, confusion matrix, ROC curve)

a. ANN Results:

<table>
<tr><th></th><th>before optimization</th><th>After optimization</th></tr>
<tr><td>Loss curve</td><td> 
</td><td> 
</td></tr>
<tr><td>Roc curve</td><td> 
</td><td> 
</td></tr>
<tr><td>Accuracy</td><td>0.9673469387755103</td><td>0.9877551020408163</td></tr>
<tr><td>confusion matrix</td><td>
<table>
<tr><th></th><th></th><th>Predicted</th><th></th></tr>
<tr><th></th><th></th><th>0</th><th>1</th></tr>
<tr><td rowspan="2">Actual</td><td>0</td><td>59</td><td>4</td></tr>
<tr><td>1</td><td>4</td><td>178</td></tr>
</table>
</td><td>
<table>
<tr><th></th><th></th><th>Predicted</th><th></th></tr>
<tr><th></th><th></th><th>0</th><th>1</th></tr>
<tr><td rowspan="2">Actual</td><td>0</td><td>62</td><td>1</td></tr>
<tr><td>1</td><td>2</td><td>180</td></tr>
</table>
</td></tr>
</table>

b.SVM Results:

<table>
<tr><th></th><th>before optimization</th><th>After optimization</th></tr>
<tr><td>Roc curve</td><td> 
</td><td> 
</td></tr>
<tr><td>Accuracy</td><td>0.8816326530612245</td><td>0.9836734693877551</td></tr>
<tr><td>confusion matrix</td><td>
<table>
<tr><td></td><td></td><td>Predicted</td><td></td></tr>
<tr><td></td><td></td><td>0</td><td>1</td></tr>
<tr><td rowspan="2">Actual</td><td>0</td><td>49</td><td>14</td></tr>
<tr><td>1</td><td>15</td><td>167</td></tr>
</table>
</td><td>
<table>
<tr><td></td><td></td><td>Predicted</td><td></td></tr>
<tr><td></td><td></td><td>0</td><td>1</td></tr>
<tr><td rowspan="2">Actual</td><td>0</td><td>59</td><td>4</td></tr>
<tr><td>1</td><td>0</td><td>182</td></tr>
</table>
</td></tr>
</table>