

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
Initial learning rate: 0.001	Initial 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 (layers) [units : Activation function] (8: tanh,1: sigmoid)	No. of layers:3 without input layer (layers) [units : Activation function] (8: relu,8: relu,1: sigmoid)

## d. Support Vector Machine (SVM)

### ⌘ Hyper-parameters

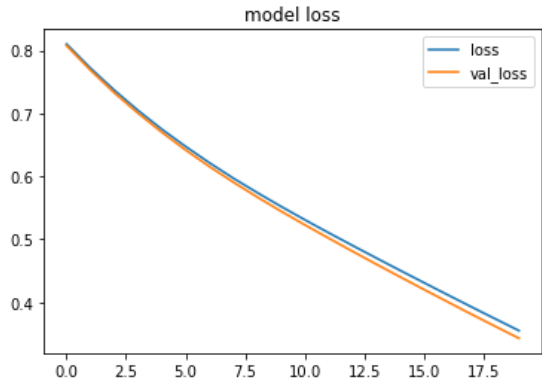
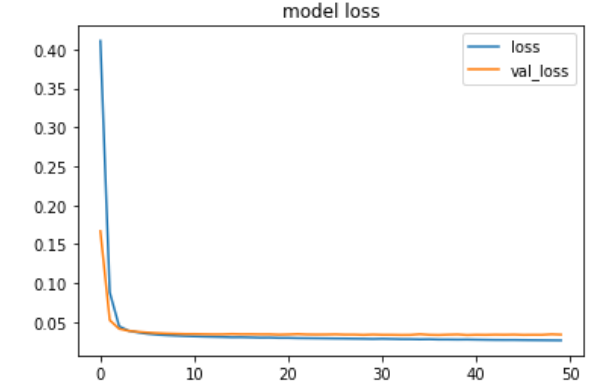
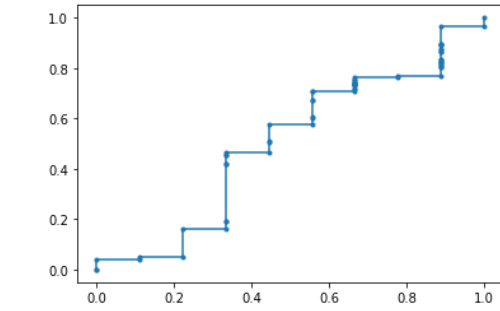
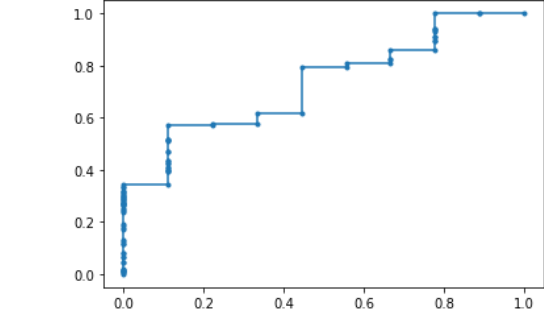
(Specify all the hyper-parameters (optimizer, regularization, ...) with their specified value in implementation)

Before optimization	After optimization
kernel="poly " degree = 7	kernel="rbf"
coef0=10	coef0=0.0
Regularization: 1000	Regularization: 1.0

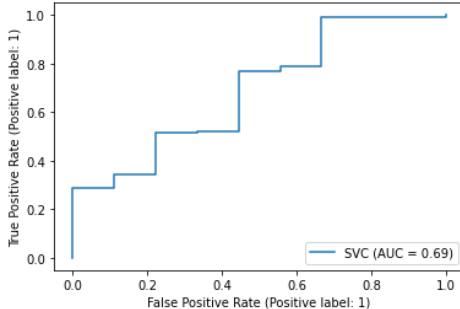
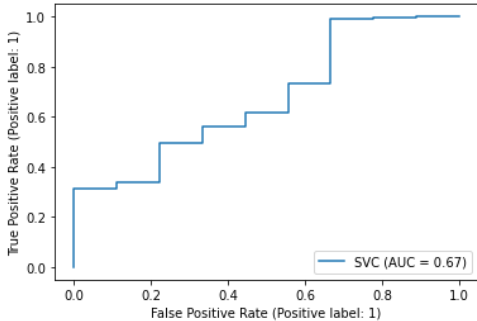
### 3. Models Results

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	0.9472222222222222			0.9944444444444445				
confusion matrix			Predicted				Predicted	
			0	1			0	1
	Actual	0	1	8	Actual	0	1	8
		1	68	1363		1	0	1431

b.SVM Results

	before optimization	After optimization																										
<div>Roc curve</div>																												
<div>Accuracy</div>	0.9881944444444445	0.9944444444444445																										
<div>confusion matrix</div>	<table><tr><td colspan="2" rowspan="2"></td><td colspan="2">Predicted</td></tr><tr><td>0</td><td>1</td></tr><tr><td rowspan="2">Actual</td><td>0</td><td>3</td><td>6</td></tr><tr><td>1</td><td>19</td><td>1412</td></tr></table>			Predicted		0	1	Actual	0	3	6	1	19	1412	<table><tr><td colspan="2" rowspan="2"></td><td colspan="2">Predicted</td></tr><tr><td>0</td><td>1</td></tr><tr><td rowspan="2">Actual</td><td>0</td><td>1</td><td>8</td></tr><tr><td>1</td><td>0</td><td>1431</td></tr></table>			Predicted		0	1	Actual	0	1	8	1	0	1431
				Predicted																								
		0	1																									
Actual	0	3	6																									
	1	19	1412																									
		Predicted																										
		0	1																									
Actual	0	1	8																									
	1	0	1431																									

## 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
Initial learning rate: 0.001	Initial 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 (layers) [units : Activation function] (6: sigmoid,6: sigmoid,1: sigmoid)	No. of layers:3 without input layer (layers) [units : Activation function] (6: sigmoid,6: relu,1: sigmoid)



## d. Support Vector Machine (SVM)

### ⌘ Hyper-parameters

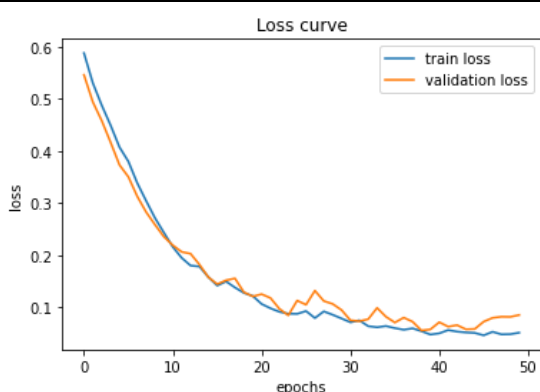
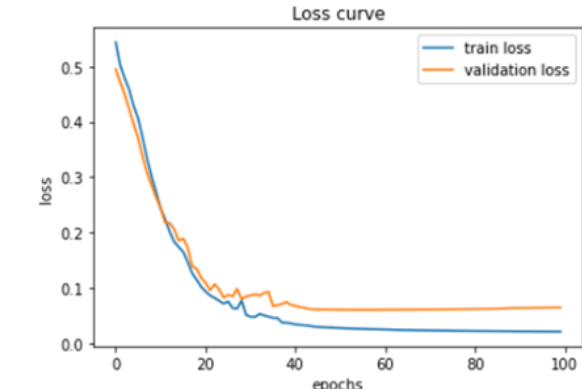
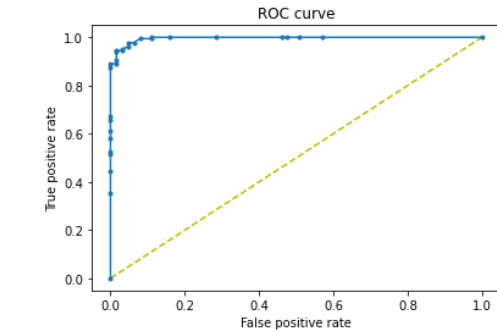
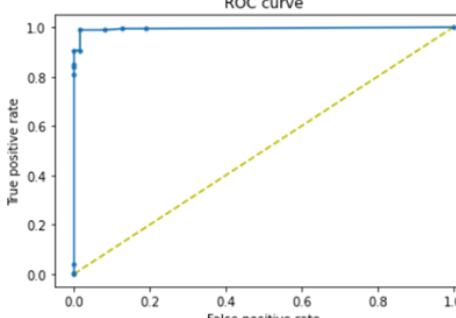
(Specify all the hyper-parameters (optimizer, regularization, ...) with their specified value in implementation)

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

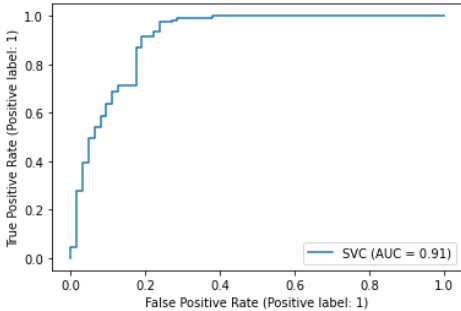
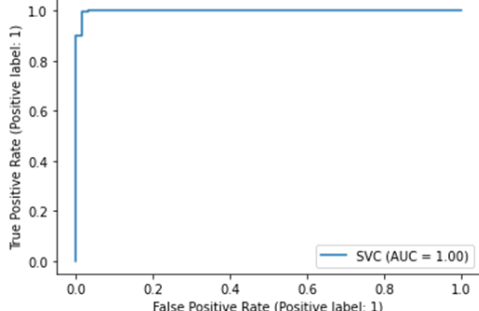
### 3. Models Results

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:

	before optimization			After optimization				
Loss curve								
Roc curve								
Accuracy	0.9673469387755103			0.9877551020408163				
confusion matrix			Predicted				Predicted	
			0	1			0	1
	Actual	0	59	4	Actual	0	62	1
1		4	178	1		2	180	

## b.SVM Results:

	before optimization				After optimization			
<b>Roc curve</b>								
<b>Accuracy</b>	0.8816326530612245				0.9836734693877551			
<b>confusion matrix</b>			Predicted				Predicted	
			0	1			0	1
	Actual	0	49	14	Actual	0	59	4
		1	15	167		1	0	182