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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. 22

|  |  |  |  |
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I. NUMERICAL DATASET

1. Project Introduction

* 1. **Dataset Name**

Credit Card Customers

* 1. **Number of classes and their labels**

(10127, 23)

CLIENTNUM',

'Attrition\_Flag',

'Customer\_Age',

'Gender',

'Dependent\_count ' ,

'Education\_Level',

'Marital\_Status',

'Income\_Category',

'Card\_Category',

'Months\_on\_book',

'Total\_Relationship\_Count',

'Months\_Inactive\_12\_mon',

'Contacts\_Count\_12\_mon',

'Credit\_Limit', 'Total\_Revolving\_Bal',

'Avg\_Open\_To\_Buy',

'Total\_Amt\_Chng\_Q4\_Q1',

'Total\_Trans\_Amt',

'Total\_Trans\_Ct',

'Total\_Ct\_Chng\_Q4\_Q1',

'Avg\_Utilization\_Ratio',

'Naive\_Bayes\_Classifier\_Attrition\_Flag\_Card\_Category\_Contacts\_Count\_12\_mon\_Dependent\_count\_Education\_Level\_Months\_Inactive\_12\_mon\_1', 'Naive\_Bayes\_Classifier\_Attrition\_Flag\_Card\_Category\_Contacts\_Count\_12\_mon\_Dependent\_count\_Education\_Level\_Months\_Inactive\_12\_mon\_2'],

* 1. **Dataset Samples Numbers**

10127

* 1. **Training, Validation and Testing**

80% for Training , 20% for validation and testing

1. Implementation Details
   * 1. **Extracted Features**

\*bin\_age extracted to 6 features (0,30), (30,40), (40,50) , (50,60) , (60,70) , (70,90)

\*IncomeCategory extracted to 6 features ,(less than 40k) ,(40k,60k),(60k,80k),(80k,120k),,(512k+),( (Unknown)

\*CardCategory extracted to 4 features (Blue) , (Gold) ,(Platinum) , (Silver)

\* bin\_Credit\_Limit extracted to 5 features (0,5k) , (5k,10k),(10k,20k),(20k,30k),(30k.40k)

\* TotalRelationshipCount extracted to 6 features (1), (2), (3), (4), (5), (6)

MonthsInactive12mon extracted to 7 features (0),(1), (2), (3), (4), (5), (6)

* + 1. **Cross-validation**

None

* + 1. **Artificial Neural Network (ANN)**
* **Hyper-parameters**

Optimizer = Adam (Learning\_rate = 0.00009)

Loss = 'binary\_crossentropy'

Batch\_size = 32 ,

Epochs = 200,

* + 1. **Support Vector Machine** **(SVM)**
* **Hyper-parameters**

Kernal = ‘linear ’

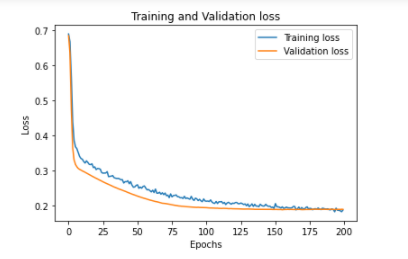
random\_state = 0

1. Models Results

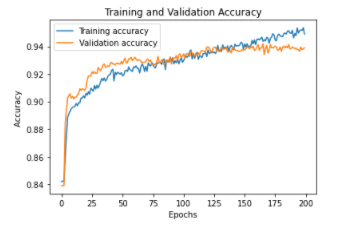
**For each model you should show all these results for your model on testing data** (loss curve, accuracy, confusion matrix, ROC curve)

* 1. **ANN Results**

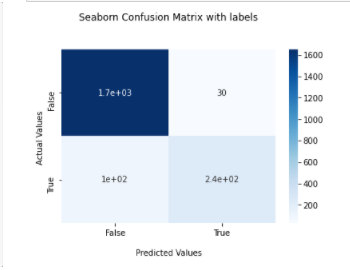
**Model loss:**

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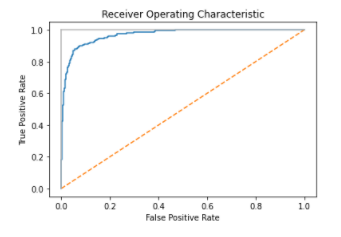
**Model accuracy:**

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**Confusion matrix:**

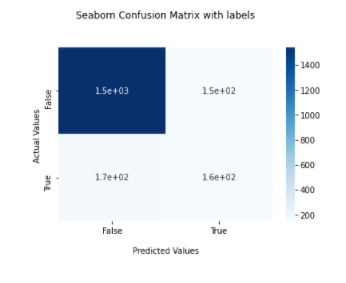
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**ROC:**

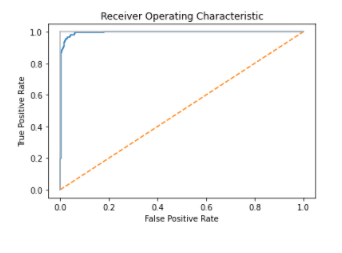
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* 1. **SVM Results**

**Confusion matrix:**

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**ROC:**

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II. IMAGE DATASET

1. Project Introduction

* 1. **Dataset Name**

Rock ,Paper and Scissors

* 1. **Number of classes and their labels**

3 , (Rock ,Paper and Scissors )

* 1. **Dataset Images Numbers and size**

**5080 (300x200)**

* 1. **Training, Validation and Testing**

80% for Training , 20% for validation and testing

2. Implementation Details

* + 1. **Extracted Features**

Gray\_scaled

* + 1. **Cross-validation**

None

* + 1. **Artificial Neural Network (ANN)**
* **Hyper-parameters**

Optimizer = SGD (learning\_rate=0.001, momentum=0.999, decay=0.001)

loss='mean\_squared\_error'

batch\_size = 10,

epochs =100,

* + 1. **Support Vector Machine** **(SVM)**
* **Hyper-parameters**

kernel='linear'

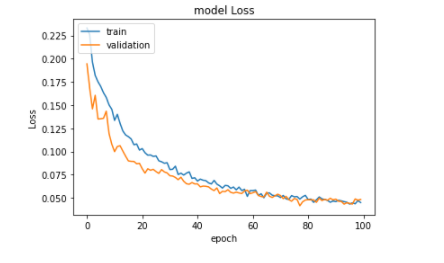
,gamma='auto'

3. Models Results

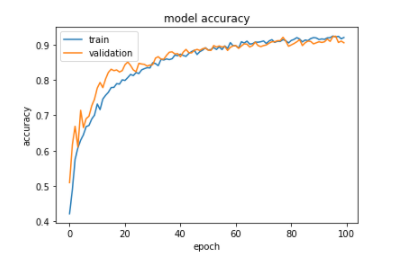
**For each model you should show all these results for your model on testing data** (loss curve, accuracy, confusion matrix, ROC curve)

* 1. **ANN Results**

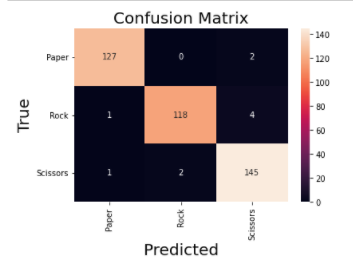
**Model Loss :**

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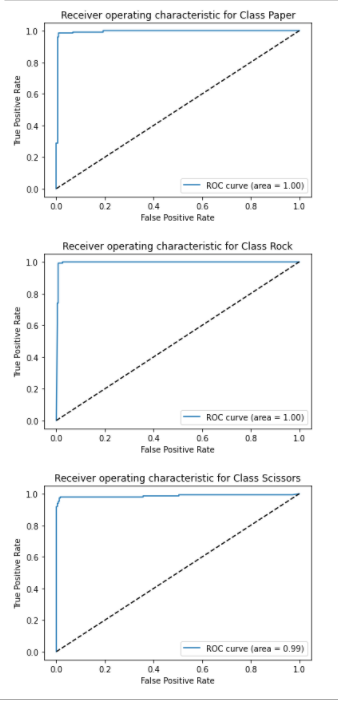
**Model accuracy:**

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**Confusion matrix:**

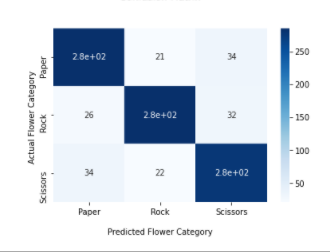
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**ROC:**

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* 1. **SVM Results**

**Confusion matrix:**

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**ROC:**