CAP 5627 Affective Computing

Project Deliverable 1 - Report

Graduate Group – 3

Team members and contributions:

Heamnath Balasubramanian: Data accessing, feature value calculation and data frame creation for the classifiers' input, also equally contributed in report, Technical paper writing.

Lalithabhinaya Mallu: Worked on SVM classifier Algorithm and equally contributed in report, Technical paper writing.

Mathan Kumar Venkateswaran: Worked on XAI and equally contributed in report, Technical paper writing.

Padmavathi Siddi: Worked on Random Forest Classifier Algorithm and and equally contributed in report, Technical paper writing.

Sravya Kodali: Data Formatting and feature values (Mean, Variance, Maximum, Minimum, Entropy) calculation. Also, equally contributed in report, Technical paper writing.

Pain Identification using SVM and Random Forest

The below is the report which shows output of scripts for classification of data using SVM and Random Forest algorithm on two datasets.

In terminal output Pain is represented as 0 and No pain is represented as 1.

1. SECTION - Random Forest Classifier on Dataset1

Random Forest	Accuracy score	Classifier vs Correlation accuracy score	Misclassified Correlation vs ground truth
Dataset1	87.50%	57.14%	20.83%

Table 1: Accuracy of RF and XAI on Dataset1.

RF on Dataset1	Pain	No Pain
Pain	24	4
No Pain	3	25

Table 2: Confusion Matrix for RF on Dataset1

```
Dataset1 RF
---confusion_matrix---
[[24  4]
 [ 3 25]]
---classification_report---
            precision    recall

         0       0.89      0.86
         1       0.86      0.89

 micro avg       0.88      0.88
 macro avg       0.88      0.88
weighted avg     0.88      0.88

Accuracy Score: 0.875
---Prediction---
[1. 0. 1. 1. 1. 0. 1. 1. 1. 0. 1. 0. 1. 0. 1. 0. 1. 0. 1. 0. 1. 0.
 1. 0. 1. 1. 1. 0. 0. 0. 1. 1. 1. 0. 1. 0. 1. 0. 1. 0. 0. 0. 1. 0. 1. 0.
 1. 0. 1. 0. 1. 0. 0. 0.]
Classifier vs Correlation Accuracy Score: 0.5714285714285714
Misclassified Correlation vs Ground Truth Accuracy : 0.20833333333333334
```

Fig1: Output of RF1.sh

2. SECTION - Random Forest Classifier on Dataset2

Random Forest	Accuracy score	Classifier vs Correlation accuracy score	Misclassified Correlation vs ground truth
Dataset2	91.42%	95.71%	33.33%

Table 3: Accuracy of RF and XAI on Dataset2.

RF on Dataset2	Pain	No Pain
Pain	8	20
No Pain	4	248

Table 4: Classification Matrix of RF on Dataset2

Fig2: Output of RF2.sh

3.   SECTION - Support Vector Machine Classifier on Dataset1

SVM	Accuracy score	Classifier vs Correlation accuracy score	Misclassified Correlation vs ground truth
Dataset1	83.92%	58.92%	8.69%

Table 5: Accuracy of SVM and XAI on Dataset1.

SVM on Dataset1	Pain	No Pain
Pain	21	7
No Pain	2	26

Table 6: Classification Matrix of SVM on Dataset1

```
Dataset1 SVM
---confusion_matrix---
[[21  7]
 [ 2 26]]
---classification_report---
             precision    recall

          0       0.91      0.75
          1       0.79      0.93

   micro avg       0.84      0.84
   macro avg       0.85      0.84
weighted avg       0.85      0.84

Accuracy Score: 0.8392857142857143
---Prediction---
[1 1 1 1 1 0 1 0 1 0 1 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 0 1 1 1 0 1
 0 1 0 1 0 0 1 1 1 1 0 1 1 1 0 1 0 1 0]
Classifier vs Correlation Accuracy Score: 0.5892857142857143
Misclassified Correlation vs Ground Truth Accuracy : 0.08695652173913043
```

Fig3: Output of SVM1.sh

4. SECTION - Support Vector Machine Classifier on Dataset2

SVM	Accuracy score	Classifier vs Correlation accuracy score	Misclassified Correlation vs ground truth
Dataset2	90.71%	98.57%	25%

Table 7: Accuracy of SVM and XAI on Dataset2.

SVM on Dataset2	Pain	No Pain
Pain	3	25
No Pain	1	251

Table 8: Classification Matrix of SVM on Dataset2

Fig4: Output of SVM2.sh