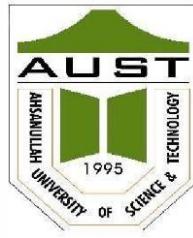


AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
DHAKA-1208, BANGLADESH.



Department of Computer Science and Engineering
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Submitted to

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Lab Group : B1

Naïve Bayes Classification and Random Forest Classification

1. Random Forest Classification

Dataset: HeartDisease.csv

Source Code:

```
1. # -*- coding: utf-8 -*-
2. """
3. Created on Fri Oct 11 00:29:03 2019
4.
5. @author: nowshad
6. """
7. from sklearn.model_selection import train_test_split
8. from sklearn.ensemble import RandomForestClassifier
9. from sklearn import metrics
10. import pandas as pd
11. import numpy
12.
13. dataset = pd.read_csv('HeartDisease.csv')
14. print("\nSize:- ", dataset.shape)
15. print("\n", dataset.head(5))
16.
17. X=dataset[['age', 'sex', 'cp', 'trestbps', 'chol', 'fbs', 'restecg', 'thalach',
18.            'exang', 'oldpeak', 'slope', 'ca', 'thal']]
19. y=dataset['target']
20. X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.33)
21. clf=RandomForestClassifier(n_estimators=100)
22. clf.fit(X_train,y_train)
23. y_pred=clf.predict(X_test)
24. print()
25. df = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
26. print(df.head())
27.
28. # Displaying errors
29. print('\nMean Absolute Error:', metrics.mean_absolute_error(y_test, y_pred))
30. print('Mean Squared Error:', metrics.mean_squared_error(y_test, y_pred))
31. print('Root Mean Squared Error:', numpy.sqrt(metrics.mean_squared_error(y_test, y_pred)))
32. print("Accuracy:",metrics.accuracy_score(y_test, y_pred))
```

Output:

```

IPython console
Console 1/A
In [3]: runfile('G:/AUST4.1/AILab/Term project 03/RandomForest.py', wdir='G:/AUST4.1/AILab/Term project 03')

Size:- (303, 14)

   age  sex  cp  trestbps  chol  fbs  restecg  thalach  exang  oldpeak  slope  ca  thal
target
0   63   1   3    145    233   1         0    150     0      2.3    0  0    1    1
1   37   1   2    130    250   0         1    187     0      3.5    0  0    2    1
2   41   0   1    130    204   0         0    172     0      1.4    2  0    2    1
3   56   1   1    120    236   0         1    178     0      0.8    2  0    2    1
4   57   0   0    120    354   0         1    163     1      0.6    2  0    2    1

   Actual  Predicted
67         1         1
255        0         0
164         1         1
11         1         1
142         1         1

Mean Absolute Error: 0.14
Mean Squared Error: 0.14
Root Mean Squared Error: 0.37416573867739417
Accuracy: 0.86

In [4]:

```

2. Naïve Bayes Classification

Dataset: HeartDisease.csv

Source Code:

```

1. # -*- coding: utf-8 -*-
2. """
3. Created on Fri Oct 11 00:29:03 2019
4.
5. @author: nowshad
6. """
7. from sklearn.model_selection import train_test_split
8. import pandas as pd
9. from sklearn.naive_bayes import GaussianNB
10. from sklearn import metrics
11. import numpy
12.
13. dataset = pd.read_csv('HeartDisease.csv')
14. print("\nSize:- ", dataset.shape)
15. print("\n", dataset.head(5))
16.
17. X=dataset[['age', 'sex', 'cp', 'trestbps', 'chol', 'fbs', 'restecg', 'thalach',
18.            'exang', 'oldpeak', 'slope', 'ca', 'thal']]
19. y=dataset['target']
20. X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.33)
21. model = GaussianNB()
22. model.fit(X_train, y_train)
23. model_predictions = model.predict(X_test)
24.
25. df = pd.DataFrame({'Actual': y_test, 'Predicted': model_predictions})
26. print("\n", df.head())
27.
28. # Displaying errors

```

```

29. print('Mean Absolute Error:', metrics.mean_absolute_error(y_test, model_predictions)
)
30. print('Mean Squared Error:', metrics.mean_squared_error(y_test, model_predictions))
31. print('Root Mean Squared Error:', numpy.sqrt(metrics.mean_squared_error(y_test, mode
l_predictions)))
32. print("Accuracy:", metrics.accuracy_score(y_test, model_predictions))

```

Output:

```

In [5]: runfile('G:/AUST4.1/AILab/Term project 03/NaiveBayes.py', wdir='G:/AUST4.1/AILab/Term
project 03')

Size:- (303, 14)

   age  sex  cp  trestbps  chol  fbs  restecg  thalach  exang  oldpeak  slope  ca  thal
target
0   63   1   3    145    233   1         0    150     0      2.3    0   0     1     1
1   37   1   2    130    250   0         1    187     0      3.5    0   0     2     1
2   41   0   1    130    204   0         0    172     0      1.4    2   0     2     1
3   56   1   1    120    236   0         1    178     0      0.8    2   0     2     1
4   57   0   0    120    354   0         1    163     1      0.6    2   0     2     1

   Actual  Predicted
221       0         0
159       1         1
269       0         0
224       0         0
118       1         1
Mean Absolute Error: 0.17
Mean Squared Error: 0.17
Root Mean Squared Error: 0.41231056256176607
Accuracy: 0.83

In [6]:

```

3. Comparison between Naïve Bayes Classification and Random Forest Classification

Metrics Score	Naïve Bayes Classification	Random Forest Classification
Mean Absolute Error	0.17	0.14
Mean Squared Error	0.17	0.14
Root Mean Squared Error	0.4123	0.37
Accuracy Score	83%	86%