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ML LAB ASSIGNMENT

SUPRATIM NAG -- CSE-AIML/22/057 -- GROUP-B

Q-8b:Implementation of Ensemble Techniques

----- Write a python code to show ensemble technique using Boosting mechanism.

```
In [1]: import pandas as pd
          import numpy as np
          import matplotlib.pyplot as plt
          from sklearn import model_selection
          from sklearn.ensemble import AdaBoostClassifier
          from sklearn.model_selection import train_test_split
 In [ ]: data = pd.read csv(r"C:\Users\SUPRATIM NAG\OneDrive\Documents\ML\Personal Datasets\Dataset.csv")
In [11]: data.shape
Out[11]: (100, 11)
In [12]: data.head(1)
               Patient
                                             Cholestero
                                                                                                                                         Medication
                                                                                                                                                             Follow-up
                                  Blood
                                                            Heart
                                                                                                                            Recovery
                                                                  вмі
                                                                                    Diagnosis
                                                                                                         Treatment Plan
                       Age
                                                  Levels
                   ID
                                                             Rate
                                                                                                                               Status
                                                                                                                                                          Requirement
                                Pressure
                                                                                                                                               Туре
                                                                             Hypertension with
                                                                                                    Medication: Lisinopril
                                                                                                                               Active
                                                                                                                                           Lisinopril.
          0
                  101
                         65
                                     130
                                                    250
                                                               72 28.0
                                                                                                                                                              Quarterly
                                                                                                                             Recovery
                                                                              high cholesterol.
                                                                                                  (blood pressure). Stati...
                                                                                                                                             Statins
In [15]: meddata=data[['Age','Blood Pressure','Cholesterol Levels','Heart Rate','BMI','Diagnosis']]
          meddata.head(1)
             Age Blood Pressure Cholesterol Levels Heart Rate BMI
                                                                                               Diagnosis
          0
              65
                                                              72 28.0 Hypertension with high cholesterol.
In [16]: meddata['Diagnosis'] = meddata['Diagnosis'].apply(
              lambda x: 1 if any(condition in x for condition in ['Hypertension', 'Obesity', 'Overweight']) else 0
        \verb|C:\USers\SUPRATIM NAG\AppData\Local\Temp\ipykernel\_8668\2310464088.py:1: SettingWithCopyWarning: \\
        A value is trying to be set on a copy of a slice from a DataFrame. Try using .loc[row_indexer,col_indexer] = value instead
         See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
          meddata['Diagnosis'] = meddata['Diagnosis'].apply(
In [19]: meddata.head(1)
             Age Blood Pressure Cholesterol Levels Heart Rate BMI Diagnosis
                                                 250
          0
              65
                              130
                                                              72 28.0
In [48]: X = meddata.drop('Diagnosis', axis=1)
            = meddata['Diagnosis']
          X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.20)
In [49]: # PROCESS 1
          #seed=7
          num trees=10
          model = AdaBoostClassifier(n_estimators=num_trees)
In [50]: kfold=model_selection.KFold(n_splits=6)
          results = model_selection.cross_val_score(model,X_train, y_train, cv=kfold)
         C:\Users\SUPRATIM NAG\anaconda3\Lib\site-packages\sklearn\ensemble\_weight_boosting.py:519: FutureWarning: The SAMME.R algorithm (the default) is
         deprecated and will be removed in 1.6. Use the SAMME algorithm to circumvent this warning.
          warnings.warn(
        C:\Users\SUPRATIM NAG\anaconda3\Lib\site-packages\sklearn\ensemble\_weight_boosting.py:519: FutureWarning: The SAMME.R algorithm (the default) is deprecated and will be removed in 1.6. Use the SAMME algorithm to circumvent this warning.
           warnings.warn(
        C:\Users\SUPRATIM NAG\anaconda3\Lib\site-packages\sklearn\ensemble\_weight_boosting.py:519: FutureWarning: The SAMME.R algorithm (the default) is deprecated and will be removed in 1.6. Use the SAMME algorithm to circumvent this warning.
         C:\Users\SUPRATIM NAG\anaconda3\Lib\site-packages\sklearn\ensemble\_weight_boosting.py:519: FutureWarning: The SAMME.R algorithm (the default) is
         deprecated and will be removed in 1.6. Use the SAMME algorithm to circumvent this warning.
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         deprecated and will be removed in 1.6. Use the SAMME algorithm to circumvent this warning.
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         deprecated and will be removed in 1.6. Use the SAMME algorithm to circumvent this warning.
          warnings.warn(
In [51]: print("Results:", results)
    print("Mean Results:", results.mean())
        Results: [0.85714286 0.78571429 0.69230769 0.69230769 0.92307692 0.69230769]
         Mean Results: 0.7738095238095238
```

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```
In [154... X = meddata.drop('Diagnosis', axis=1)
            y = meddata['Diagnosis']
           X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.20)
In [155... #PROCESS 2
           model = AdaBoostClassifier(n_estimators=num_trees)
model.fit(X_train, y_train)
         C:\Users\SUPRATIM NAG\anaconda3\Lib\site-packages\sklearn\ensemble\_weight_boosting.py:519: FutureWarning: The SAMME.R algorithm (the default) is deprecated and will be removed in 1.6. Use the SAMME algorithm to circumvent this warning.
            warnings.warn(
Out[155...
                   AdaBoostClassifier
           AdaBoostClassifier(n_estimators=10)
In [156... y_pred = model.predict(X_test)
In [157... model.score(X_test, y_test)
Out[157... 0.65
In [158... from sklearn.metrics import classification_report, confusion_matrix
           print(confusion_matrix(y_test,y_pred))
           print(classification_report(y_test,y_pred))
          [[9 3]
           [4 4]]
                         precision recall f1-score support
                                      0.75
0.50
                              0.69
                                                    0.72
                             0.57
                                                    0.53
                                                                  8
              accuracy
                                                    0.65
                                                                  20
                                      0.62
0.65
             macro avg
                             0.63
                                                     0.63
                                                                 20
                          0.64
         weighted avg
                                                    0.65
                                                                 20
  In [ ]:
```