DecisionTree_splitting_3_into_train_val

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In [43]: %matplotlib inline

In [44]: from pathlib import Path
         from pandas.plotting import scatter_matrix
         from sklearn.model_selection import train_test_split
         from sklearn import tree
         from sklearn.tree import DecisionTreeClassifier
         from sklearn.metrics import accuracy_score
         import pandas as pd
         from sklearn.metrics import confusion_matrix
         import matplotlib.pyplot as plt

In [45]: #Description of features
         #Average[3]: Average acceleration (for each axis)
         #Standard Deviation[3]: Standard deviation (for each axis)
         #Average Absolute Difference[3]: Average absolute
         #difference between the value of each of the 200 readings
         #within the ED and the mean value over those 200 values
         #(for each axis)
         #Average Resultant Acceleration[1]: Average of the square
         #roots of the sum of the values of each axis squared
         #over the ED
         #Time Between Peaks[3]: Time in milliseconds between
         #peaks in the sinusoidal waves associated with most
         #activities (for each axis)
         #Binned Distribution[30]: We determine the range of values
         #for each axis (maximum  minimum), divide this range into
         #10 equal sized bins, and then record what fraction of the
         #200 values fell within each of the bins.

In [46]: my_file = Path("/Users/bharu/CS690-PROJECTS/ActivityAnalyzer/activity_analyzer/Decisi
         df = pd.read_csv(my_file)
         df.head()
         df.shape#(no of rows, no of columns)

Out[46]: (417, 46)

In [47]: df_unique = df.drop_duplicates(subset=['User', 'Timestamp'])
         df_unique.head()
         df_unique.shape
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Out[47]: (406, 46)

In [48]: X = df_unique.values[:,2:45]

In [49]: Y = df_unique.values[:,45]

In [50]: X_train,X_test,Y_train,Y_test = train_test_split(X,Y,test_size=0.3)

In [51]: df_gini = DecisionTreeClassifier(criterion = 'gini')

In [52]: df_gini.fit(X_train, Y_train)

Out[52]: DecisionTreeClassifier(class_weight=None, criterion='gini', max_depth=None,
                     max_features=None, max_leaf_nodes=None,
                     min_impurity_decrease=0.0, min_impurity_split=None,
                     min_samples_leaf=1, min_samples_split=2,
                     min_weight_fraction_leaf=0.0, presort=False, random_state=None,
                     splitter='best')

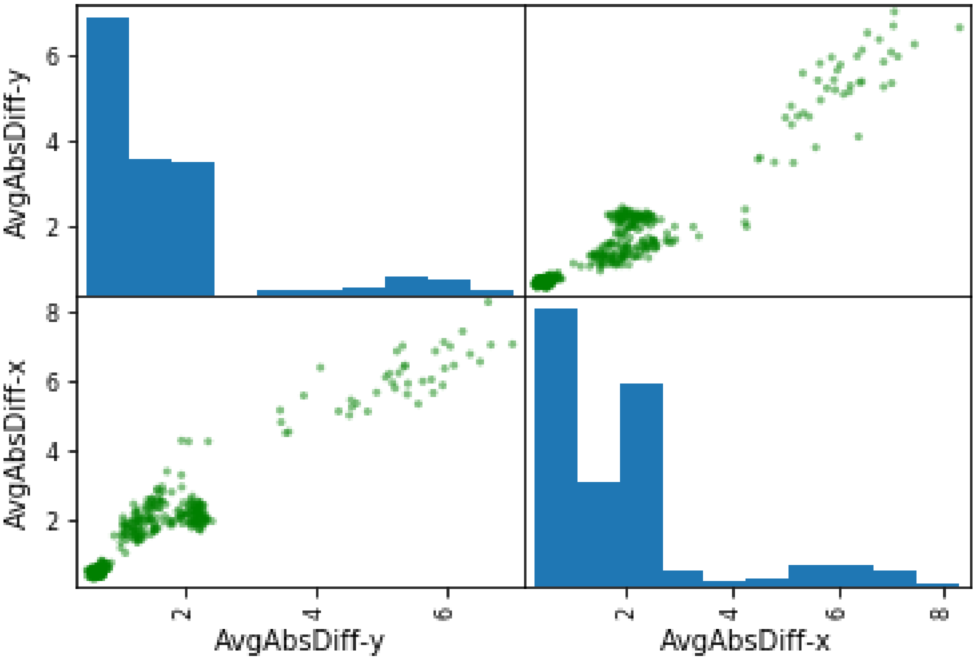
In [53]: feature_imp = df_gini.feature_importances_

In [54]: main_features = []
         for i in range(0,len(feature_imp)):
             if feature_imp[i] > 0:
                 entry = []
                 entry.append(df.columns.values[i+2])
                 entry.append(feature_imp[i])
                 main_features.append(entry)
         main_features

Out[54]: [['Bin2,x', 0.014124747145460347],
          ['Bin10,x', 0.04021722275547264],
          ['TimeDiffPeaks-z', 0.10575756055970709],
          ['AvgAbsDiff-x', 0.037885619165666143],
          ['AvgAbsDiff-y', 0.77429141337218865],
          ['AvgAcc-x', 0.013768058240612375],
          ['AvgAcc-y', 0.013955378760892704]]

In [55]: frame = df_unique.loc[:,['AvgAbsDiff-y','AvgAbsDiff-x']]

In [56]: scatter_matrix(frame,color='g')
         plt.savefig('./Data-Visualization/images/scatter_matrix_AvgAbsDiffxy_dt_train_val_same
```



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In [57]: #Predicting using test data
         Y_predict_gini = df_gini.predict(X_test)

In [58]: #Calculating accuracy score
         score = accuracy_score(Y_test,Y_predict_gini)
         score

Out[58]: 0.97540983606557374

In [59]: cm = confusion_matrix(Y_test,Y_predict_gini)
         cm

Out[59]: array([[48,  1],
                [ 2, 71]])
```