Assignment 5

KNN algorithm on diabetes dataset

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
import warnings
warnings.filterwarnings('ignore')
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn import metrics

df=pd.read_csv('diabetes.csv')

df.columns
```

```
Index(['Pregnancies', 'Glucose', 'BloodPressure', 'SkinThickness',
'Insulin',
       'BMI', 'Pedigree', 'Age', 'Outcome'],
      dtype='object')
```

Check for null values. If present remove null values from the dataset

```
df.isnull().sum()
```

```
Pregnancies      0
Glucose          0
BloodPressure    0
SkinThickness    0
Insulin          0
BMI              0
Pedigree         0
Age              0
Outcome          0
dtype: int64
```

Outcome is the label/target, other columns are features

```
X = df.drop('Outcome',axis = 1)
y = df['Outcome']

from sklearn.preprocessing import scale
X = scale(X)
# split into train and test
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size =
0.3, random_state = 42)

from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier(n_neighbors=7)

knn.fit(X_train, y_train)
y_pred = knn.predict(X_test)

print("Confusion matrix: ")
cs = metrics.confusion_matrix(y_test,y_pred)
print(cs)

Confusion matrix:
[[123  28]
 [ 37  43]]

print("Acccuracy ",metrics.accuracy_score(y_test,y_pred))

Acccuracy  0.7186147186147186
```

Classification error rate: proportion of instances misclassified over the whole set of instances. Error rate is calculated as the total number of two incorrect predictions (FN + FP) divided by the total number of a dataset (examples in the dataset.

Also error_rate = 1- accuracy

```
total_misclassified = cs[0,1] + cs[1,0]
print(total_misclassified)
total_examples = cs[0,0]+cs[0,1]+cs[1,0]+cs[1,1]
print(total_examples)
print("Error rate",total_misclassified/total_examples)
print("Error rate ",1-metrics.accuracy_score(y_test,y_pred))

65
231
Error rate 0.2813852813852814
Error rate  0.2813852813852814

print("Precision score",metrics.precision_score(y_test,y_pred))

Precision score 0.6056338028169014

print("Recall score ",metrics.recall_score(y_test,y_pred))

Recall score  0.5375

print("Classification report
",metrics.classification_report(y_test,y_pred))

Classification report                precision    recall  f1-score
support
```

0	0.77	0.81	0.79	151
1	0.61	0.54	0.57	80
accuracy			0.72	231
macro avg	0.69	0.68	0.68	231
weighted avg	0.71	0.72	0.71	231