

AI DIABETES PREDICTION SYSTEM

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INTRODUCTION :

K-Nearest Neighbours (KNN) is a popular machine learning algorithm used for classification and regression tasks. It is a lazy learning, non-parametric algorithm that uses data with several classes to predict the classification of the new sample point. KNN is non-parametric since it doesn't make any assumptions on the data being studied.

During the training phase, the KNN algorithm stores the entire training dataset as a reference. When implementing an algorithm, you will always need a data set. So, you start by loading the training and the test data. Then, you choose the nearest data points (the value of K). K can be any integer.

The working of KNN Algorithm in Machine Learning can be summarized in three steps:

Load the data

Choose the nearest data points (the value of K)

Do the following, for each test data –

Calculate the distance between test data and each row of training data

Sort the calculated distances in ascending order based on distance values

Get top K rows from sorted array

Get the most frequent class of these rows

Return this class as output.

PROCESS:

```
import pandas as pd
```

```
import numpy as np
```

```
from sklearn.model_selection import train_test_split
```

```
from sklearn.preprocessing import StandardScaler
```

```

from sklearn.neighbors import KNeighborsClassifier

from sklearn.metrics import confusion_matrix

from sklearn.metrics import f1_score

from sklearn.metrics import accuracy_score


dataset=pd.read_csv("/kaggle/input/diabetes-data-set/diabetes.csv")

print(len(dataset))

print(dataset.head())

```

OUTPUT:

768

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI \
0	6	148	72	35	0	33.6
1	1	85	66	29	0	26.6
2	8	183	64	0	0	23.3
3	1	89	66	23	94	28.1
4	0	137	40	35	168	43.1

	DiabetesPedigreeFunction	Age	Outcome
0	0.627	50	1
1	0.351	31	0
2	0.672	32	1
3	0.167	21	0
4	2.288	33	1

```

nonzero=['Glucose','BloodPressure','SkinThickness','Insulin','BMI']

```

```
for col in nonzero:

    dataset[col]=dataset[col].replace(0,np.NaN)

    mean=int(dataset[col].mean(skipna=True))

    dataset[col]=dataset[col].replace(np.NaN,mean)

print(dataset['Glucose'])
```

OUTPUT:

```
0    148.0
1     85.0
2    183.0
3     89.0
4    137.0
...
763   101.0
764   122.0
765   121.0
766   126.0
767    93.0
```

Name: Glucose, Length: 768, dtype: float64

```
x=dataset.iloc[:,0:8]
```

```
y=dataset.iloc[:,8]
```

```
x_train,x_test,y_train,y_test=train_test_split(x,y,random_state=1,test_size=0.3)
```

```
sc=StandardScaler()
```

```
x_train=sc.fit_transform(x_train)
```

```
x_test=sc.transform(x_test)
```

```
classifier=KNeighborsClassifier(n_neighbors=15,p=2,metric='euclidean')
```

```
model=classifier.fit(x_train,y_train)
```

```
yp=classifier.predict(x_test)
```

```
yp
```

OUTPUT:

```
array([1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0, 1, 0,  
       1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
       0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0,  
       0, 1, 1, 1, 1, 1, 1, 0, 1, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0,  
       0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0,  
       1, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0,  
       0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 1, 1, 0,  
       1, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 0, 0, 1, 0,  
       1, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0,
```

```
0, 1, 1, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0,
0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0])
```

```
CM=confusion_matrix(y_test,yp)
print(CM)
```

OUTPUT:

```
[[133 13]
 [ 34 51]]
```

```
print("F-Score: ",(f1_score(y_test,yp)))
```

OUTPUT:

```
F-Score: 0.6845637583892616
```

CONCLUSION:

The AI prediction system using the KNN algorithm has shown promise in making accurate predictions. While it has its strengths, we acknowledge its limitations and recommend further research and improvements to maximize its potential. The system has the potential to contribute to data-driven decision-making and add value in real-world applications.

