

```
In [34] import pandas as pd
```

```
from sklearn.model_selection import LeaveOneOut, cross_val_score  
from sklearn.linear_model import Logistic Regression
```

```
from sklearn.preprocessing import LabelEncoder
```

```
import numpy as np
```

```
In [32] df = pd.read_csv("Heart.csv")
```

```
df['Ca'] = df['Ca'].fillna(value=df['Ca'].mean())
```

```
df['Thal'] = df['Thal'].fillna(value=df['Thal'].mode()[0])  
df['ChestPain'] = LabelEncoder().fit_transform(df['Chest Pain'])
```

```
=
```

```
df['Thal'] = LabelEncoder().fit_transform(df['Thal'])  
df['AHD'] = LabelEncoder().fit_transform(df['AHD'])
```

```
In [33] X = df[['Age', 'Sex', 'ChestPain', 'RestBP', 'Chol', 'RestECG', 'MaxHR']]  
y = df['AHD']
```

```
In [25] model = Logistic Regression (max_iter=303)
```

```
loo =
```

```
LeaveOneOut()
```

```
scores = cross_val_score (model, x, y, cv=loo)  
print("Mean LOOCV Accuracy:", np.mean(scores))
```

```
Mean LOOCV Accuracy: 0.768976897689769
```

```
In [31]: print(df)
```

```
Unnamed: 0 Age Sex
```

```
ChestPain
```

```
RestBP
```

```
Chol Fbs
```

```
RestECG
```

```
MaxHR
```

```
0 1 2 3 4
```

1 63

1

3

145

233

1

2

150

2

67

1

0

160

286

0

2

108

3

4

60

67

1

0

120

229

0

2

129

37

1

1

130

250

0

0

187

5

41

0

2

130

204

0

2

172

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...

...

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...

...

...

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298

299

45

1

3

110 264

0

0

132

299

300

68

1

0

144 193

1

0

141

300

301

57

1

0

130

131

0

0

115

301

302 57

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2

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236

302

303 38

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1

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20

00

174

173

ExAng

Oldpeak Slope

Ca Thal

AHD

0123 +

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301

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302

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0

[303 rows x 15 columns]

In [27] from sklearn.model_selection import KFold

In [28] kf = KFold(n_splits=10, shuffle=True, random_state=42)
model = Logistic Regression (max_iter=1000)

scores = cross_val_score (model, x, y, cv=kf)

print("Mean K-Fold Accuracy:", np.mean (scores))

Mean K-Fold Accuracy: 0.7756989247311827

In [29] from sklearn.model_selection import Stratified KFold, cross_val_score

In [30] skf = StratifiedKFold (n_splits=10, shuffle=True, random_state=42)
model = Logistic Regression (max_iter=1000)

scores = cross_val_score (model, x, y, cv=skf)

print("Mean Stratified K-Fold Accuracy: ", np.mean (scores))

Mean Stratified K-Fold Accuracy: 0.7725806451612902

In []:

In []: