

```
In [1]: import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

```
In [15]: df=pd.read_csv('heart.csv')
df.head()
df=df.drop(columns=['thal'])
df
```

Out[15]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	target
0	63	1	3	145	233	1	0	150	0	2.3	0	0	1
1	37	1	2	130	250	0	1	187	0	3.5	0	0	1
2	41	0	1	130	204	0	0	172	0	1.4	2	0	1
3	56	1	1	120	236	0	1	178	0	0.8	2	0	1
4	57	0	0	120	354	0	1	163	1	0.6	2	0	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...
298	57	0	0	140	241	0	1	123	1	0.2	1	0	0
299	45	1	3	110	264	0	1	132	0	1.2	1	0	0
300	68	1	0	144	193	1	1	141	0	3.4	1	2	0
301	57	1	0	130	131	0	1	115	1	1.2	1	1	0
302	57	0	1	130	236	0	0	174	0	0.0	1	1	0

303 rows × 13 columns

```
In [3]: independent=df[['age',"sex","cp","trestbps","chol","fbs","thalach","exang","oldpeak","slope","ca","thal"]]
dependent=df[["target"]]
from sklearn.model_selection import train_test_split
X_train,X_test,Y_train,Y_test=train_test_split(independent,dependent,test_size=1/3,random_state=0)
```

```
In [16]: from sklearn.ensemble import RandomForestClassifier
classifier=RandomForestClassifier(n_estimators=10,criterion='entropy',random_state=0)
classifier.fit(X_train,Y_train)
```

C:\ProgramData\anaconda3\Lib\site-packages\sklearn\base.py:1151: DataConversionWarning: A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n\_samples,), for example using ravel().

```
return fit_method(estimator, *args, **kwargs)
```

Out[16]:

RandomForestClassifier

RandomForestClassifier(criterion='entropy', n\_estimators=10, random\_state=0)

```
In [17]: Y_pred=classifier.predict(X_test)
```

```
In [18]: from sklearn.metrics import confusion_matrix,classification_report
cm=confusion_matrix(Y_test,Y_pred)
print(cm)
```

```
[[38 11]
 [12 40]]
```

```
In [19]: clf_report=classification_report(Y_test,Y_pred)
print("Classification_Report",clf_report)
```

Classification_Report		precision	recall	f1-score	support
	0	0.76	0.78	0.77	49
	1	0.78	0.77	0.78	52
accuracy			0.77	101	
macro avg		0.77	0.77	0.77	101
weighted avg		0.77	0.77	0.77	101

```
In [20]: import joblib
joblib.dump(classifier,'random_forest_model.pkl')
print("Model saved as random_forest_model.pkl")
```

Model saved as random\_forest\_model.pkl

```
In [21]: loaded_model=joblib.load('random_forest_model.pkl')
print("Model loaded successfully.")
```

Model loaded successfully.

```
In [22]: y_pred_loaded=loaded_model.predict(X_test)
print("Predictions from loaded model:\n",y_pred_loaded)
```

Predictions from loaded model:

```
[0 1 1 0 0 0 0 0 0 1 1 0 1 1 0 0 1 0 1 1 0 0 0 0 0 0 0 1 1 1 0 1 1 1 1 0
 1 0 0 1 1 1 0 0 0 1 0 0 1 1 1 1 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
 0 0 1 0 1 0 0 0 0 1 0 1 0 0 1 1 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1]
```

```
In [23]: age=int(input("enter the age value"))
sex=int(input("enter the sex value"))
cp=int(input("enter the cp value"))
trestbps=int(input("enter the trestbps value"))
chol=int(input("enter the chol value"))
fbs=int(input("enter the fbs value"))
restecg=int(input("enter the restecg value"))
thalach=int(input("enter the thalach value"))
exang=int(input("enter the exang value"))
oldpeak=float(input("enter the oldpeak value"))
slope=int(input("enter the slope value"))
ca=int(input("enter the ca value"))
future_prediction=classifier.predict([[age,sex,cp,trestbps,chol,fbs,restecg,thalach,exang,oldpeak,slope,ca]])
print("future_prediction={Purchased=0,Non Purchased=1}",format(future_prediction))
```

```
enter the age value14
enter the sex value0
enter the cp value1
enter the trestbps value210
enter the chol value12
enter the fbs value21
enter the restecg value24
enter the thalach value25
enter the exang value251
enter the oldpeak value1.2
enter the slope value25
enter the ca value15
future_prediction={Purchased=0,Non Purchased=1} [0]
```

C:\ProgramData\anaconda3\Lib\site-packages\sklearn\base.py:464: UserWarning: X does not have valid feature names, but RandomForestClassifier was fitted with feature names

```
warnings.warn(
```

In [ ]:

In [ ]: