```
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import LogisticRegression
import seaborn as sns
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error

df=pd.read_csv('/content/diabetes.csv')
print(df)
```

```
    gender  age  hypertension  heart_disease smoking_history    bmi  \
0   Female   80           130              1           never  25.19
1   Female   54            80              0         No Info  27.32
2     Male   28            85              0           never  27.32
3   Female   36            90              0         current  23.45
4     Male   76           120              1         current  20.14
5   Female   89           140              0           never  27.32
6   Female   44            82              0           never  19.31
7   Female   79           130              0         No Info  23.86
8     Male   42            87              0           never  33.64
9   Female   32            84              0           never  27.32
10  Female   80           100              1           never  25.19
11  Female   94           145              0         No Info  27.32
12    Male   70           120              0           never  27.32
13  Female   36            90              0         current  23.45
14    Male   86           138              1         current  20.14
15  Female   20            80              0           never  27.32
16  Female   44            82              0           never  19.31
17  Female   79           122              0         No Info  23.86
18    Male   42            87              0           never  33.64
19  Female   32            84              0           never  27.32

    HbA1c_level  blood_glucose_level  diabetes
0           6.6                  140         0
1           6.6                   80         0
2           5.7                  158         0
3           5.0                  155         0
4           4.8                  155         0
5           6.6                   85         0
6           6.5                  200         1
7           5.7                   85         0
8           4.8                  145         0
9           5.0                  100         0
10          6.6                  140         0
11          6.6                   80         0
12          5.7                  158         1
13          5.0                  155         1
14          4.8                  155         1
```

```
15          6.6                   85         1
16          6.5                  200         1
17          5.7                   85         1
18          4.8                  145         1
19          5.0                  100         1
```

```
h=df.head(10)
t=df.tail(10)
```

```
print(df.shape)
```

```
(20, 9)
```

```
for i in range(1,20,-1):
  df.drop([i],axis=0,inplace=True)
```

```
for i in range(9):
  df.drop([i],axis=0,inplace=True)
```

```
dfmt=pd.concat([h,t],axis=0)
dfmt.to_csv("test_file.csv")
data=pd.read_csv('/content/test_file.csv')
print(data)
```

```
    Unnamed: 0  gender  age  hypertension  heart_disease
smoking_history  \
0            0  Female   80           130              1
never
1            1  Female   54            80              0         No
Info
2            2    Male   28            85              0
never
3            3  Female   36            90              0
current
4            4    Male   76           120              1
current
5            5  Female   89           140              0
never
6            6  Female   44            82              0
never
7            7  Female   79           130              0         No
Info
8            8    Male   42            87              0
never
9            9  Female   32            84              0
never
10          10  Female   80           100              1
never
11          11  Female   94           145              0         No
Info
12          12    Male   70           120              0
```

```
never
13          13  Female   36            90              0
current
14          14    Male   86           138              1
current
15          15  Female   20            80              0
never
16          16  Female   44            82              0
never
17          17  Female   79           122              0         No
Info
18          18    Male   42            87              0
never
19          19  Female   32            84              0
never

      bmi  HbA1c_level  blood_glucose_level  diabetes
0   25.19          6.6                  140         0
1   27.32          6.6                   80         0
2   27.32          5.7                  158         0
3   23.45          5.0                  155         0
4   20.14          4.8                  155         0
5   27.32          6.6                   85         0
6   19.31          6.5                  200         1
7   23.86          5.7                   85         0
8   33.64          4.8                  145         0
9   27.32          5.0                  100         0
10  25.19          6.6                  140         0
11  27.32          6.6                   80         0
12  27.32          5.7                  158         1
13  23.45          5.0                  155         1
14  20.14          4.8                  155         1
15  27.32          6.6                   85         1
16  19.31          6.5                  200         1
17  23.86          5.7                   85         1
18  33.64          4.8                  145         1
19  27.32          5.0                  100         1

X=dfmt['age']
y=dfmt['hypertension']
z=dfmt['heart_disease']

X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

z_train, z_test, y_train, y_test = train_test_split(z, y,
test_size=0.2, random_state=42)
```

```
X_train=np.array(X_train)
y_train=np.array(y_train)
z_train=np.array(z_train)
```

```
X_train=X_train.reshape(-1,1)
y_train=y_train.reshape(-1,1)
z_train=z_train.reshape(-1,1)
```

```
model=LinearRegression()
model.fit(X_train,y_train)
```

```
LinearRegression()
```

```
model1=LinearRegression()
model1.fit(z_train,z_train)
```

```
LinearRegression()
```

```
X_test=np.array(X_test)
z_test=np.array(z_test)
```

```
X_test=X_test.reshape(-1)
z_test=z_test.reshape(-1)
```

```
X_test=pd.Series(X_test)
z_test=pd.Series(z_test)
```

```
X_test=X_test.values.reshape(-1,1)
z_test=z_test.values.reshape(-1,1)
```

```
y_predict=model.predict(X_test)
yz_predict=model1.predict(z_test)
```

```
y_pred = model.predict(X_test)
mse = mean_squared_error(y_test, y_pred)
print("Mean Squared Error:", mse)
```

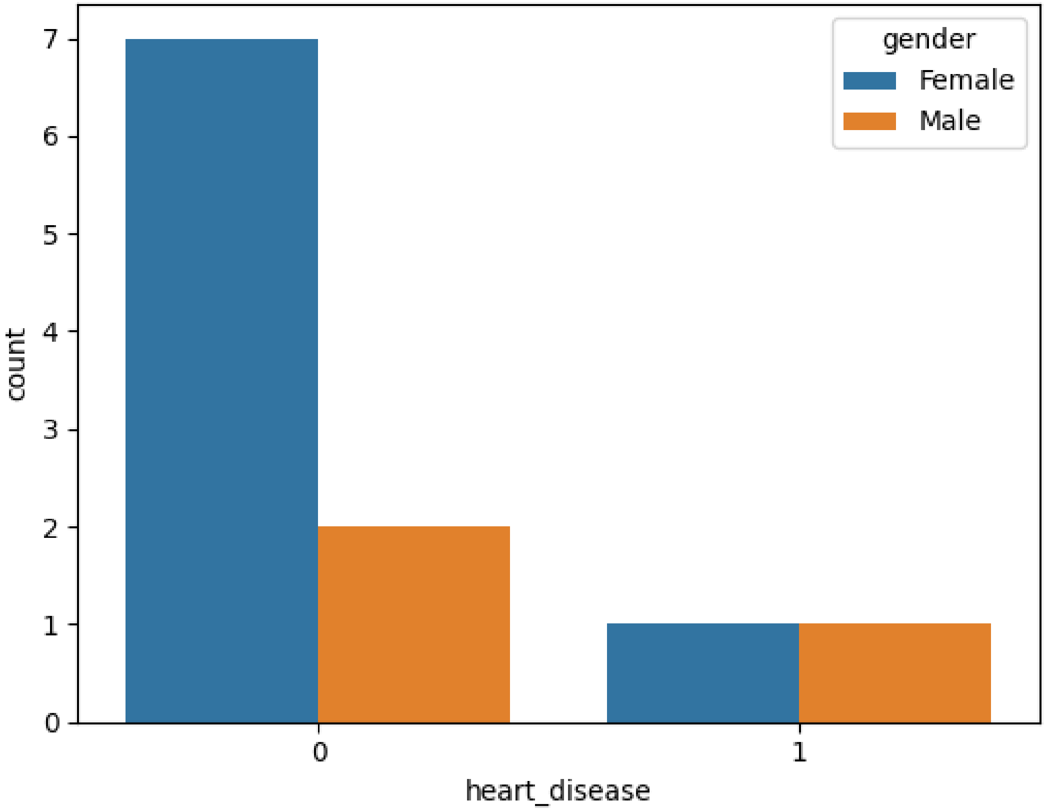
```
Mean Squared Error: 145.79705484104218
```

```
data.isnull().sum()
```

```
Unnamed: 0             0
gender                 0
age                    0
hypertension           0
heart_disease          0
smoking_history        0
bmi                    0
HbA1c_level            0
blood_glucose_level    0
diabetes               0
dtype: int64
```

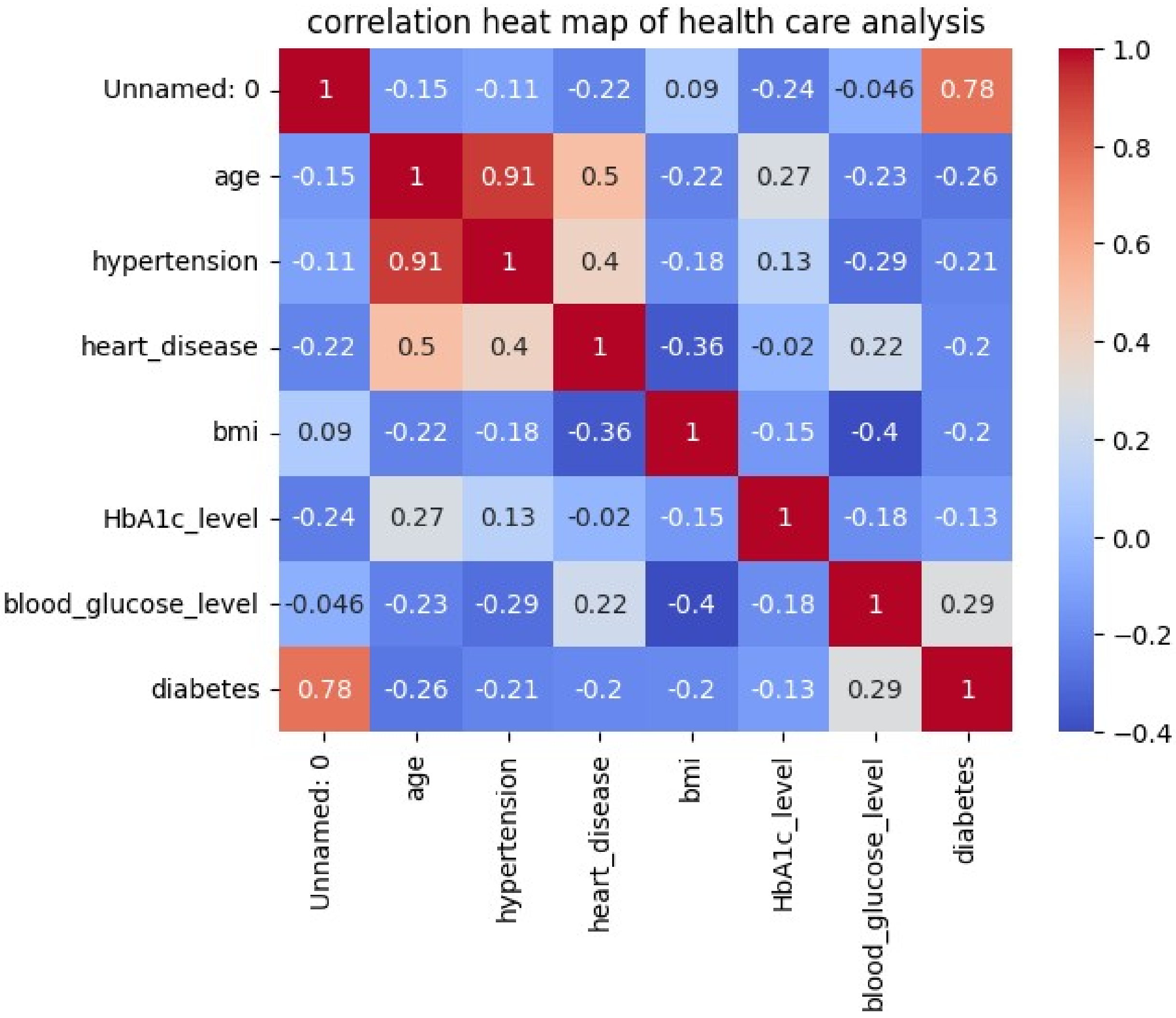
```
sns.countplot(data=df,x='heart_disease',hue='gender',linewidth=1)
```

```
<Axes: xlabel='heart_disease', ylabel='count'>
```

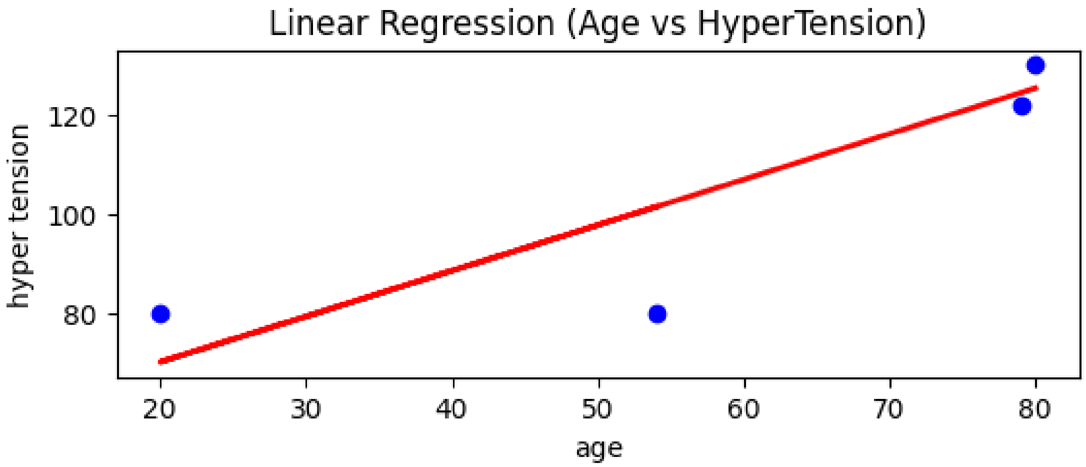


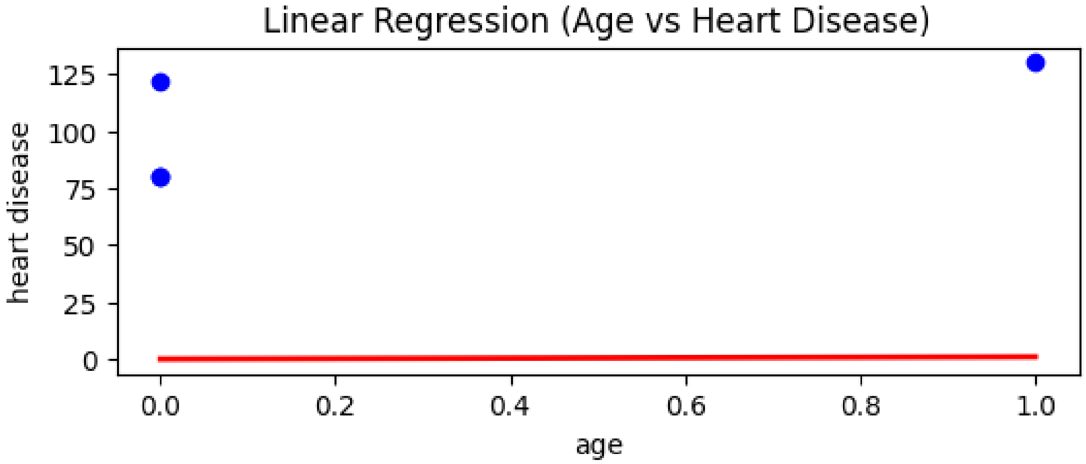
```
correlation_matrix=data.corr()
sns.heatmap(correlation_matrix,annot=True,cmap='coolwarm')
plt.title("correlation heat map of health care analysis")
plt.show()
```

```
<ipython-input-95-b4b1a8da4549>:1: FutureWarning: The default value of
numeric_only in DataFrame.corr is deprecated. In a future version, it
will default to False. Select only valid columns or specify the value
of numeric_only to silence this warning.
  correlation_matrix=data.corr()
```



```
import seaborn as sns
plt.subplot(2,1,1)
plt.scatter(X_test,y_test,color='blue')
plt.plot(X_test,y_predict,color='red',linewidth=2)
plt.xlabel("age")
plt.ylabel("hyper tension")
plt.title("Linear Regression (Age vs HyperTension)")
plt.show()
plt.subplot(2,1,2)
plt.scatter(z_test,y_test,color='blue')
plt.plot(z_test,yz_predict,color='red',linewidth=2)
plt.xlabel("age")
plt.ylabel("heart disease")
plt.title("Linear Regression (Age vs Heart Disease)")
plt.show()
```





```python
from sklearn.linear_model import LinearRegression
# Assuming X_train and y_train are your training features and labels

# Train the model
model = LinearRegression()
model.fit(X_train, y_train)

# Read the Age of a person from the console
age = float(input("Enter the Age:"))

# Prepare the feature vector for prediction
X_test = [[age]]

# Make prediction for Hyper tension
predicted_HT = model.predict(X_test)

# Print the predicted Hypertension
print("predicted Hyper Tension:", predicted_HT )

if(predicted_HT >= 130 or predicted_HT <80):
  print("You may have Heart Disease")
else:
  print("You may not have Heart Disease")
```

```
Enter the Age:90
predicted Hyper Tension: [[134.52648532]]
You may have Heart Disease
```