Machine Learning

Assignment 2: Multiple Linear Regression

Question: A teacher wants to predict the mark of any student based on the number of classes he attended and quizzes as well. From the following data, predict the mark of a student who attended 2 classes and 2 quizzes.

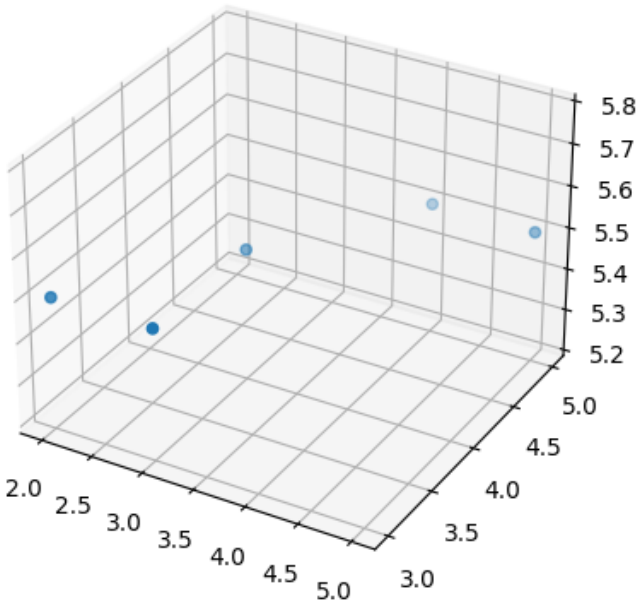
Classes	Quizzes	Marks
3	4	8
4	5	9
3	3	9
5	5	10
2	3	6

Code:

```
import pandas as pd
import matplotlib.pyplot as mlt
import numpy as np
from mpl_toolkits import mplot3d
df= pd.read_csv("MLR_Data.csv")
print(df)
df.columns
df.head()
x1 = df['Classes']
x2 = df['Quizzes']
y = df['Marks']
mlt.scatter(x1,y)
mlt.xlabel('h')
mlt.ylabel('v')
X = np.array([[1,3,4],[1,4,5],[1,3,3],[1,5,5],[1,2,3]])
Y = ([[8],[9],[7],[10],[6]])
print('Matrix X:',X)
X_t = np.transpose(X)
print('Transpose X:',X_t)
r = np.dot(X_t,X)
print('Product of X and Transpose X :',r)
a = (np.linalg.inv(r))
print('Inverse of product of X and Transpose X:',a)
i = (np.dot(X_t,Y))
f = np.dot(a,i)
print('The Final result after calculating beta values: ',f)
beta_0 = f[0]
beta_1 = f[1]
beta_2 = f[2]
n = beta_0 + beta_1*2 + beta_2*2
print('So for 2 quizes and 2 classes marks are',n)
fig = mlt.figure()
ax = mlt.axes(projection='3d')
zdata = n
xdata = x1
ydata = x2
ax.scatter3D(xdata, ydata, zdata, cmap='Greens')
mlt.show()
```

Output:

```
   Classes  Quizzes  Marks
0        3        4      8
1        4        5      9
2        3        3      9
3        5        5     10
4        2        3      6
Matrix X: [[1 3 4]
 [1 4 5]
 [1 3 3]
 [1 5 5]
 [1 2 3]]
Transpose X: [[1 1 1 1 1]
 [3 4 3 5 2]
 [4 5 3 5 3]]
Product of X and Transpose X : [[ 5 17 20]
 [17 63 72]
 [20 72 84]]
Inverse of product of X and Transpose X: [[ 4.5         0.5        -1.5       ]
 [ 0.5         0.83333333 -0.83333333]
 [-1.5        -0.83333333  1.08333333]]
The Final result after calculating beta values:  [[2.5       ]
 [0.83333333]
 [0.66666667]]
So for 2 quizes and 2 classes marks are [5.5]
```



Submitted By:

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