

```
1 """AI&ML Lab-9:  
2 Implement the non-parametric Locally Weighted Regression Algorithm in order to  
3 fit data points. Select appropriate data set for your experiment and draw graphs"""  
4  
5 import numpy as np  
6 import matplotlib.pyplot as plt  
7 import pandas as pd  
8  
9 tou = 0.5  
10  
11 data=pd.read_csv("lab9.csv")  
12 X_train = np.array(data.total_bill)  
13 print(X_train)  
14 X_train = X_train[:, np.newaxis]  
15 print(len(X_train))  
16 y_train = np.array(data.tip)  
17 X_test = np.array([i/10 for i in range(500)])  
18 X_test = X_test[:, np.newaxis]  
19 y_test = []  
20 count = 0  
21  
22 for r in range(len(X_test)):  
23     wts = np.exp(-np.sum((X_train - X_test[r]) ** 2, axis=1)/(2*tou**2))  
24     W = np.diag(wts)  
25     factor1 = np.linalg.inv(X_train.T.dot(W).dot(X_train))  
26     parameters = factor1.dot(X_train.T).dot(W).dot(y_train)  
27     prediction = X_test[r].dot(parameters)  
28     y_test.append(prediction)  
29     count += 1  
30  
31 print(len(y_test))  
32  
33 y_test = np.array(y_test)
```

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34
35 plt.plot(X_train.squeeze(), y_train, 'o')
36 plt.plot(X_test.squeeze(), y_test, 'o')
37 plt.show()
38
39 """Output:
40 [16.99 10.34 21.01 23.68 24.59 25.29  8.77 26.88 15.04 14.78 10.27 35.26
41 15.42 18.43 14.83 21.58 10.33 16.29 16.97 20.65 17.92 20.29 15.77 39.42
42 19.82 17.81 13.37 12.69 21.7  19.65  9.55 18.35 15.06 20.69 17.78 24.06
43 16.31 16.93 18.69 31.27 16.04 17.46 13.94  9.68 30.4  18.29 22.23 32.4
44 28.55 18.04 12.54 10.29 34.81  9.94 25.56 19.49 38.01 26.41 11.24 48.27
45 20.29 13.81 11.02 18.29 17.59 20.08 16.45  3.07 20.23 15.01 12.02 17.07
46 26.86 25.28 14.73 10.51 17.92 27.2  22.76 17.29 19.44 16.66 10.07 32.68
47 15.98 34.83 13.03 18.28 24.71 21.16 28.97 22.49  5.75 16.32 22.75 40.17
48 27.28 12.03 21.01 12.46 11.35 15.38 44.3  22.42 20.92 15.36 20.49 25.21
49 18.24 14.31 14.    7.25 38.07 23.95 25.71 17.31 29.93 10.65 12.43 24.08
50 11.69 13.42 14.26 15.95 12.48 29.8   8.52 14.52 11.38 22.82 19.08 20.27
51 11.17 12.26 18.26  8.51 10.33 14.15 16.    13.16 17.47 34.3  41.19 27.05
52 16.43  8.35 18.64 11.87  9.78  7.51 14.07 13.13 17.26 24.55 19.77 29.85
53 48.17 25.    13.39 16.49 21.5  12.66 16.21 13.81 17.51 24.52 20.76 31.71
54 10.59 10.63 50.81 15.81  7.25 31.85 16.82 32.9  17.89 14.48  9.6  34.63
55 34.65 23.33 45.35 23.17 40.55 20.69 20.9  30.46 18.15 23.1  15.69 19.81
56 28.44 15.48 16.58  7.56 10.34 43.11 13.    13.51 18.71 12.74 13.    16.4
57 20.53 16.47 26.59 38.73 24.27 12.76 30.06 25.89 48.33 13.27 28.17 12.9
58 28.15 11.59  7.74 30.14 12.16 13.42  8.58 15.98 13.42 16.27 10.09 20.45
59 13.28 22.12 24.01 15.69 11.61 10.77 15.53 10.07 12.6  32.83 35.83 29.03
60 27.18 22.67 17.82 18.78]
61 244
62 500
63
64 """
65
66
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