



INFO

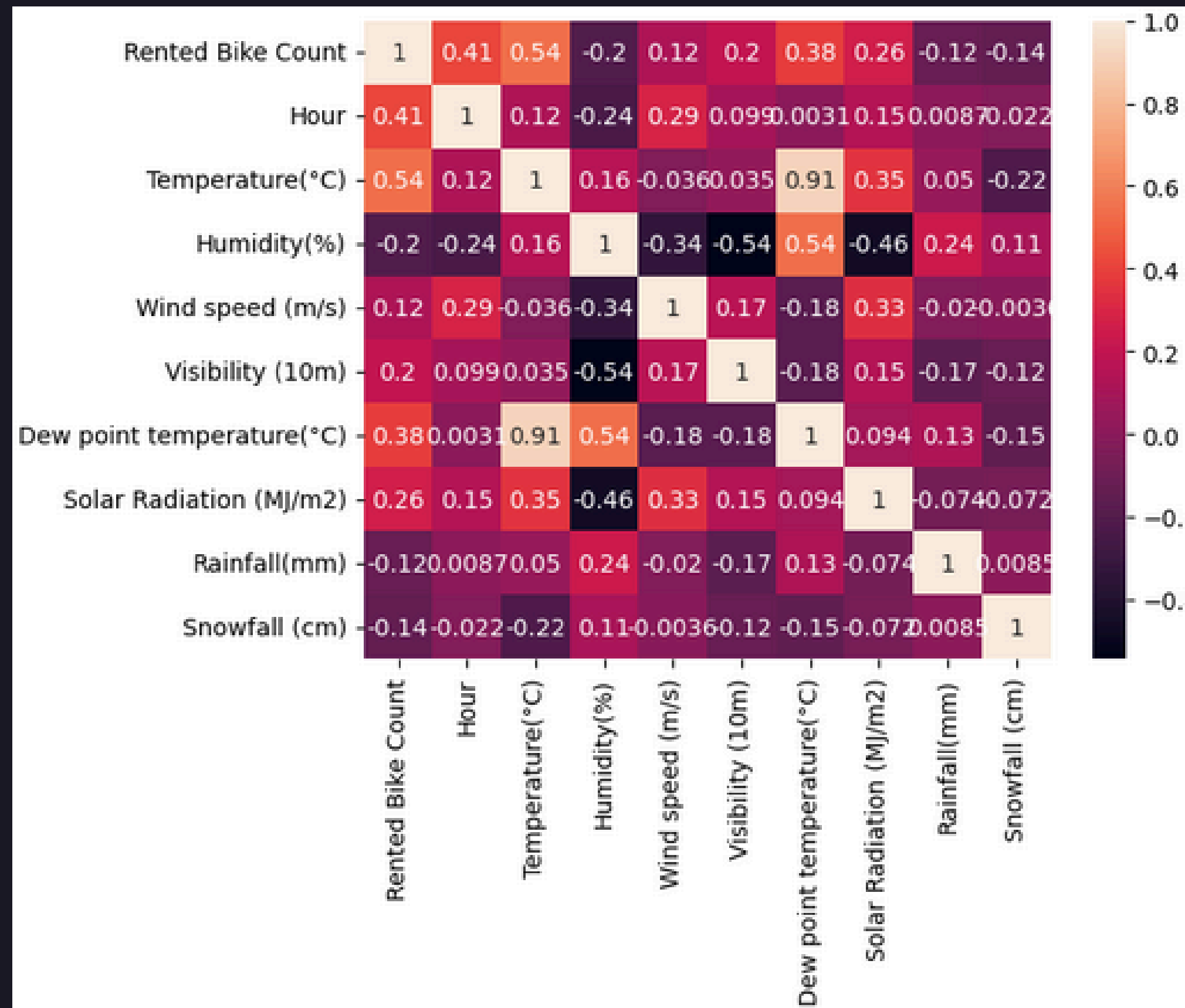
8760 Records

14 Columns

	Date	Rented Bike Count	Hour	Temperature(°C)	Humidity(%)	Wind speed (m/s)	Visibility (10m)	Dew point temperature(°C)	Solar Radiation (MJ/m2)	Rainfall(mm)	Snowfall (cm)	Seasons	Holiday	Functioning Day
0	01/12/2017	254	0	-5.2	37	2.2	2000	-17.6	0.0	0.0	0.0	Winter	No Holiday	Yes
1	01/12/2017	204	1	-5.5	38	0.8	2000	-17.6	0.0	0.0	0.0	Winter	No Holiday	Yes
2	01/12/2017	173	2	-6.0	39	1.0	2000	-17.7	0.0	0.0	0.0	Winter	No Holiday	Yes
3	01/12/2017	107	3	-6.2	40	0.9	2000	-17.6	0.0	0.0	0.0	Winter	No Holiday	Yes
4	01/12/2017	78	4	-6.0	36	2.3	2000	-18.6	0.0	0.0	0.0	Winter	No Holiday	Yes

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8760 entries, 0 to 8759
Data columns (total 14 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   Date                                8760 non-null   object
1   Rented Bike Count                  8760 non-null   int64
2   Hour                              8760 non-null   int64
3   Temperature(°C)                   8760 non-null   float64
4   Humidity(%)                       8760 non-null   int64
5   Wind speed (m/s)                  8760 non-null   float64
6   Visibility (10m)                   8760 non-null   int64
7   Dew point temperature(°C)          8760 non-null   float64
8   Solar Radiation (MJ/m2)            8760 non-null   float64
9   Rainfall(mm)                      8760 non-null   float64
10  Snowfall (cm)                     8760 non-null   float64
11  Seasons                            8760 non-null   object
12  Holiday                            8760 non-null   object
13  Functioning Day                    8760 non-null   object
dtypes: float64(6), int64(4), object(4)
memory usage: 958.2+ KB
```

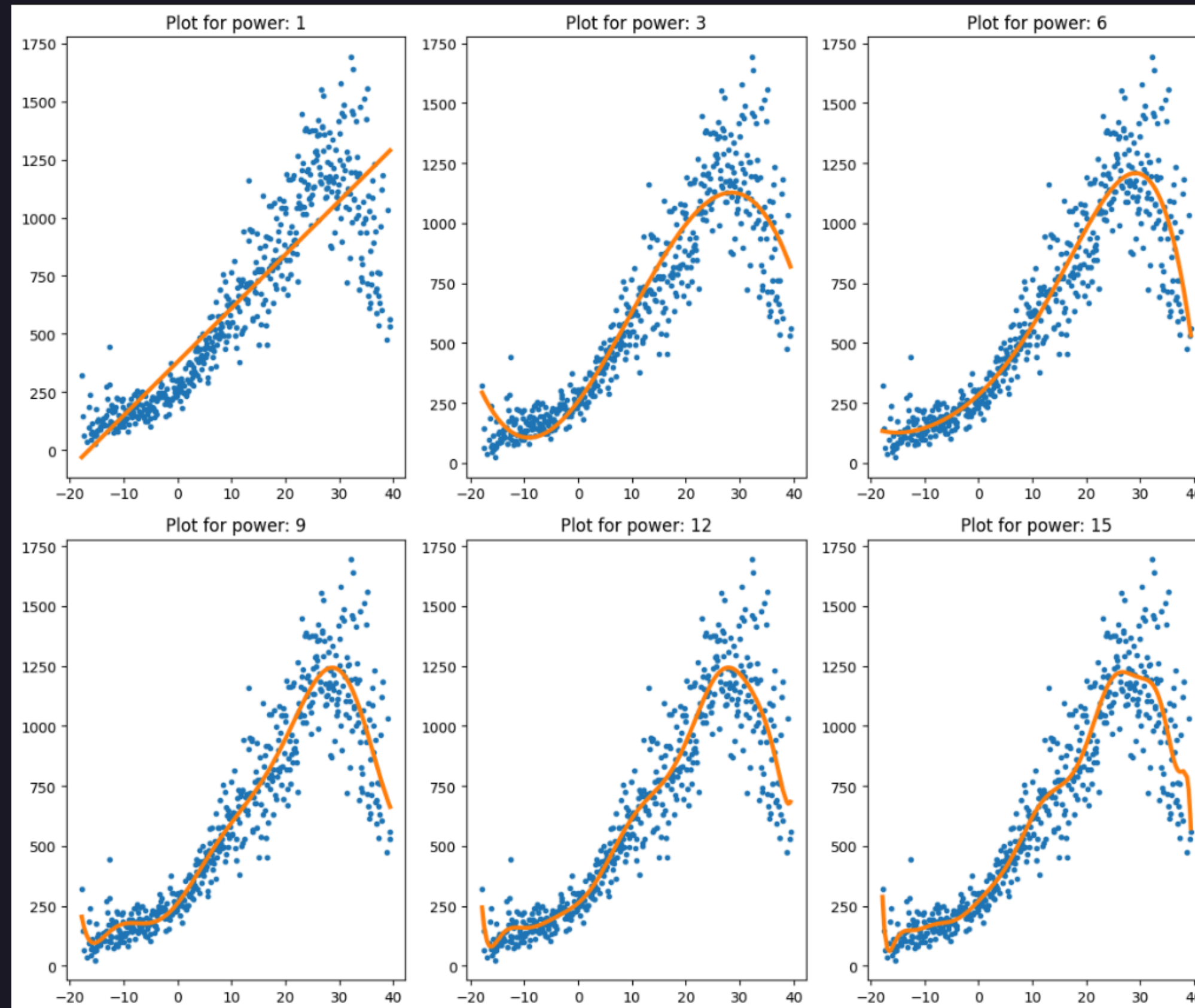
CORRELATION MATRIX



LINEAR REGRESSION

04

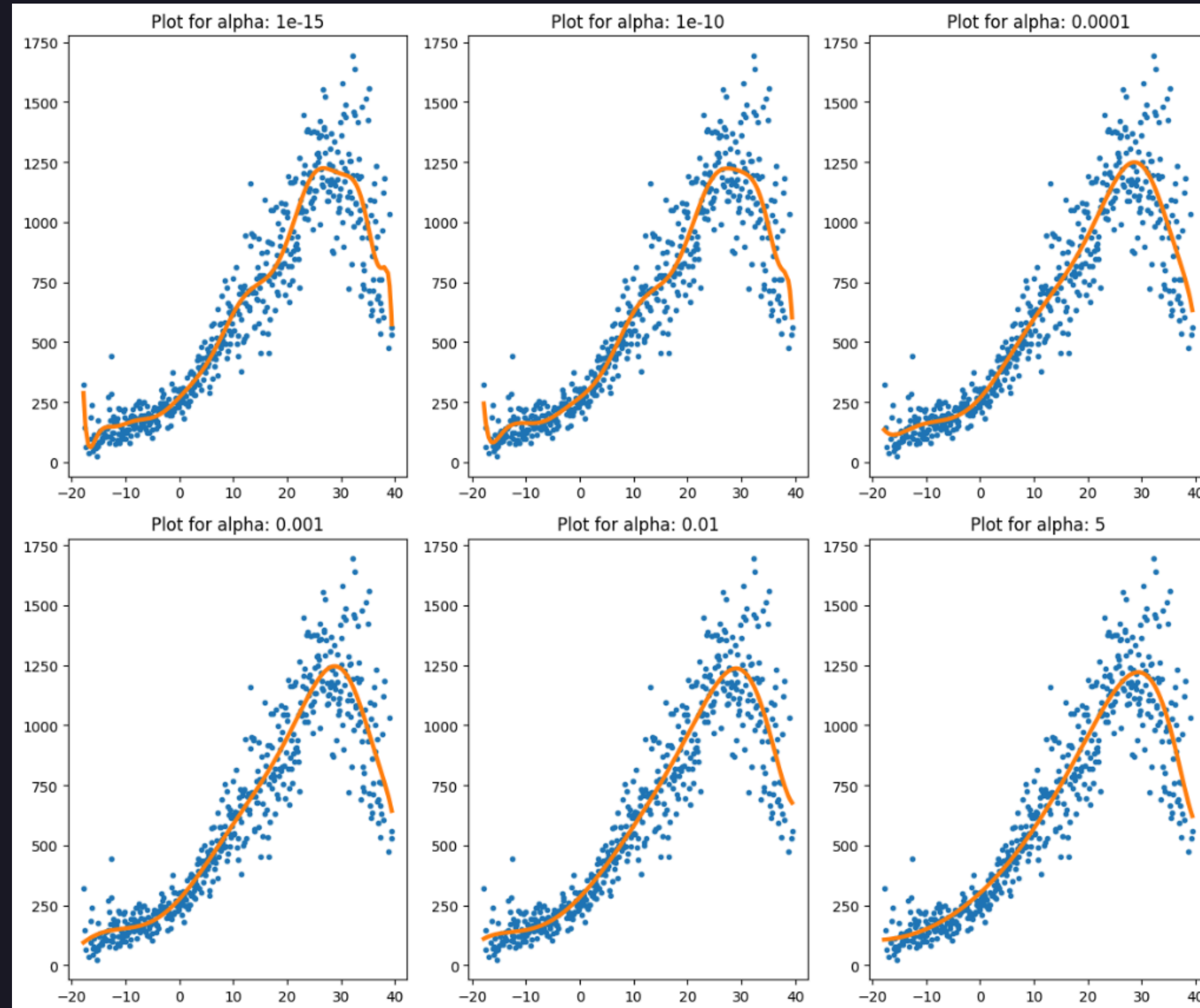
Rented Bike Mean \leftrightarrow Temperature(C°)



05

RIDGE REGRESSION

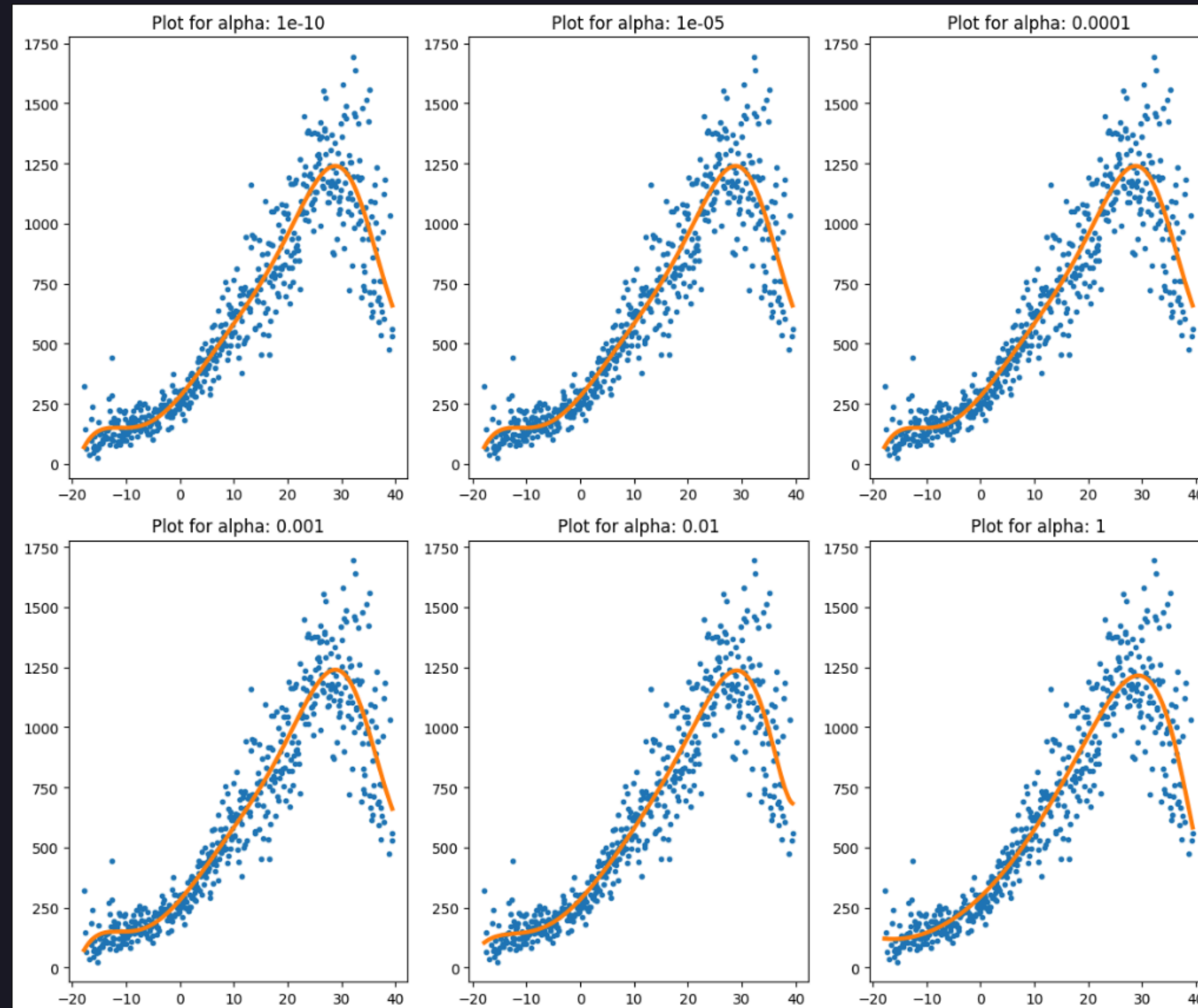
Rented Bike Mean \leftrightarrow Temperature(C°)



LASSO REGRESSION

06

Rented Bike Mean \leftrightarrow Temperature(C°)



REGRESSION RESULTS

Rented Bike Mean <-> Temperature(C°)

Linear Regression

	rss	rmse	r2_score	intercept
model_pow_1	2.1166e+07	196.89	0.77497	632.29
model_pow_2	2.0669e+07	194.56	0.78025	632.29
model_pow_3	1.2306e+07	150.13	0.86917	632.29
model_pow_4	1.0579e+07	139.2	0.88752	632.29
model_pow_5	1.0476e+07	138.52	0.88862	632.29
model_pow_6	1.0476e+07	138.52	0.88862	632.29
model_pow_7	1.0331e+07	137.55	0.89016	632.29
model_pow_8	1.0159e+07	136.41	0.89199	632.29
model_pow_9	1.0104e+07	136.04	0.89257	632.29
model_pow_10	1.0086e+07	135.91	0.89277	632.29
model_pow_11	1.0085e+07	135.91	0.89277	632.29
model_pow_12	9.9987e+06	135.32	0.8937	632.29
model_pow_13	9.9904e+06	135.27	0.89378	632.29
model_pow_14	9.9428e+06	134.95	0.89429	632.29
model_pow_15	9.836e+06	134.22	0.89543	632.29

Ridge Regression

	rss	rmse	r2_score	intercept
alpha_1e-15	9.836e+06	134.22	0.89543	632.29
alpha_1e-10	9.8713e+06	134.46	0.89505	632.29
alpha_1e-08	9.9589e+06	135.05	0.89412	632.29
alpha_0.0001	1.0111e+07	136.08	0.8925	632.29
alpha_0.001	1.0171e+07	136.48	0.89186	632.29
alpha_0.01	1.0243e+07	136.97	0.8911	632.29
alpha_1	1.0331e+07	137.56	0.89016	632.29
alpha_5	1.0404e+07	138.04	0.88939	632.29
alpha_10	1.055e+07	139.01	0.88783	632.29
alpha_20	1.0928e+07	141.47	0.88381	632.29

Lasso Regression

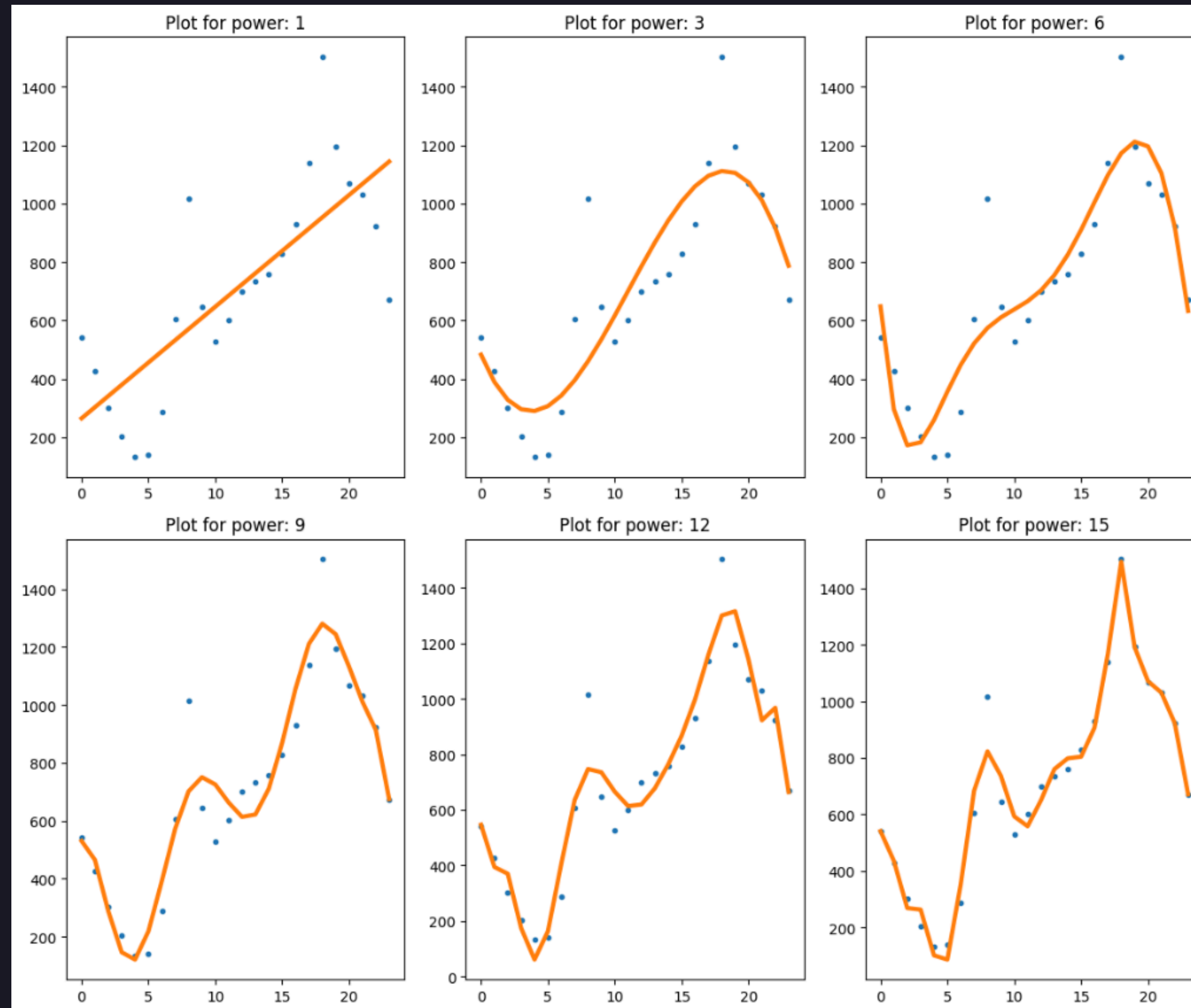
	rss	rmse	r2_score	intercept
alpha_1e-15	1.0221e+07	136.82	0.89134	632.29
alpha_1e-10	1.0221e+07	136.82	0.89134	632.29
alpha_1e-08	1.0221e+07	136.82	0.89134	632.29
alpha_1e-05	1.0221e+07	136.82	0.89134	632.29
alpha_0.0001	1.0221e+07	136.82	0.89133	632.29
alpha_0.001	1.0221e+07	136.82	0.89133	632.29
alpha_0.01	1.0248e+07	137	0.89104	632.29
alpha_1	1.0403e+07	138.03	0.88939	632.29
alpha_5	1.0965e+07	141.71	0.88342	632.29
alpha_10	1.1932e+07	147.83	0.87315	632.29

alpha_1e-05	0
alpha_0.0001	0
alpha_0.001	1
alpha_0.01	3
alpha_1	10
alpha_5	11
alpha_10	12

LINEAR REGRESSION

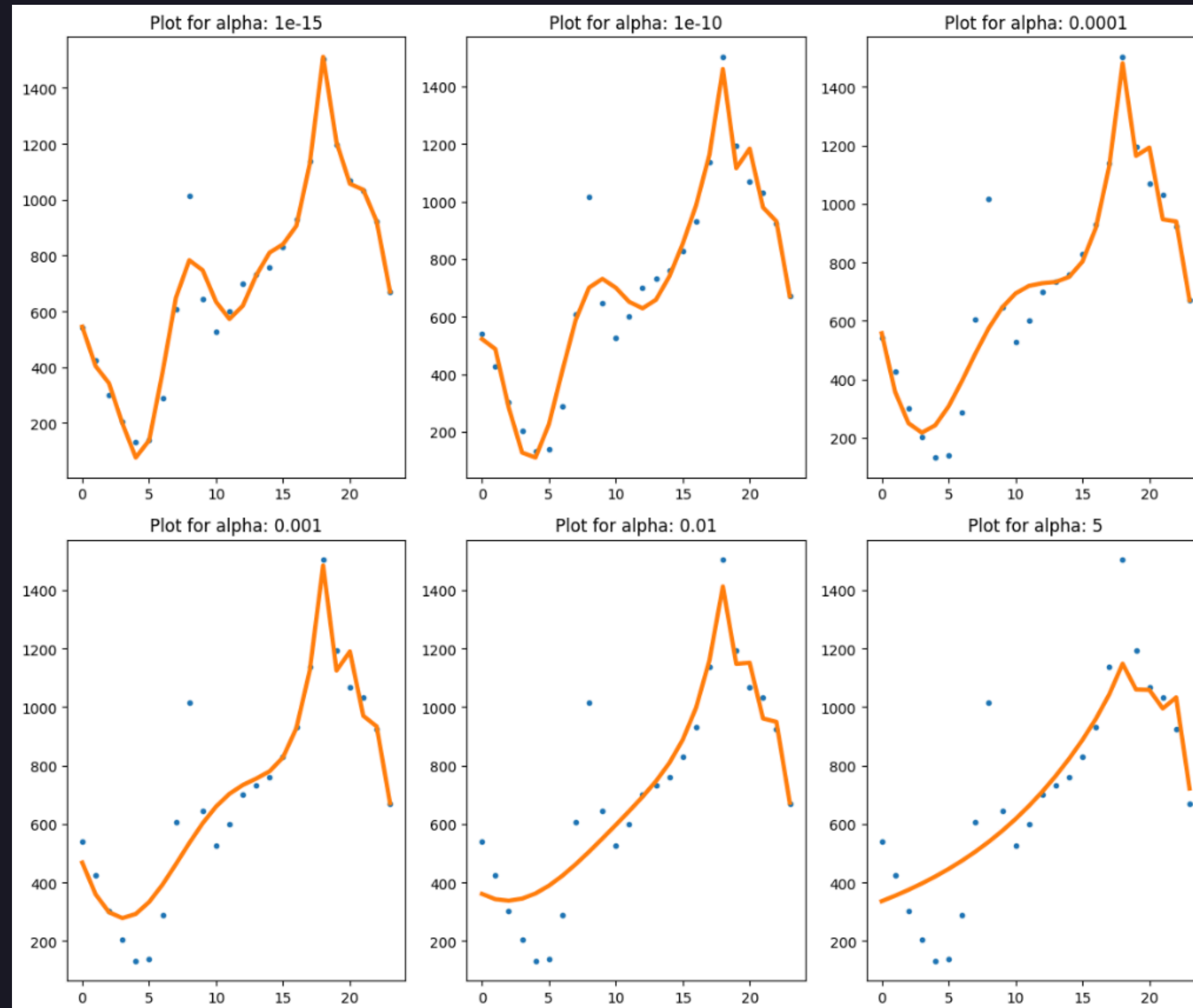
08

Rented Bike Mean \leftrightarrow Hour



RIDGE REGRESSION

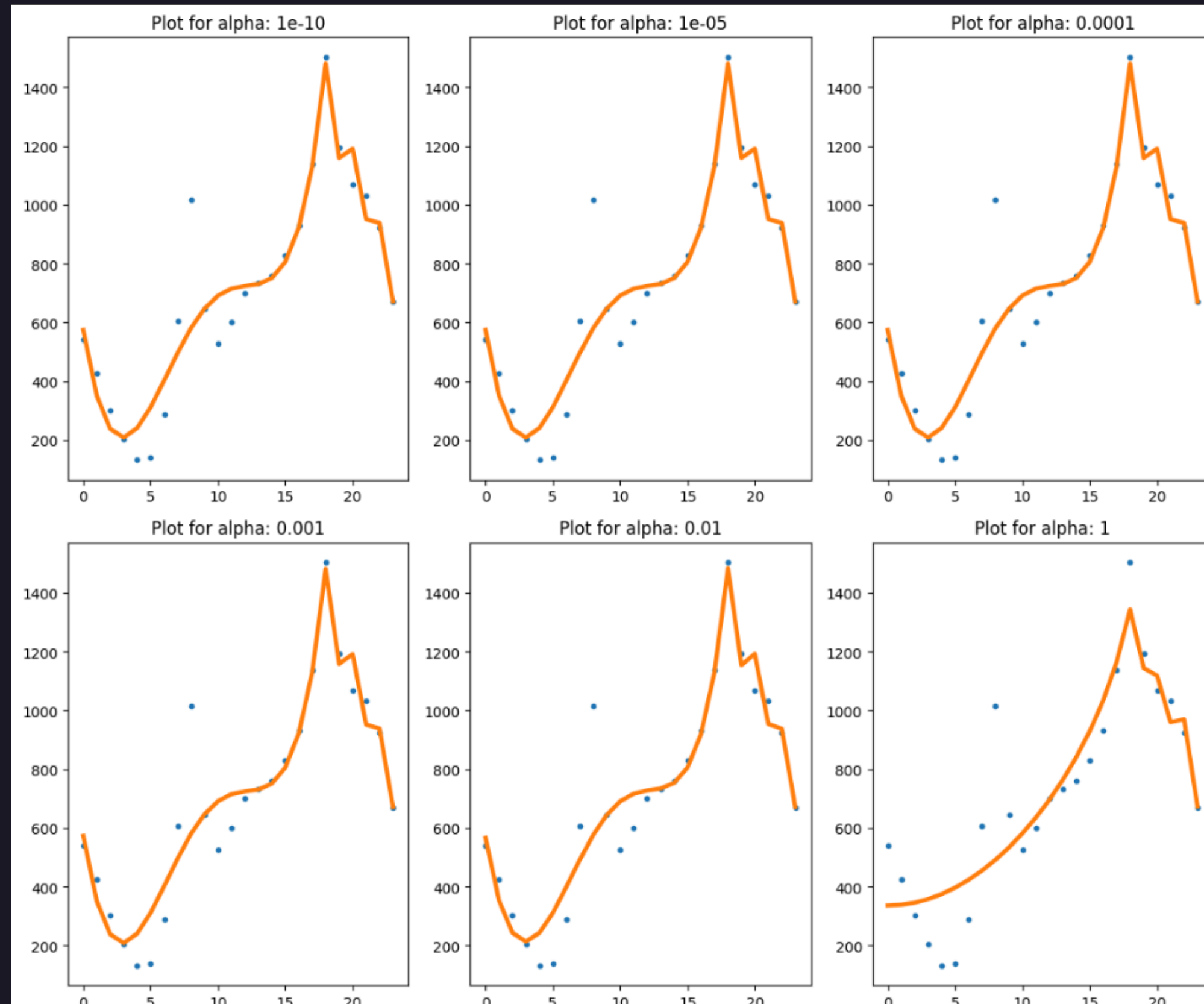
Rented Bike Mean \leftrightarrow Hour



LASSO REGRESSION

10

Rented Bike Mean \leftrightarrow Hour



REGRESSION RESULTS

Rented Bike Mean <-> Hour

Linear Regression

	rss	rmse	r2_score	intercept
model_pow_1	1.2353e+06	226.87	0.57631	704.6
model_pow_2	1.2056e+06	224.13	0.58651	704.6
model_pow_3	7.3773e+05	175.32	0.74697	704.6
model_pow_4	7.2669e+05	174.01	0.75076	704.6
model_pow_5	5.2965e+05	148.56	0.81834	704.6
model_pow_6	5.0505e+05	145.06	0.82678	704.6
model_pow_7	3.4017e+05	119.05	0.88333	704.6
model_pow_8	2.9652e+05	111.15	0.8983	704.6
model_pow_9	2.7708e+05	107.45	0.90497	704.6
model_pow_10	2.7435e+05	106.92	0.9059	704.6
model_pow_11	2.1882e+05	95.485	0.92495	704.6
model_pow_12	2.1665e+05	95.01	0.92569	704.6
model_pow_13	1.0141e+05	65.002	0.96522	704.6
model_pow_14	1.0117e+05	64.925	0.9653	704.6
model_pow_15	77,362	56.775	0.97347	704.6

Ridge Regression

	rss	rmse	r2_score	intercept
alpha_1e-15	1.0258e+05	65.379	0.96482	704.6
alpha_1e-10	2.1195e+05	93.975	0.9273	704.6
alpha_1e-08	2.2886e+05	97.652	0.92151	704.6
alpha_0.0001	3.3532e+05	118.2	0.88499	704.6
alpha_0.001	3.974e+05	128.68	0.8637	704.6
alpha_0.01	5.2566e+05	148	0.81971	704.6
alpha_1	6.3369e+05	162.49	0.78266	704.6
alpha_5	7.346e+05	174.95	0.74805	704.6
alpha_10	8.6187e+05	189.5	0.7044	704.6
alpha_20	1.086e+06	212.72	0.62752	704.6

Lasso Regression

	rss	rmse	r2_score	intercept
alpha_1e-15	3.3092e+05	117.42	0.8865	704.6
alpha_1e-10	3.3092e+05	117.42	0.8865	704.6
alpha_1e-08	3.3092e+05	117.42	0.8865	704.6
alpha_1e-05	3.3093e+05	117.42	0.8865	704.6
alpha_0.0001	3.3096e+05	117.43	0.88649	704.6
alpha_0.001	3.3128e+05	117.49	0.88638	704.6
alpha_0.01	3.3475e+05	118.1	0.88519	704.6
alpha_1	6.0005e+05	158.12	0.79419	704.6
alpha_5	6.2946e+05	161.95	0.78411	704.6
alpha_10	6.689e+05	166.95	0.77058	704.6

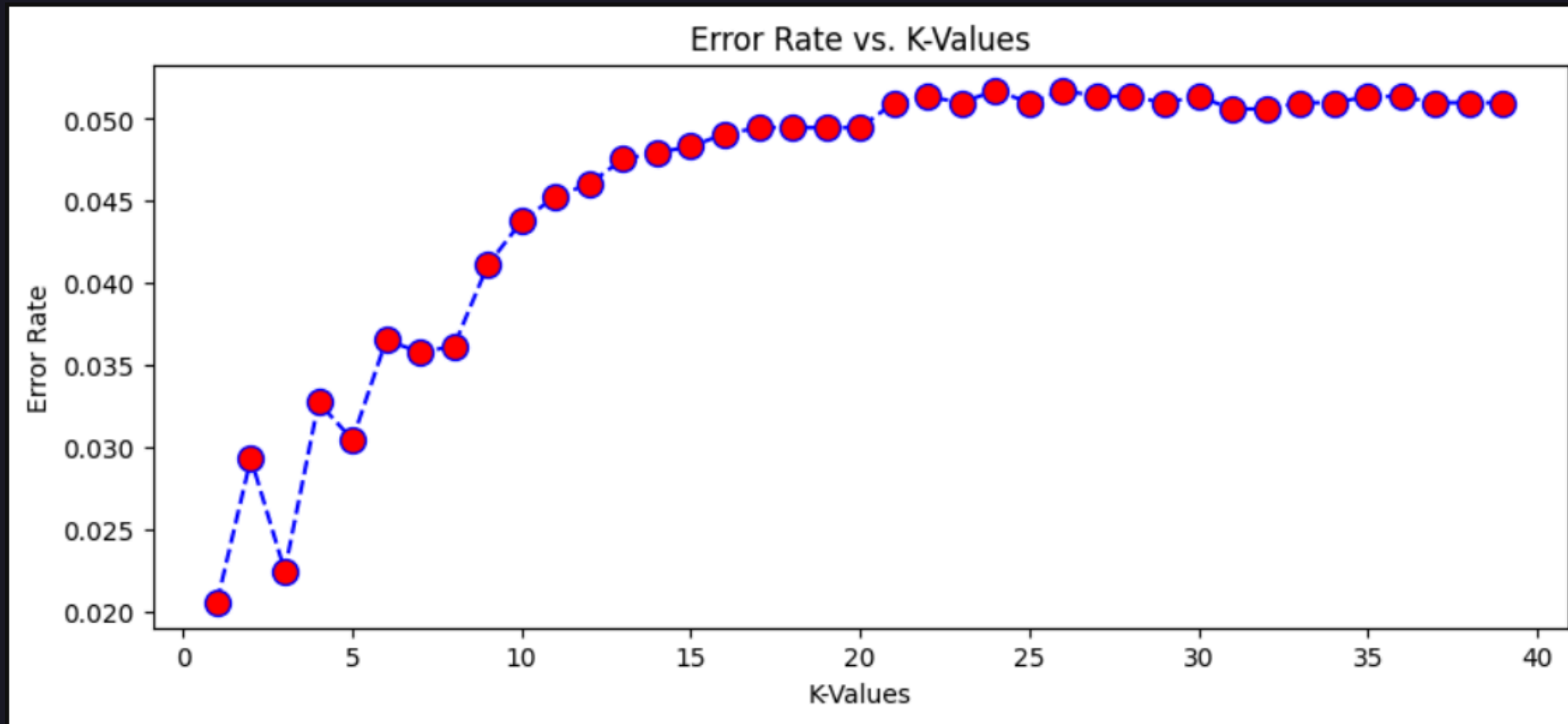
```
alpha_1e-05      0
alpha_0.0001     0
alpha_0.001      0
alpha_0.01       0
alpha_1          10
alpha_5          11
alpha_10         11
```

CLASSIFICATION

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Holidays

KNN



CLASSIFICATION

1

	precision	recall	f1-score	support
Holiday	0.79	0.81	0.80	134
No Holiday	0.99	0.99	0.99	2494
accuracy			0.98	2628
macro avg	0.89	0.90	0.90	2628
weighted avg	0.98	0.98	0.98	2628
TP - True Negative 109				
FP - False Positive 25				
FN - False Negative 29				
TP - True Positive 2465				
Accuracy Rate: 0.9794520547945206				
Misclassification Rate: 0.02054794520547945				

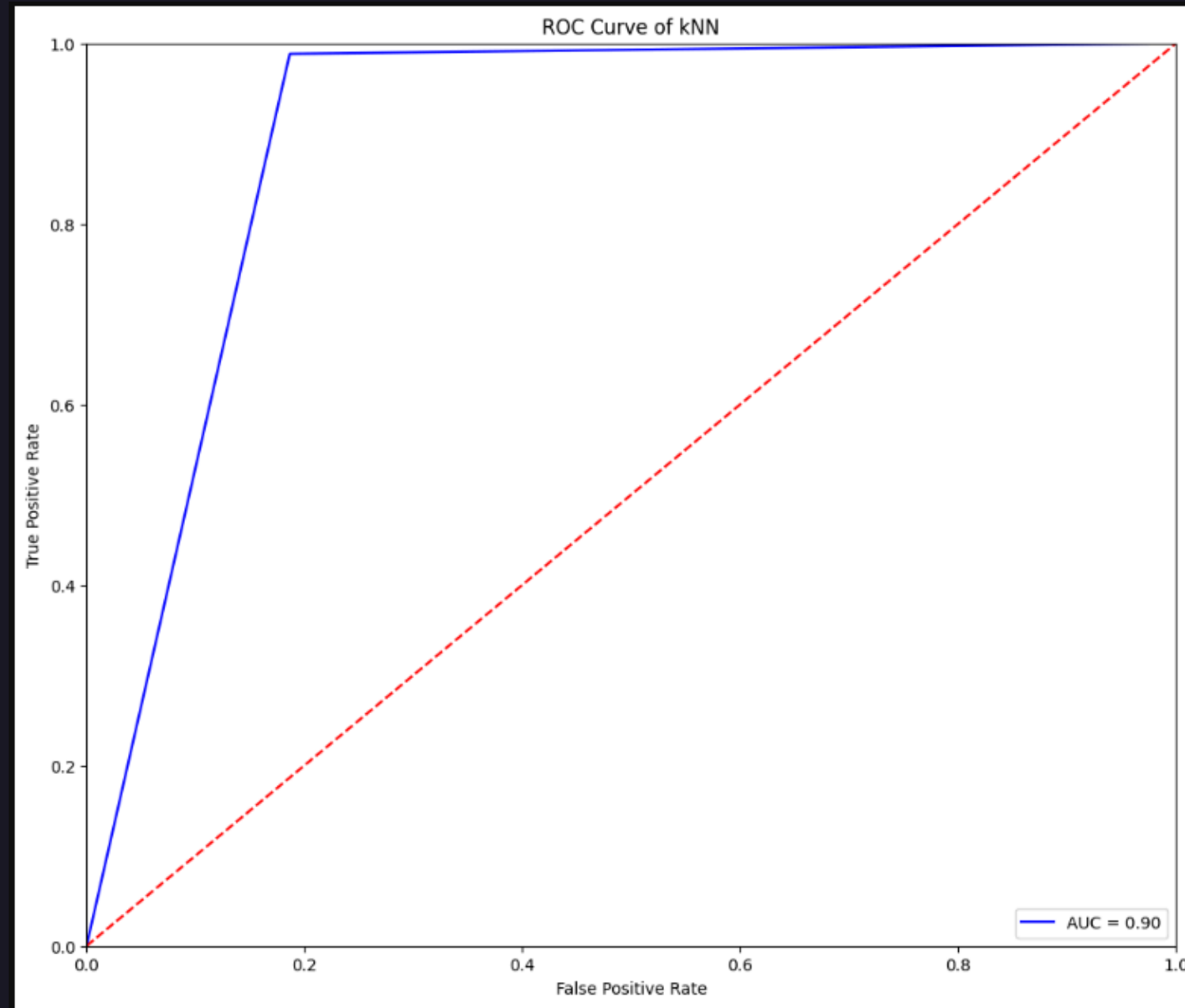
3

	precision	recall	f1-score	support
Holiday	0.81	0.73	0.77	134
No Holiday	0.99	0.99	0.99	2494
accuracy			0.98	2628
macro avg	0.90	0.86	0.88	2628
weighted avg	0.98	0.98	0.98	2628
TP - True Negative 98				
FP - False Positive 36				
FN - False Negative 23				
TP - True Positive 2471				
Accuracy Rate: 0.9775494672754946				
Misclassification Rate: 0.022450532724505326				

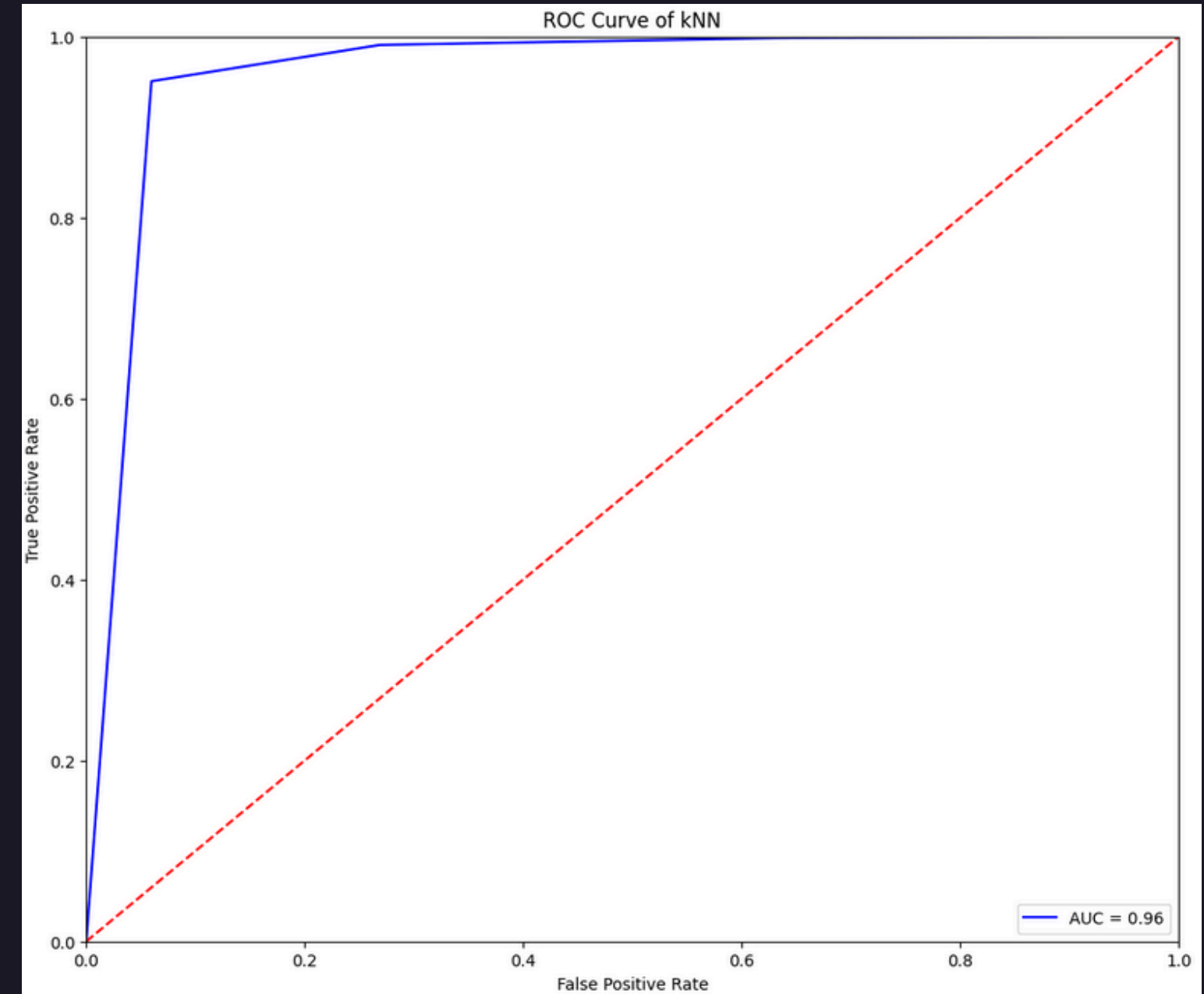
CLASSIFICATION

14

1



3



CLASSIFICATION

Seasons

SVM

	precision	recall	f1-score	support
Autumn	0.64	0.58	0.61	680
Spring	0.63	0.65	0.64	624
Summer	0.83	0.86	0.85	659
Winter	0.91	0.94	0.92	665
accuracy			0.76	2628
macro avg	0.75	0.76	0.76	2628
weighted avg	0.76	0.76	0.76	2628

CLASSIFICATION

Holidays

Logistic Regression

	precision	recall	f1-score	support
Holiday	0.00	0.00	0.00	149
No Holiday	0.95	1.00	0.98	2917
accuracy			0.95	3066
macro avg	0.48	0.50	0.49	3066
weighted avg	0.91	0.95	0.93	3066

CLASSIFICATION

Holidays

Random Forest

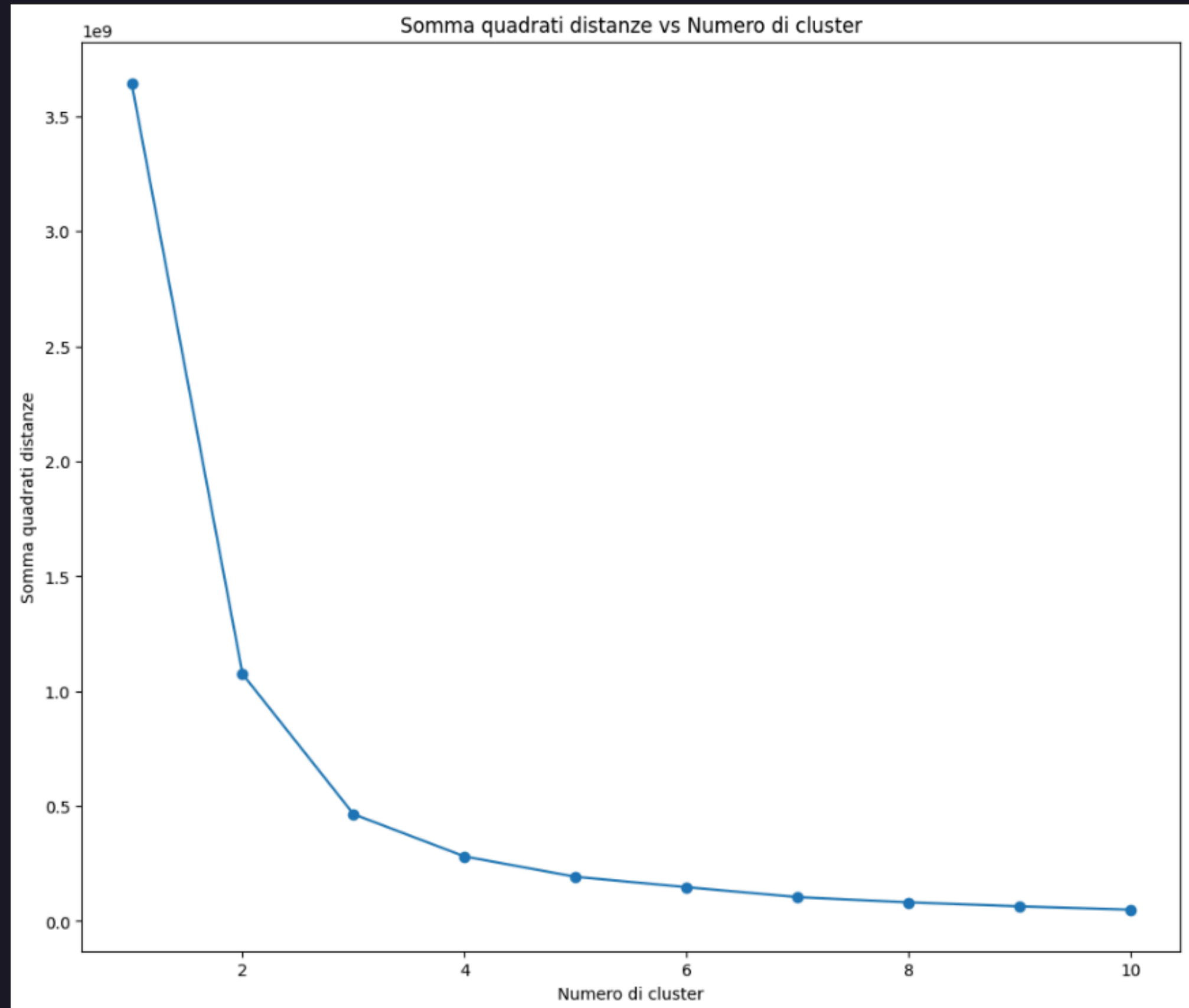
	precision	recall	f1-score	support
Holiday	0.85	0.15	0.25	149
No Holiday	0.96	1.00	0.98	2917
accuracy			0.96	3066
macro avg	0.90	0.57	0.61	3066
weighted avg	0.95	0.96	0.94	3066

K-MEANS CLUSTERING

18

Temperature(C°) <-> Rented Bike Count

```
Numero di cluster: 1  
Somma quadrati distanze: 3645184086.8082023  
Numero di iterazioni: 2  
  
Numero di cluster: 2  
Somma quadrati distanze: 1074559764.674103  
Numero di iterazioni: 9  
  
Numero di cluster: 3  
Somma quadrati distanze: 465325388.76934034  
Numero di iterazioni: 11  
  
Numero di cluster: 4  
Somma quadrati distanze: 281574008.8246765  
Numero di iterazioni: 6  
  
Numero di cluster: 5  
Somma quadrati distanze: 193133141.10134205  
Numero di iterazioni: 21  
  
Numero di cluster: 6  
Somma quadrati distanze: 147958429.13276693  
Numero di iterazioni: 27  
  
Numero di cluster: 7  
Somma quadrati distanze: 104803846.23269033  
Numero di iterazioni: 45  
  
Numero di cluster: 8  
Somma quadrati distanze: 81979175.12450704  
Numero di iterazioni: 19  
  
Numero di cluster: 9  
Somma quadrati distanze: 64533444.12097802  
Numero di iterazioni: 13  
  
Numero di cluster: 10  
Somma quadrati distanze: 50150490.19259894  
Numero di iterazioni: 7
```



K-MEANS CLUSTERING

Temperature(C°) <-> Rented Bike Count

Centroidi ottenuti:

```
[[ 5.88899859 195.33897508]  
[ 20.82094102 1321.47647449]  
[ 23.32081737 2170.33971903]  
[ 17.21933153 744.2899729 ]]
```

Somma quadrati distanze: 281574008.825
Numero di iterazioni: 6

