Sagar Patni

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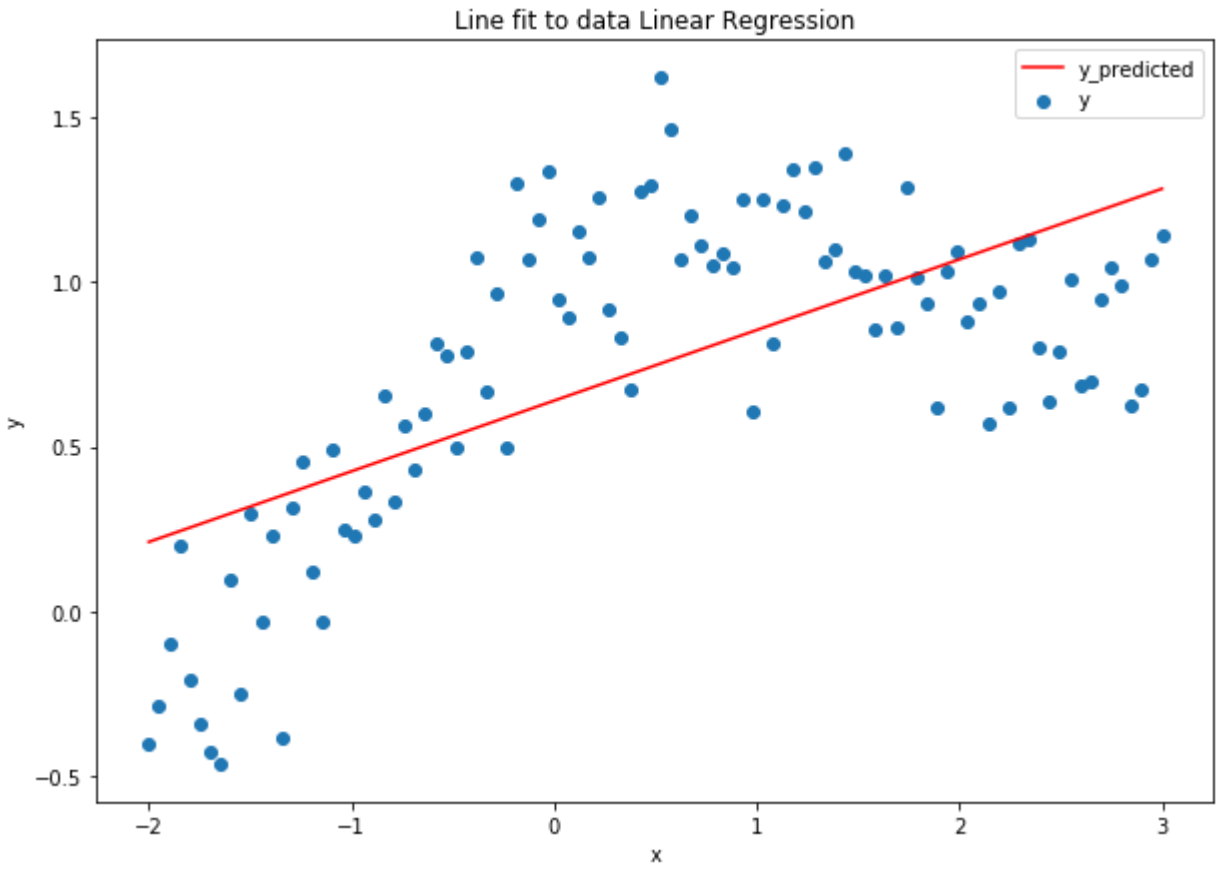
Question 1. Linear Regression

A. Plot line fit to data.



B. mean square error.
0.13507342

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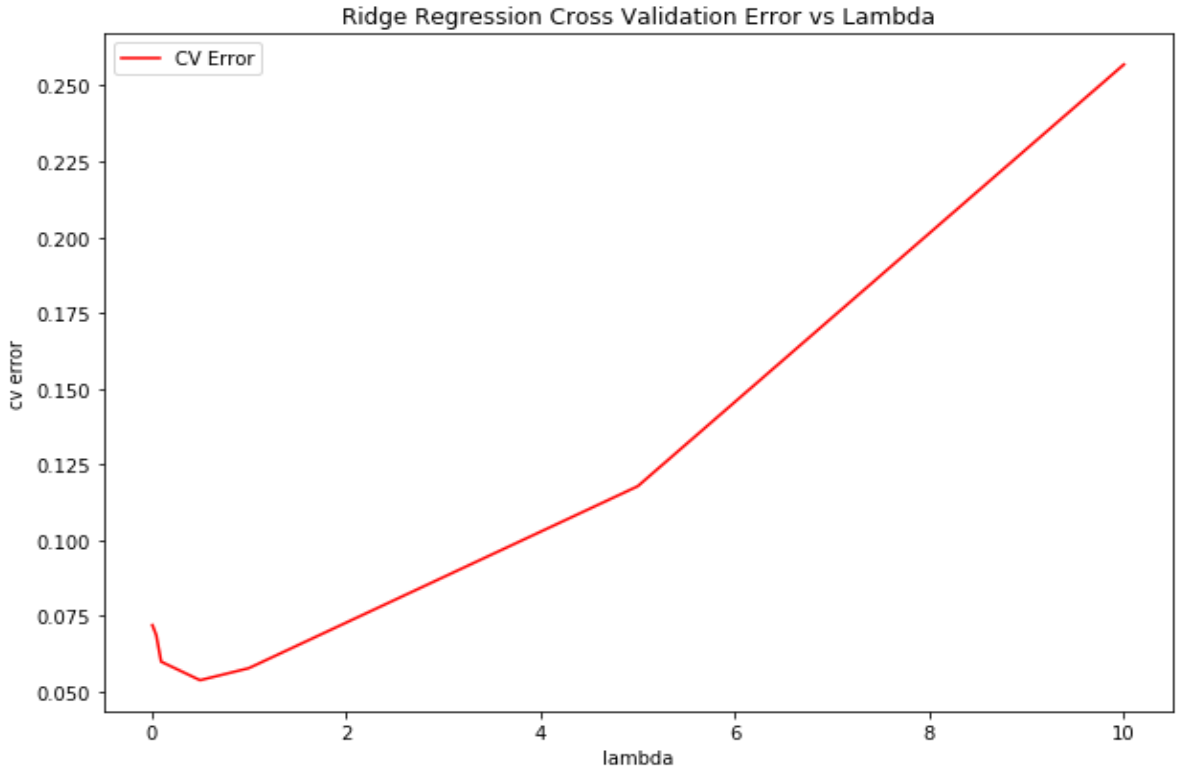
Question 2. Ridge Regression.

A. Plot of cross validation error and train error vs lambdas



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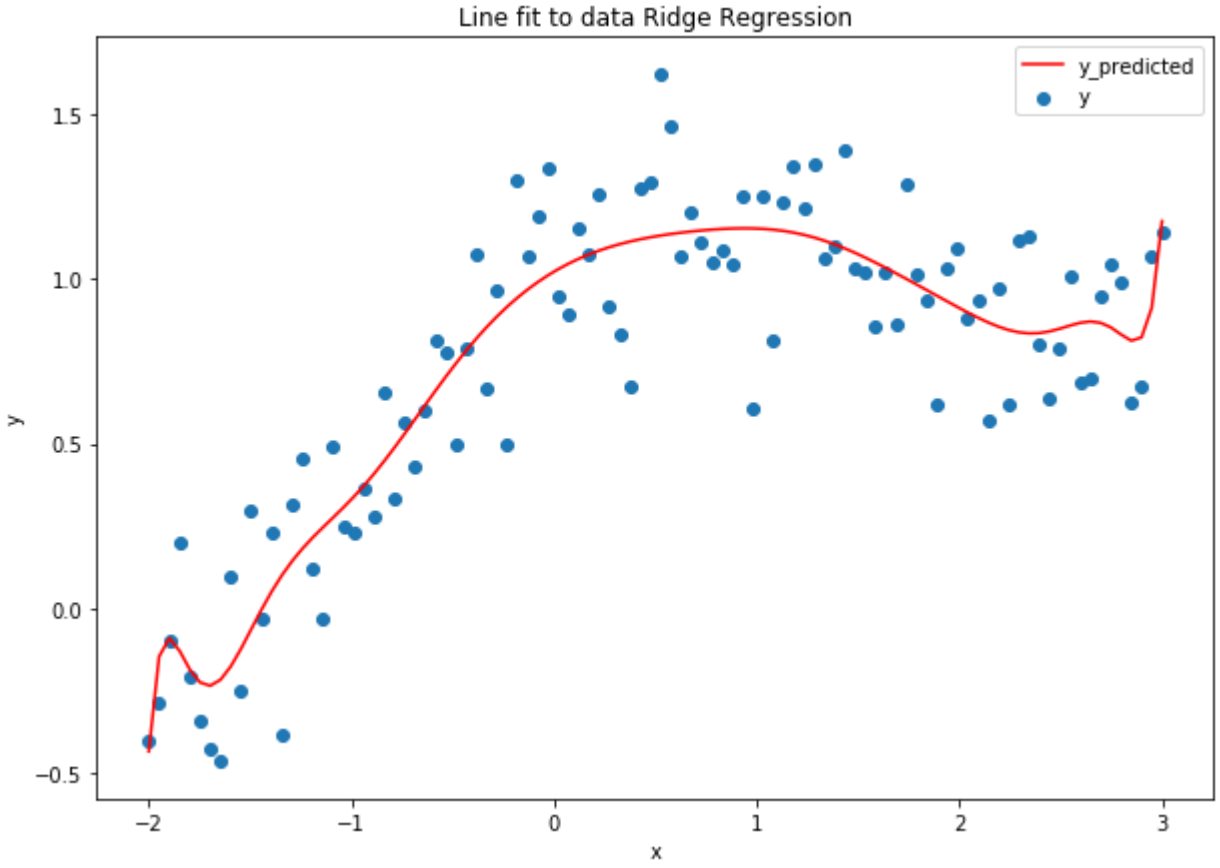
B. Plot of Polynomial fit to data.



Avg. Train Error Values

```
{0.01: 0.039328912401031549, 0.05: 0.039334686888644999, 0.1:
0.039466555098265875, 0.5: 0.040084144303032379, 1: 0.042010689130760538,
5: 0.10759749156191442, 10: 0.23611500093735444}
```

Avg. Crossvalidation Error Values

```
{0.01: 0.062513056311316553, 0.05: 0.059865826721411684, 0.1:
0.062314730227717011, 0.5: 0.05545642497840686, 1: 0.056202255686781485,
5: 0.11918468234448243, 10: 0.25419632512584905}
```

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Question 3. Logistic Regression.

Hyperparameters:

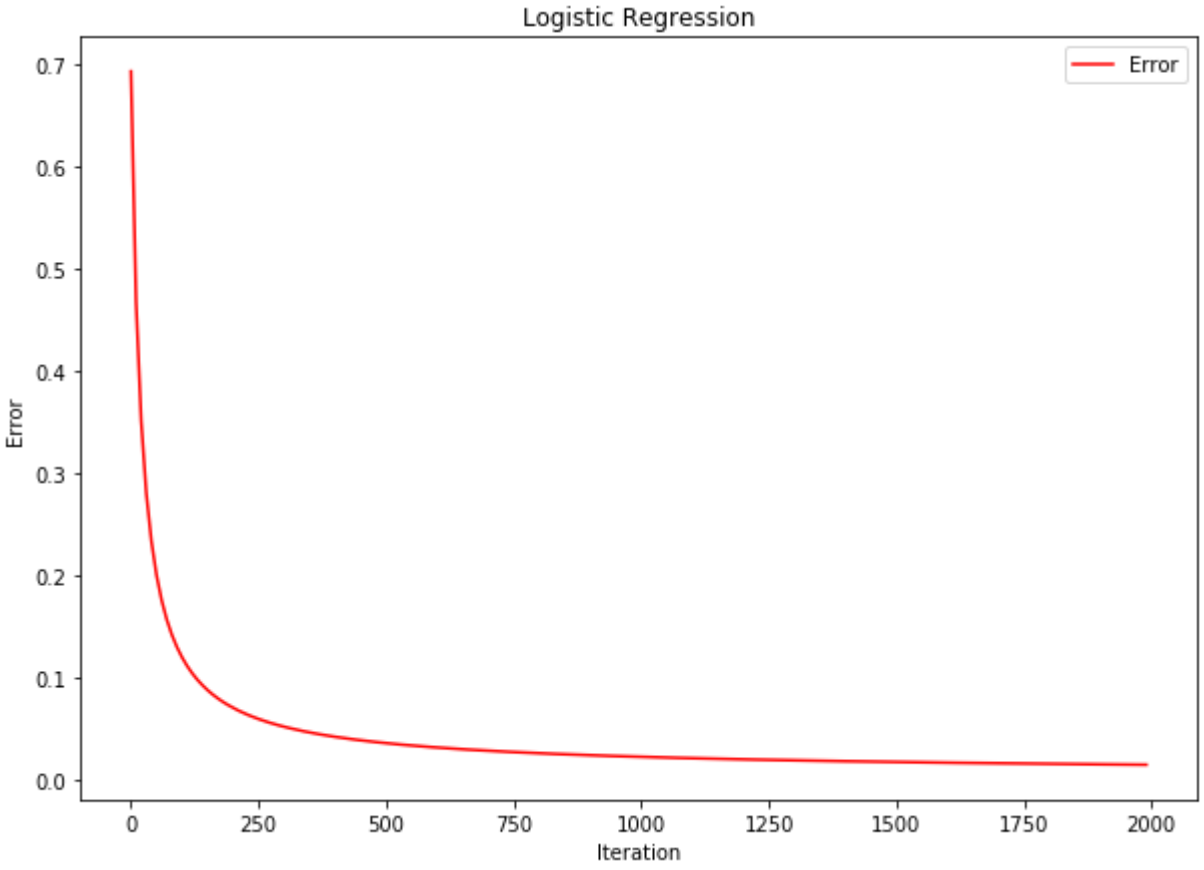
learning_rate = 0.01

num_iterations = 2000

A. Train and Test Accuracies.

```
Accuracy for training set is 99.76312672720094 %
Accuracy for testing set is 99.90543735224587 %
```

B. Plot of train Error vs iteration.



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Cost per iteration

```
Cost at iteration 0 is: 0.693147
Cost at iteration 100 is: 0.119966
Cost at iteration 200 is: 0.070543
Cost at iteration 300 is: 0.052032
Cost at iteration 400 is: 0.042170
Cost at iteration 500 is: 0.035974
Cost at iteration 600 is: 0.031688
Cost at iteration 700 is: 0.028528
Cost at iteration 800 is: 0.026091
Cost at iteration 900 is: 0.024149
Cost at iteration 1000 is: 0.022559
Cost at iteration 1100 is: 0.021231
Cost at iteration 1200 is: 0.020102
Cost at iteration 1300 is: 0.019130
Cost at iteration 1400 is: 0.018282
Cost at iteration 1500 is: 0.017535
Cost at iteration 1600 is: 0.016872
Cost at iteration 1700 is: 0.016278
Cost at iteration 1800 is: 0.015742
Cost at iteration 1900 is: 0.015256
```