Logistic Regression and Regularization

For L1 loss:

The LogisticRegression package from the sklearn module was used to classify the dataset.
The penalty was set to L1 and the following results were obtained by varying the regularization parameter lambda.
The solver used was *'liblinear'*.

Lambda	Accuracy
0.001	94.1281%
0.1	94.1281%
1.0	94.0391%
10	93.9501%
100	95.2846%
1000	95.5551%

The above values of lambda in the regularization term reported the following accuracies as given in the above chart. We see that, as we increase lambda our accuracy increases.

For L2 loss:

The penalty was set to L2 and the following results were obtained by varying the regularization parameter lambda. The solver used was *'newton-cg'*.

Lambda	Accuracy
0.001	93.0604%
0.1	93.1494%
1.0	93.4163%
10	93.5943%
100	93.6832%
1000	94.1281%

Juxtaposing the L1 and L2 loss:

The penalty was set to L2 and the following results were obtained by varying the regularization parameter lambda.

Parameters used:
  Solver: elasticnet
  Loss: log
  Max no. of iterations = 100
  l1_ratio = 0.25

Adjusting the lambda parameter and the L1:L2 ratio, we try to find the best fit in terms of the accuracy.

L1 Ratios / Lambda	0.10	0.25	0.50	0.75
0.001	93.68%	94.57%	93.77%	94.48%
0.1	93.68%	94.30%	94.39%	94.66%
1.0	95.72%	94.12%	95.01%	95.19%
10	95.46%	94.48%	93.50%	93.32%
100	88.87%	49.28%	49.28%	49.28%
1000	50.71%	50.71%	49.28%	50.71%

The above table contains the accuracies in the matrix table.