Q4 Report

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Abstract

Implemented the linear classifier using following regularization methods.

1. Lasso
2. Ridge
3. ElasticNet
4. No regularization

First 3 regularizations are implemented using "sklearn"
To execute the program, following is the syntax
$python2 < fileName > .py < trainSet.csv >< testSet.csv >$
Available files in this directory:

- q4_a.py –> Least Square regression with Lasso Regularization applied
- q4_b.py –> Least Square regression with Ridge Regularization applied
- q4_c.py –> Least Square regression with ElasticNet Regularization applied
- q4_d.py –> Least Square regression with No Regularization applied

1 Experiments with different Hyper parameters

Lasso regularization : Accuracies noted for different Hyper parameters

- Accuracy = 36.0576923077% (75/208) while alpha = 1e-15
- Accuracy = 36.0576923077% (75/208) while alpha = 1e-10
- Accuracy = 36.0576923077% (75/208) while alpha = 1e-08
- Accuracy = 36.0576923077% (75/208) while alpha = 1e-05
- Accuracy = 36.0576923077% (75/208) while alpha = 0.0001
- Accuracy = 56.7307692308% (118/208) while alpha = 0.001
- Accuracy = 46.1538461538% (96/208) while alpha = 0.01
- Accuracy = 51.9230769231% (108/208) while alpha = 1
- Accuracy = 50.4807692308% (105/208) while alpha = 5
- Accuracy = 49.5192307692% (103/208) while alpha = 10

Note: 0.00111111 is used as Hyper Parameter, noted accurary is 69.2307692308% (144/208) in q4_a.py

Ridge regularization : Accuracies noted for different Hyper parameters

- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-15**
- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-10**
- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-08**
- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-05**
- **Accuracy = 36.0576923077% (75/208) while alpha = 0.0001**
- **Accuracy = 36.0576923077% (75/208) while alpha = 0.001**
- **Accuracy = 36.0576923077% (75/208) while alpha = 0.01**
- **Accuracy = 63.9423076923% (133/208) while alpha = 1**
- **Accuracy = 63.9423076923% (133/208) while alpha = 5**
- **Accuracy = 63.9423076923% (133/208) while alpha = 10**

This is used as Hyper Parameter in q4_b.py

ElasticNet regularization : Accuracies noted for different Hyper parameters

- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-15**
- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-10**
- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-08**
- **Accuracy = 36.0576923077% (75/208) while alpha = 1e-05**
- **Accuracy = 36.0576923077% (75/208) while alpha = 0.0001**
- **Accuracy = 72.1153846154% (150/208) while alpha = 0.001**
- **Accuracy = 63.9423076923% (133/208) while alpha = 0.01**
- **Accuracy = 51.4423076923% (107/208) while alpha = 1**
- **Accuracy = 49.5192307692% (103/208) while alpha = 5**
- **Accuracy = 48.5576923077% (101/208) while alpha = 10**

This is used as Hyper Parameter in q4_c.py