**STOCK PRICE PREDICTION**

**INTERIM REPORT**

**Features:**

Original Dataset had the following features :

|  |
| --- |
| Opening Price |
| Highest Price |
| Lowest Price |
| Last Price |
| Closing Price |
| Trade Quantity |
| Turnover(Lacs) |

Based on the Study and Research in Stock Market We have come out with the following features :

|  |
| --- |
| Previous Day Closing Price |
| Same Day Opening Price |
| Previous Day Nifty Closing Price |
| 10 Days Moving averages |
| 15 Days Moving averages |
| 20 Days Moving averages |
| 40 Days Moving averages |
| 10 Days Momentum |
| 40 Days Momentum |
| Average Difference between Opening Price and Closing Price (5 Days ) |
| Average Difference between Opening Price and Closing Price (10 Days ) |
| Average Difference between Opening Price and Closing Price (40 Days ) |
| Average Difference between Highest Price and Lowest Price (5 Days ) |
| Average Difference between Highest Price and Lowest Price (10 Days ) |
| Average Difference between Highest Price and Lowest Price (40 Days ) |
| Volatility |
| Average Turnover for 10 Days |
|  |

**PREPROCESSING**

|  |  |  |
| --- | --- | --- |
| **Technique** | **Applied** | **Remarks** |
| Normalization | YES | The Dataset was scaled between 0 and 1. |
| PCA | NO | The number of features were not large. |
| Missing Values Correcton | YES | Taking average of surrounding values |
| Equalise no of Datapoints in Datasets | YES | Equal no of Datapoints in each dataset were processed. |

**Techniques Applied**

* **Simple Linear Regression**
* **LASSO Regression**
* **Ridge Regression**

**We performed Regularized Linear Regression. We used grid-search based approach to find the best value of alpha and delta (one which gives minimum MSE) for fitting the model.**

dvalues=[0,0.1,0.05,0.01,0.005,0.001,0.0005,0.0001,0.00005,0.00001];

avalues=[0.1,0.05,0.01,0.005,0.001,0.0005,0.0001,0.00005,0.00001];

**LASSO REGULARIZED REGRESSION**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | alpha | 0.1 | 0.05 | 0.01 | 0.005 | 0.001 | 0.0005 | 0.0001 | 0.00005 | 0.00001 |
| Delta |  |  |  |  |  |  |  |  |  |  |
| 0 |  | 0.002191 | 0.0024 | 0.0078 | 0.0146 | 0.0345 | 0.041 | 0.0617 | 0.0680 | 0.0745 |
| 0.1 |  | 0.0035 | 0.0071 | 0.034 | 0.059 | 0.1435 | 0.2068 | 0.4141 | 0.47533 | 0.5366 |
| 0.05 |  | 0.0025 | 0.0039 | 0.0185 | 0.032 | 0.0792 | 0.1073 | 0.1967 | 0.223 | 0.2503 |
| 0.01 |  | 0.00219 | 0.0026 | 0.0095 | 0.017 | 0.0418 | 0.0519 | 0.0821 | 0.0914 | 0.1008 |
| 0.005 |  | **0.00218** | 0.0025 | 0.00864 | 0.0161 | 0.0380 | 0.0465 | 0.0715 | 0.0792 | 0.08771 |
| 0.001 |  | 0.0022 | 0.0024 | 0.0079 | 0.014 | 0.0352 | 0.0424 | 0.0636 | 0.0702 | 0.0769 |
| 0.0005 |  | 0.00219 | 0.0024 | 0.0079 | 0.0147 | 0.0348 | 0.0419 | 0.0062 | 0.0691 | 0.0757 |
| 0.0001 |  | 0.00219 | 0.00247 | 0.00784 | 0.0146 | 0.0345 | 0.0415 | 0.0619 | 0.0682 | 0.0747 |
| 0.00005 |  | 0.00219 | 0.0024 | 0.0078 | 0.0146 | 0.0345 | 0.0415 | 0.0618 | 0.0681 | 0.0746 |
| 0.00001 |  | 0.00219 | 0.0024 | 0.0078 | 0.0146 | 0.0345 | 0.0414 | 0.0617 | 0.0680 | 0.0745 |

**RIDGE REGULARIZED REGRESSION**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | alpha | 0.1 | 0.05 | 0.01 | 0.005 | 0.001 | 0.0005 | 0.0001 | 0.00005 | 0.00001 |
| Delta |  |  |  |  |  |  |  |  |  |  |
| 0 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0383 | 0.056 | 0.0641 | 0.0735 |
| 0.1 |  | 0.0371 | 0.0369 | 0.0372 | 0.0373 | 0.0382 | 0.0399 | 0.0575 | 0.065 | 0.0651 |
| 0.05 |  | 0.0371 | 0.0369 | 0.0371 | 0.0377 | 0.0392 | 0.1073 | 0.0568 | 0.0646 | 0.0736 |
| 0.01 |  | 0.0371 | 0.0368 | 0.0371 | 0.0377 | 0.0386 | 0.0386 | 0.0562 | 0.0642 | 0.0735 |
| 0.005 |  | 0.0374 | 0.0368 | 0.0371 | 00372 | 0.0380 | 0.0465 | 0.0715 | 0.0642 | 0.0735 |
| 0.001 |  | 0.0374 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0385 | 0.0560 | 0.0641 | 0.0735 |
| 0.0005 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0384 | 0.0560 | 0.0641 | 0.0735 |
| 0.0001 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0384 | 0.0560 | 0.0641 | 0.0735 |
| 0.00005 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0384 | 0.0560 | 0.0641 | 0.0735 |
| 0.00001 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0384 | 0.0560 | 0.0641 | 0.07354 |

**With Cross Validation**

**LASSO REGULARIZED REGRESSION**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | alpha | 0.1 | 0.05 | 0.01 | 0.005 | 0.001 | 0.0005 | 0.0001 | 0.00005 | 0.00001 |
| Delta |  |  |  |  |  |  |  |  |  |  |
| 0 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0384 | 0.0560 | 0.0641 | 0.0735 |
| 0.1 |  | 0.0408 | 0.0402 | 0.0442 | 0.0478 | 0.0779 | 0.1249 | 0.3850 | 0.4878 | 0.6012 |
| 0.05 |  | 0.0388 | 0.0391 | 0.0404 | 0.0423 | 0.0556 | 0.0750 | 0.1815 | 0.2240 | 0.2710 |
| 0.01 |  | 0.0374 | 0.0372 | 0.0378 | 0.0382 | 0.0407 | 0.0448 | 0.0747 | 0.0877 | 0.1024 |
| 0.005 |  | **0.0373** | 0.0371 | 0.0374 | 0.0377 | 0.0390 | 0.0416 | 0.0649 | 0.0754 | 0.0871 |
| 0.001 |  | 0.0371 | 0.0369 | 0.0371 | 0.0373 | 0.0376 | 0.0390 | 0.0578 | 0.0663 | 0.0761 |
| 0.0005 |  | 0.0371 | 0.0369 | 0.0371 | 0.0372 | 0.0375 | 0.0387 | 0.0569 | 0.0652 | 0.0748 |
| 0.0001 |  | 0.0371 | 0.036 | 0.0371 | 0.0372 | 0.0373 | 0.0385 | 0.0562 | 0.0644 | 0.0738 |
| 0.00005 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0385 | 0.0561 | 0.0642 | 0.0736 |
| 0.00001 |  | 0.0371 | 0.0368 | 0.0371 | 0.0372 | 0.0373 | 0.0384 | 0.0560 | 0.0642 | 0.0735 |

**RIDGE REGULARIZED REGRESSION**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | alpha | 0.1 | 0.05 | 0.01 | 0.005 | 0.001 | 0.0005 | 0.0001 | 0.00005 | 0.00001 |
| Delta |  |  |  |  |  |  |  |  |  |  |
| 0 |  | 0.002 | 0.0024 | 0.0078 | 0.014 | 0.034 | 0.0414 | 0.061 | 0.0680 | 0.0745 |
| 0.1 |  | 0.002 | 0.0026 | 0.0089 | 0.016 | 0.035 | 0.043 | 0.062 | 0.0686 | 0.0747 |
| 0.05 |  | 0.0021 | 0.0025 | 0.0083 | 0.0153 | 0.0352 | 0.0422 | 0.0622 | 0.0683 | 0.0746 |
| 0.01 |  | 0.0021 | 0.0024 | 0.0079 | 0.0148 | 0.0346 | 0.0416 | 0.0618 | 0.0681 | 0.0745 |
| 0.005 |  | 0.0021 | 0.0024 | 0.0078 | 0.0147 | 0.0345 | 0.0415 | 0.0617 | 0.0680 | 0.0745 |
| 0.001 |  | 0.0021 | 0.0024 | 0.0078 | 0.0146 | 0.0345 | 0.0415 | 0.0618 | 0.0680 | 0.0745 |
| 0.0005 |  | 0.0021 | 0.0024 | 0.0078 | 0.0146 | 0.0345 | 0.0414 | 0.0617 | 0.0680 | 0.0745 |
| 0.0001 |  | 0.0021 | 0.0024 | 0.0078 | 0.0146 | 0.0345 | 0.0414 | 0.0617 | 0.0680 | 0.0745 |
| 0.00005 |  | 0.0021 | 0.0024 | 0.0078 | 0.0146 | 0.0345 | 0.0414 | 0.0617 | 0.0680 | 0.0745 |
| 0.00001 |  | 0.0021 | 0.0024 | 0.0078 | 0.0145 | 0.0345 | 0.0414 | 0.0617 | 0.0680 | 0.0745 |