WORLDQUANT UNIVERSITY

Submission Number: 1

Group Number: 08

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Question 11

When we compared R-squared and MSE metrics for our model evaluation, we found that Lasso performed better than PCA regression. Compared to the PCA regression, Lasso regression provides a better fit to the data.

R-squared values for Lasso is 97% and for PCA it is 96%. MSE values are 1372.8 and 2349.6 for Lasso and PCA respectively.

Question 12

The Lasso model provides better interpretation of results compared to the PCA regression. When we compared R-squared and MSE results we found that the Lasso model performed better.

Question 13

We have divided the work into three parts, since we are three members. The first part is data importing, dimensional, data summary preparation and data exploration. The second part focused on model building, such as PCA regression and Lasso. The third part focused on generating technical and non-technical reports for senior management.

Question 14

Technical Report

Problem Statement

Our objective is to predict the performance of the stock market. We have used LUX Index as a dependent variable and MSCI Indexes as independent variables.

Algorithm Explanation

We have used supervised algorithms to evaluate the relationship between independent and dependent variables. We performed a dimensionality reduction of the input data to improve our regression model. We have used PCA techniques for that and Lasso for feature selection and regularization.

Experimental Evaluation

To evaluate our model we have used R-squares and MSE metrics. We have divided our data into training and testing into $2/3^{rd}$ and $1/3^{rd}$ respectively. R-squared help us to check goodness of fit. Higher the value of fitness better the model has performed. MSE

is a mean squared error which is the calculation of the mean of error which is difference of actual value and predicted value.

Results and Conclusion

R-squared shows that Lasso has reached 97% and PCA 96% and MSE is also towards Lasso giving value of 1372.8 and for PCA 2349.6. On the basis of those metrics we can say that Lasso has performed better than PCA.
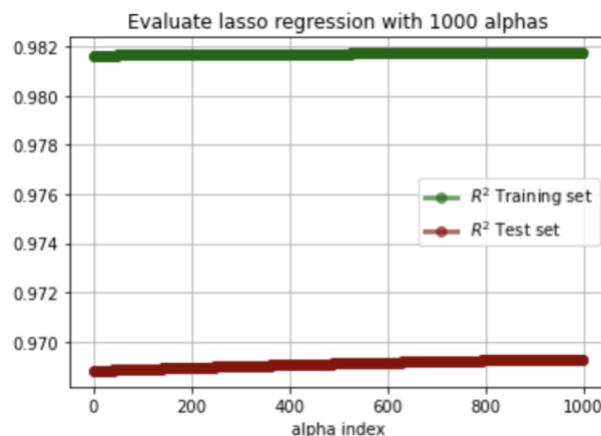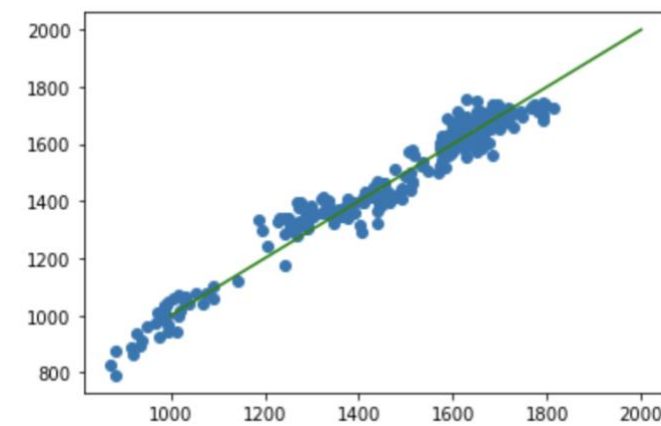
Question 15

Non-Technical Report

We have performed an analysis to check the relationship between the stock market index in various parts of the world. Our investigation shows that there is a relationship between various MSCI indexes. We have used LUX index as our dependent variable and the others left as independent variable. We have used regression supervised algorithm for the analysis. To evaluate the model we have used metrics which basically

capture the difference between the actual value and predicted value. We have concluded that there is an accuracy of 97% from our best performing model.

References:

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