Predicting Bitcoin High Price With Respect To The Opening Price

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Dataset Introduction and Goals

- Dataset obtained from Kaggle.
- 2991 Rows and 9 Columns.
- Daily Data from 2013 to 2021
- Numeric Features include prices opening, closing, low, high, volume and market cap.
- Goal: Predicting the bitcoin high price based on the opening price.

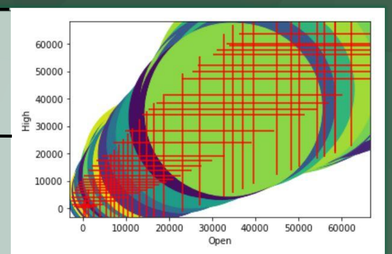
Models Used

- Supervised Learning: The dataset was split into 75% training and 25% test set.
  - Linear Regression Model
  - Decision Trees
  - SVM
  - Random Forrest
  - Clustering
  - Neural Nets

Model Outputs

```
LinearRegression()
0.9994568683960177
Mean Squared Error:  75744.28108339632
Root Mean Squared Error:  275.21678924694316
```

Linear Regression

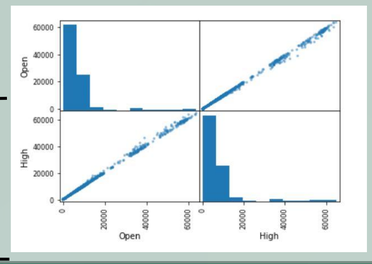



```
Accuracy:  0.982620320855615
Precision:  0.985942915466421
Sensitivity:  0.982620320855615
F1 Score:  0.9824600428406657
```

Decision Tree Test Data

```
Accuracy is  0.7647058823529411
Sensitivity is  0.7647058823529411
Precision is  0.7057921541660694
F1 is  0.7176769726075992
```

SVM Test Set




```
Accuracy (training): 0.9999296833312191
Accuracy (testing): 0.9994286956435832
R2 score : 1.00
Mean squared error: 79673.21
Root Mean squared error: 282.26
```

Random Forrest

Discussion and Results

Linear Regression Results:

- Linear Regression R2 value is 0.99 shows a strong relationship.

Decision Tree

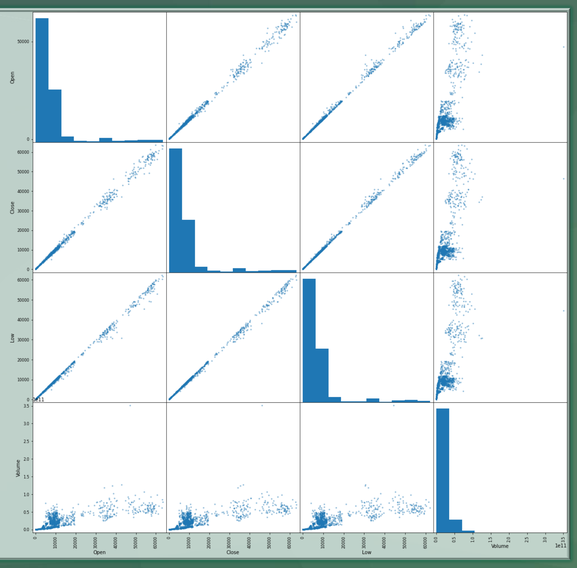
- Decision Tree was overfitting on the train set with all metrics exactly equal to 1.0
- Overfitting is classic for decision trees.
- However, analysis on the test set yields metrics close to 0.98 and interpreted in the conclusion.

SVM

- SVM accuracies are in the upper 0.70 and performs lesser than decision trees.

Random Forrest

- Metrics are very good with a R2 value of 1.0



Interpretation and Conclusion

- A high R2 value of 0.99 for linear regression suggests an excellent fit and shows strong relationship between opening and high price.
- It was suspected that the decision tree was overfitting and while it could have, the metrics for test set are high showing good predictions.
- SVM metrics seem to be poor. It could be because the dataset is imbalanced, or the kernel choice was not the best.
- To address overfitting of the decision tree metrics Random Forrest with 1000 trees was employed and high metrics yielded suggest it might not be overfitting.
- A PCA model can be employed in the **future** in order to determine if the predictions can be based off a single variable.

Additional Resources

- https://www.kaggle.com/datasets/sudalairajkumar/cryptocurrencypricehistory
- https://www.kaggle.com/datasets/jessevent/all-crypto-currencies
- https://github.com/44-599-machine-learning-S22/project-machine-learning-s22-bikash30851

Acknowledgements

Kaggle.com

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Repository

GitHub

https://github.com/44-599-machine-learning-S22/project-machine-learning-s22-bikash30851