Tesla Stock Close Price Prediction Model

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Problem Overview

The purpose of this report is to provide AI-generated regression prediction model for Tesla stock prices based on historical stock price data using MLOS Software. The predations aim to offer insights into potential future closing prices for stocks.

Benefit

- **Increased Accuracy:** AI models can analyze vast amounts of data from multiple sources in real-time.
- **Speed and Efficiency:** AI models can quickly process and analyze large volumes of data, enabling faster and more efficient exchange rate predictions.
- **Reduced Bias and Emotion:** Human traders and analysts can be influenced by biases and emotions that can impact decision-making. AI models, on the other hand, are not subject to these biases and emotions, leading to more objective and data-driven predictions.
- **Adaptability and Learning:** AI models can adapt and learn from new data and market conditions.
- **Risk Management:** Accurate exchange rate predictions can help businesses and customers manage currency risk more effectively.
- **Supporting Decision-Making:** Tesla stock predictions generated by AI models can serve as a valuable input for shareholders, investors, and customers when making strategic decisions. These predictions can provide insights into potential market trends, enabling stakeholders to make more informed and confident decisions.

Requirements for the solution

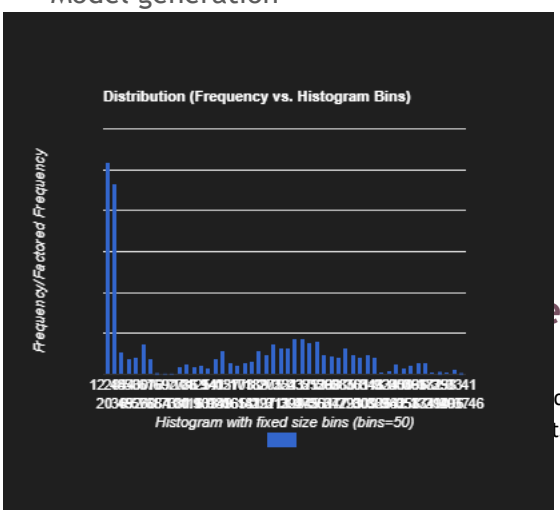
- Historical tesla stock data.
- Computational resources for model training (MLOS software)
- Knowledge of machine learning algorithms.

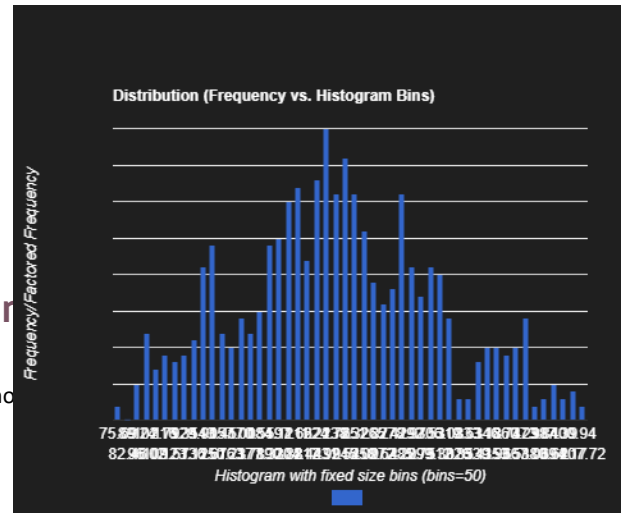
Methology

- Data Collection
- Data Wrangling and pre-processing
- Model generation

Close-Before

Close after





- Creating the input/output variables
- [redacted]

Model Generation

- Split data using an 80/20 split for training and test data
- Use the training data to fit/train our regression model. This involves feeding the input features and their corresponding target variable values to the model
- The model was trained using the Applied Random Forest algorithms. These methods achieved outstanding results, with an error rate of only 0.47, which is the best of all other approaches.
- [redacted]

Results and accuracy of selected model

- Calculate evaluation metrics: Compare the predicted values from the regression model with the actual target variable values in the test set. Calculate evaluation metrics such as Mean Absolute Error (MAE), Mean Squared Error (MSE), Root Mean Squared Error (RMSE), or R-squared (R^2) on the test data.
- Analyze the evaluation metrics to understand the model's accuracy. Lower values for MAE, MSE, and RMSE indicate better accuracy, while higher values for R-squared indicate a better fit to the data.
- Above calculations done using the MLOS software for our Regression model for Tesla stock Train data.

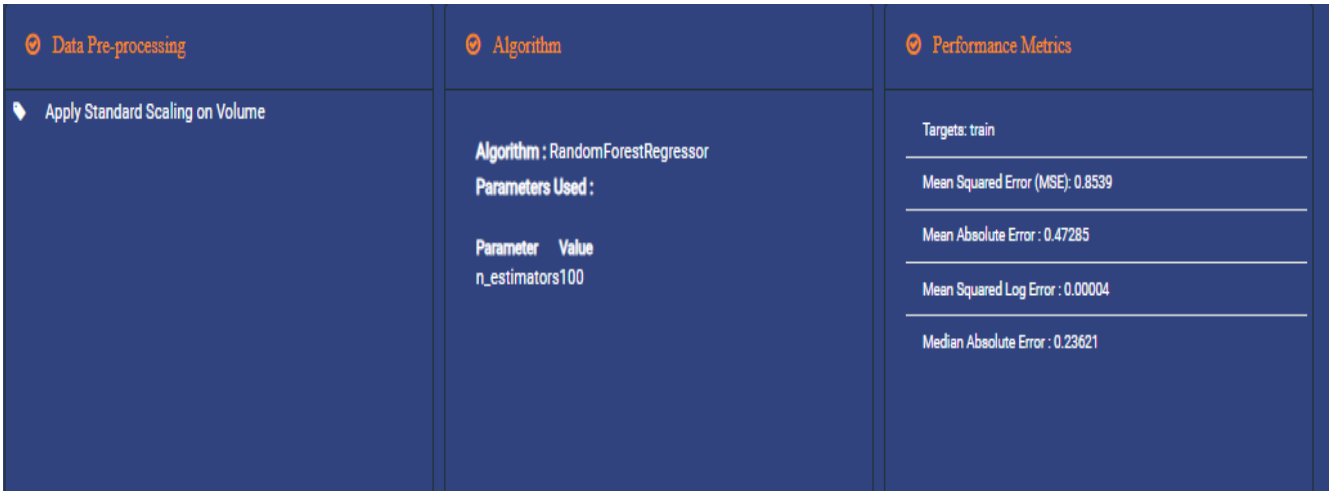
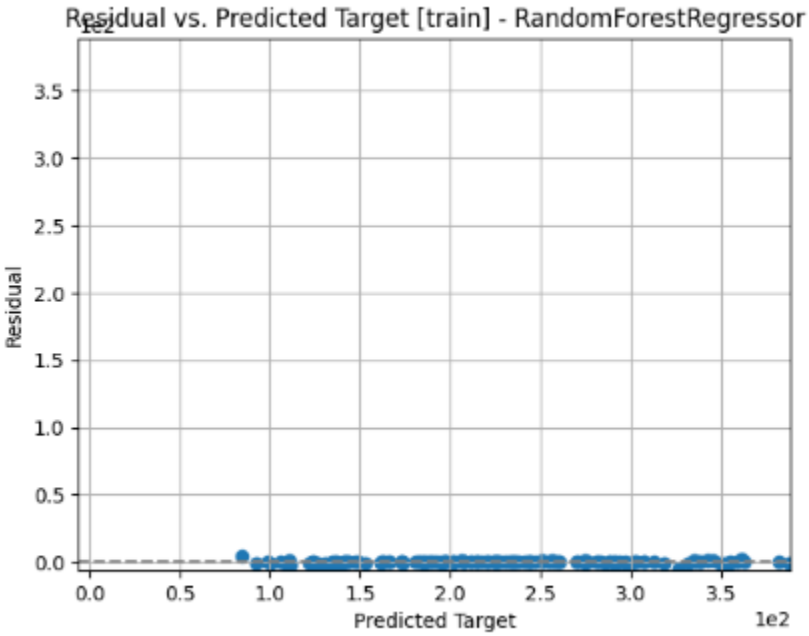
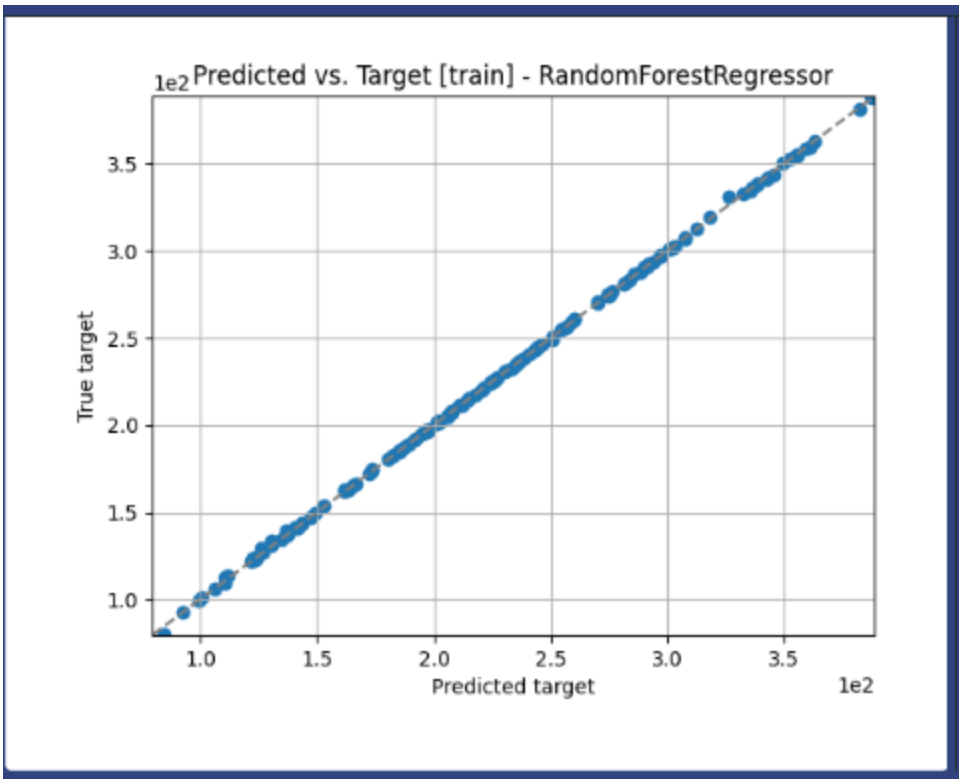


Chart1(Example):



For the scatter plot of Residual vs Predicted target, we analyzed the distribution and pattern of the data points. Ideally, we would want the residuals to be randomly scattered around the zero line, which would indicate that the model's predictions are unbiased and accurate. In our case, upon careful examination, all the data points are observed to be closely clustered around the zero line. This clustering indicates that the model is highly accurate in its predictions.

Chart 2(Example)



For the scatter plot of predicted vs target values, we analyzed the distribution of the data points. Ideally, we would expect the data points to cluster closely around the reference line, indicating a strong correlation and high accuracy between the predicted and actual values. In this scatter plot, the data points are seen clustering tightly around the reference line, providing evidence that our data model is highly accurate.

Predictions and Usage

Model scorer:

This software feature allows users to utilize test data for future predictions using the trained regression model. With this functionality, users can input new data into the software and obtain predictions based on the model's learned patterns and relationships.

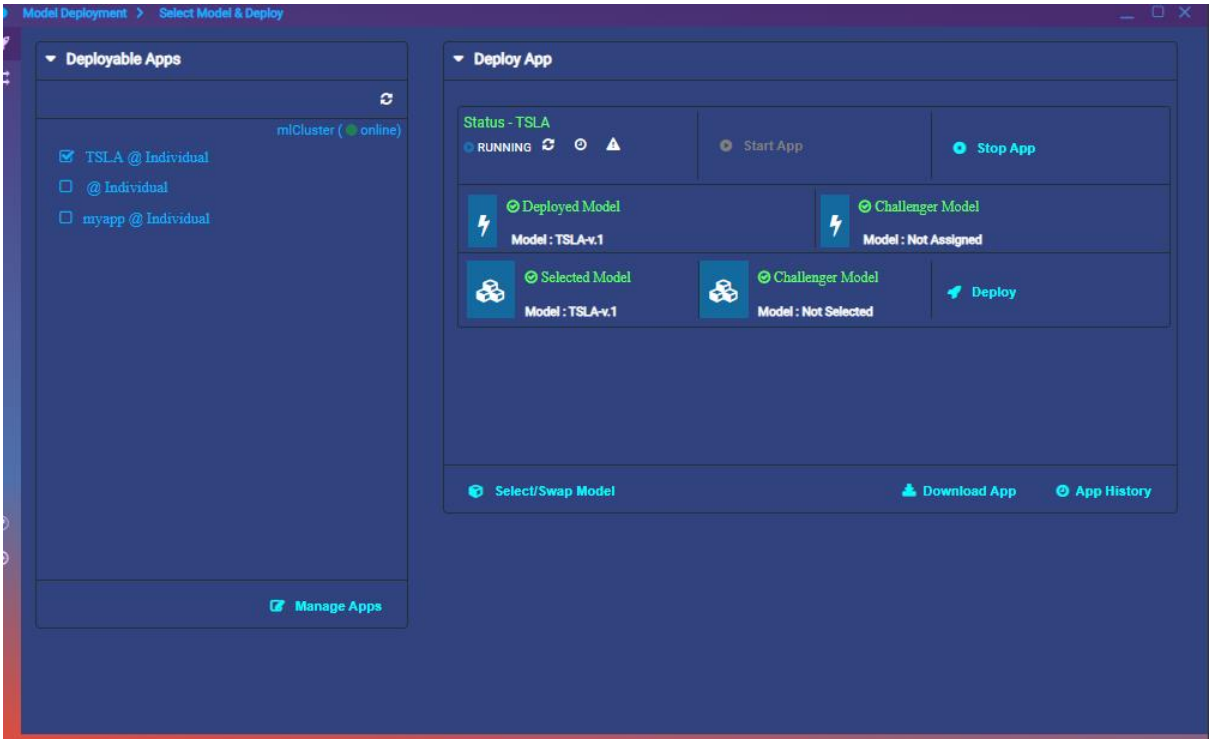
Row #	Predicted_train	train
1	185.11573241	185
2	338.05717076	337.973328
3	300.45329696	300.980011
4	185.21569867	185.899994
5	355.22403567	355.666656
6	185.61379981	185.770004
7	189.10620365	188.869995
8	243.17239949	243.389999
9	201.68687081	202.146667
10	215.26136365	215.309998
11	130.32321835	131.490005
12	233.04420364	232.66333
13	250.5083661	249.440002
14	141.30801045	141.143326

Model Deployment :

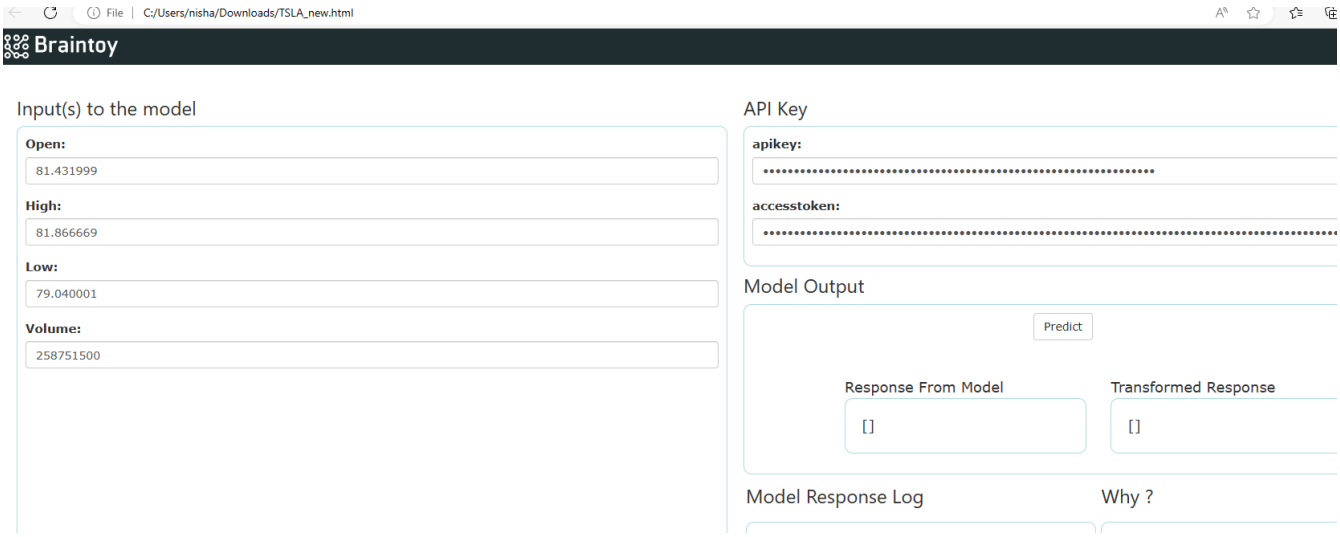
MLOS Software provides a feature that allows experts or authorized individuals to review the model before publishing it. This review process ensures that the model meets the necessary standards, accuracy requirements, and ethical considerations.

Once the model has undergone the review process and received approval, it can be published and made accessible through an API key. The API key acts as a secure access mechanism, allowing third parties to interact with the model and make predictions or use its functionalities in their own applications or systems.

By providing an API key, MLOS Software enables controlled access to the model, ensuring that only authorized users can utilize its capabilities. This approach safeguards the model's intellectual property, privacy, and security while enabling seamless integration and utilization by external applications or services.



Model External usage with API Key for predictions



Further Consideration

Lessons learned from this project include:

- Continuous model monitoring and retraining to adapt to changing market conditions
- Data could be stream to the external weblink and automate the prediction process.
- Incorporating more advanced forecasting techniques,
- Considering the impact of geopolitical factors, and incorporating sentiment analysis from news and social media data to enhance prediction accuracy