Closing Auction Price Movement Prediction

FRE-GY 7773 project presentation

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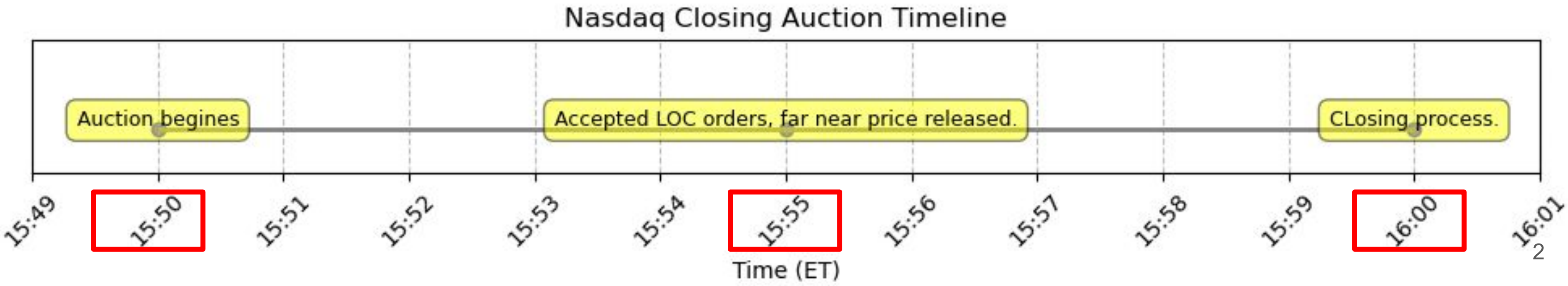
Topic Description

Develop a model capable of predicting the closing price movements for hundreds of Nasdaq-listed stocks using data from the order book and closing auction.

Closing Auction:

- Determine the closing price of the stock: aggregate orders from multiple market participants and match buyers and sellers to establish the market clearing price.
- Important Property:



Topic Description

WHY TOPIC ?

1. Importance of Closing Price
2. Closing auction determine the closing price
3. High efficiency and liquidity. place for the algorithm and high-frequency trading.

Business Importance?

1. traget client: financial institutions
2. Benifits:

- Trading strategy decisions ;
- liquidity providers, matching buy and sell orders/ volatility manipulation;
- unveal the market information

Data Insights

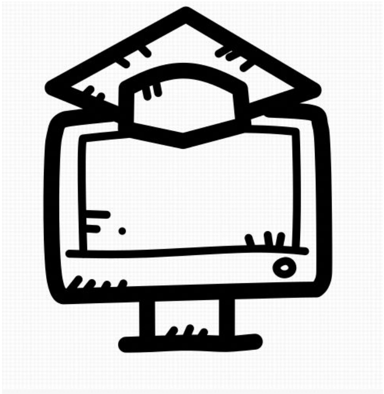
Closing Auction: Immediate market impact, price drift and transaction cost of trading

Market volume at and near the closing auction has regained momentum recently, after the retail trading boom in 2020 and 2021 shifted some flows earlier in the day. This liquidity concentration at the end of the day creates opportunities for all market participants to trade in large size with less market impact relative to other time periods. In this analysis, we leverage NYSE's rich auction imbalance data to better understand market impact in and around the closing auction and provide insights on relationships among order sizes, market impact, and trading costs

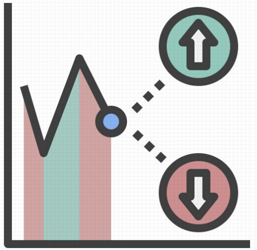
General Solution

Data

ML model



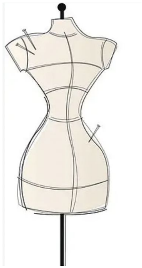
Prediction



A Solution of Haute Couture

Unique Process:

- Far price and near price appear periodically, only in the later of the day
- Solution: divide by whether having the values, then train separately



Feature Selection:

- Features form Financial Model to better reflex market situation
- Picked 30ish based on correlation coefficient

Selection of models:

- Boosting Library: CatBoost, XGBoost, and LightGBM
- Advantages: efficiency, robust, and large spectrum

Fine Tuning:

- Grid Search for a better combination of hyperparameters
- Reduced MAE: 6 -> 5.3

Machine Learning & Human Learning

Result

A desirable metric value: MAE = 5.33755.

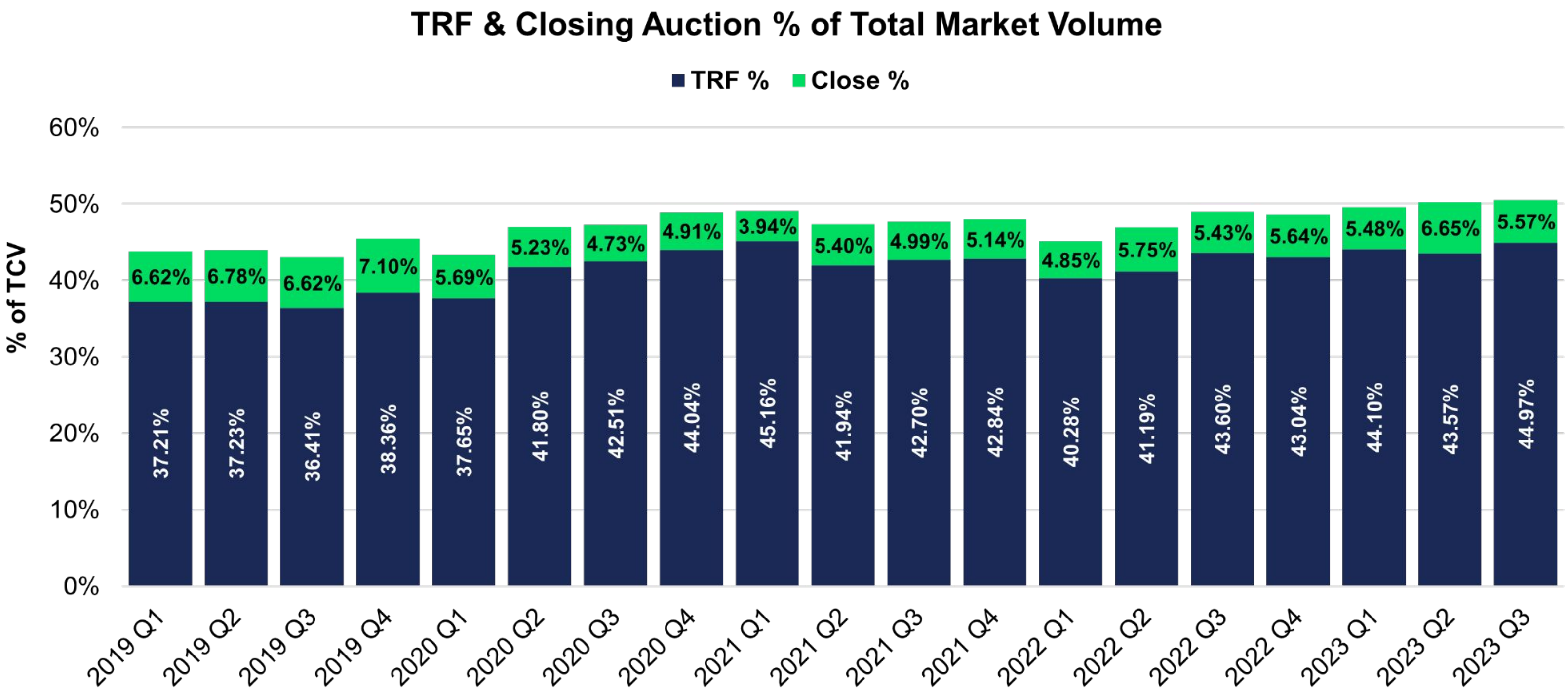
•Range of Target: (-144, 77)

Passed all qualitative test: make sure the general direction of price movement is right.

• Prediction -0.2

•True Value: -0.5

Future Research Plan: **Volume Prediction**



Time For Deployment!