Small-Cap Stock-Price-Movement Prediction

Author: Jake Oddi

Overview

Objective: Predict intraday price movements for stocks with market capitalizations $75M and $1B

Goals of Analysis:

- Thoroughly preprocess data and engineer features
- Construct a predictive model for classifying price movements

Data Understanding

- 8027 -> 160 Stocks
- Dec. 17, 2017 - Dec. 17, 2020
- TD Ameritrade Price History API
- Open, high, low, close, volume, datetime, ticker

Data Cleaning

- Relatively clean
- Screening -> 160
- Convert datetime from unix

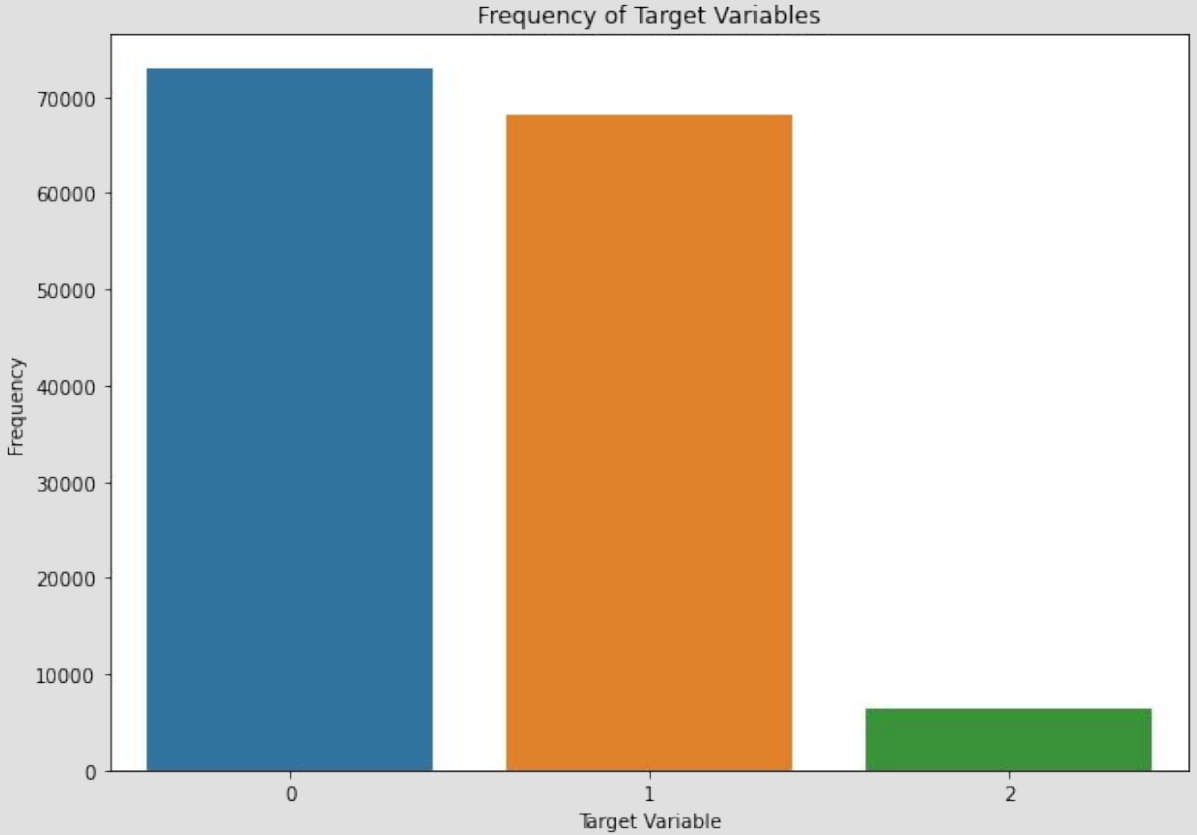
A First Look


160 Small-Cap Stocks' Mean Closing Prices Dec. 17, 2017 - Dec. 17, 2020
Mean Closing Price ($)
20
18
16
14
12
10
8
2018-01
2018-05
2018-09
2019-01
2019-05
2019-09
2020-01
2020-05
2020-09
2021-01
Date

Feature Engineering

- Target Variable
- Moving Averages
  - 10, 50, and 200 Day
  - Mean Reversion
- % Daily Price Change

Target Variable

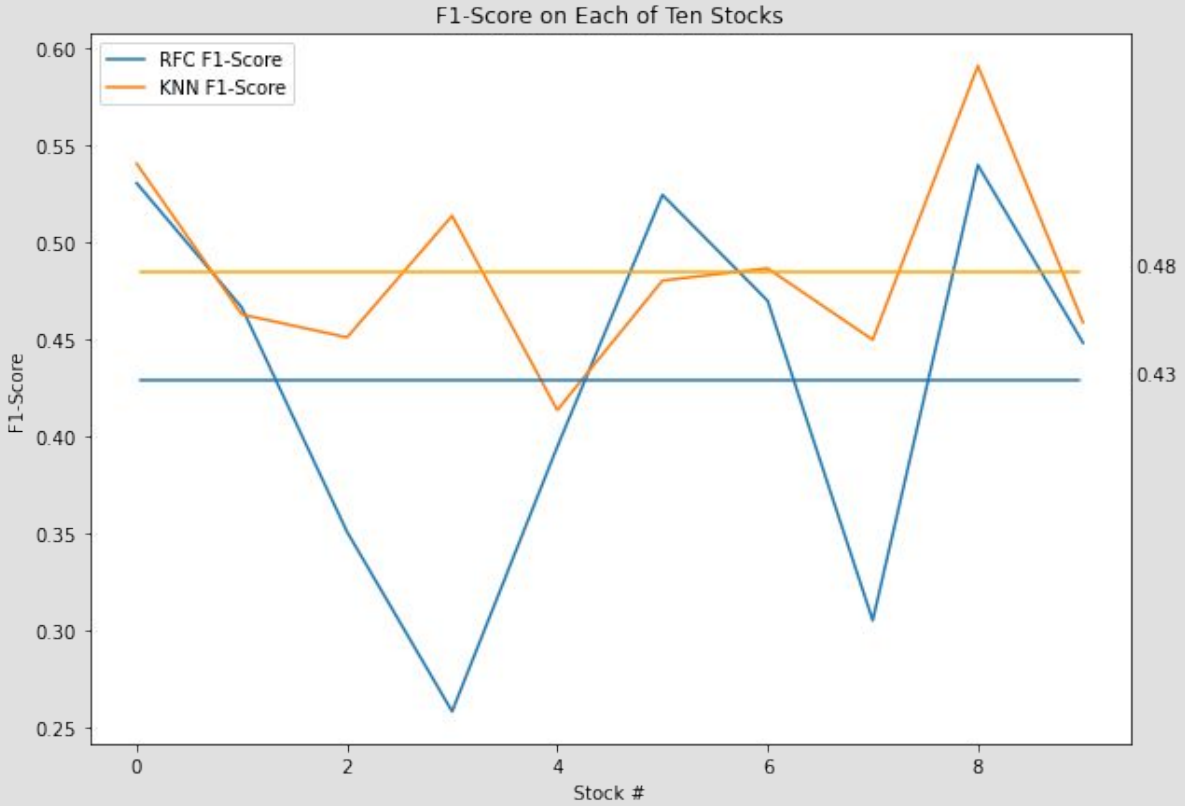


Moving Averages

Modeling

1. Baseline Model - KNN
2. GridSearchCV -> Best params
    a. Random Forest
    b. KNN
3. Train/test split
4. Random Forest, KNN
5. Evaluate
    a. F1-Scores

Performance Comparison



Conclusion and Next Steps

- KNN F1 (.48) > RFC F1 (.43)
- Only 10/160
- Add additional models, ensemble
- Regression
- More Features
  - MACD, RSI
  - Std. Dev., Beta
  - % Daily Change Volume