ALGORITHMIC TRADING PROJECT 2

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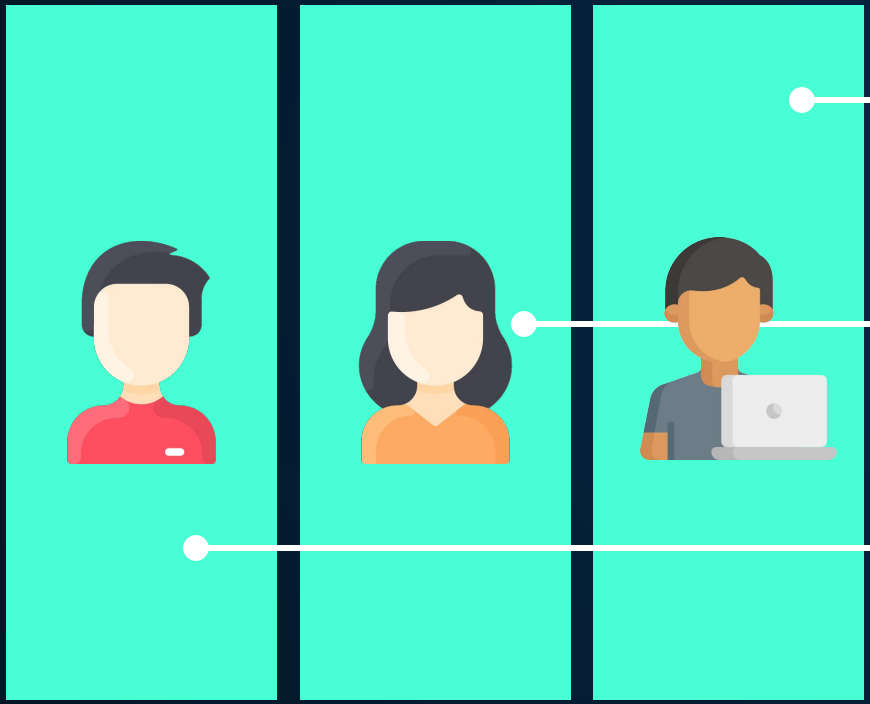
THE TEAM



Tee

Sylvia

Dana

Dynamic Strategy Trading Company

Inspired by the rise of systematic trading, we have created an algorithm trading machine which feeds different indicators through various machine learning algorithms to predict whether we should buy or sell the selected stocks on the next trading day, in order to generate alpha

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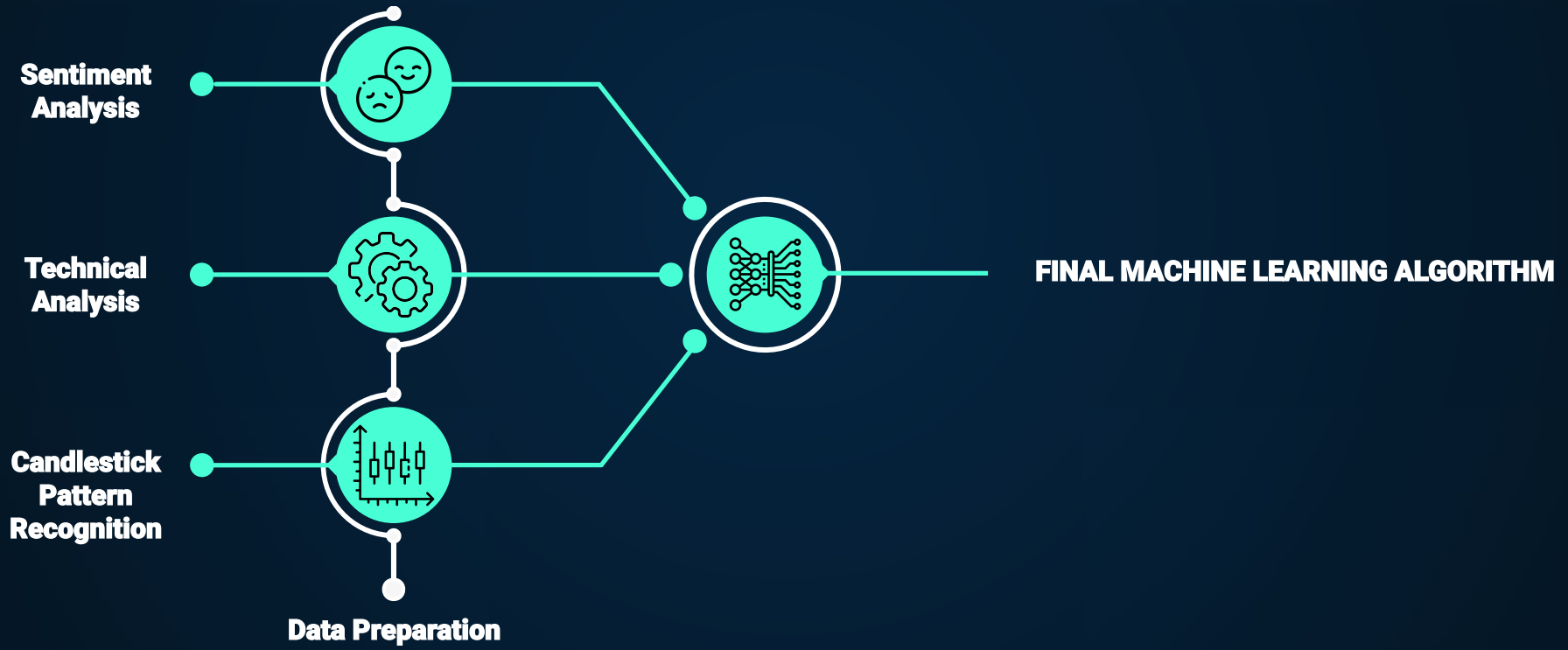
Selected Stocks

Project Design



Sentiment Analysis

Library: News API library, Natural Language Toolkit Library

New API

- Used for requesting 20 headlines for the past 30 days

Natural Language Toolkit

- Used for calculating average compound sentiment of the headlines for each day.

Technical Analysis

Library: TA-Lib Technical Analysis Library (https://ta-lib.org)

Volume
- OBV - On Balance Volume Divergence
- ADOSC - Chaikin A/D Oscillator

Momentum
- ADX - Average Directional Movement Index
- RSI - Relative Strength Index
- STOCH - Slow Stochastic Crossover

Trend
- 8, 21, 50 day EMA
- 8, 21 Day EMA Crossover
- 21, 50 Day EMA Crossover

Other
- Bollinger Band Crossover

Candlestick Pattern Recognition

Library: TA-Lib Technical Analysis Library (https://ta-lib.org)

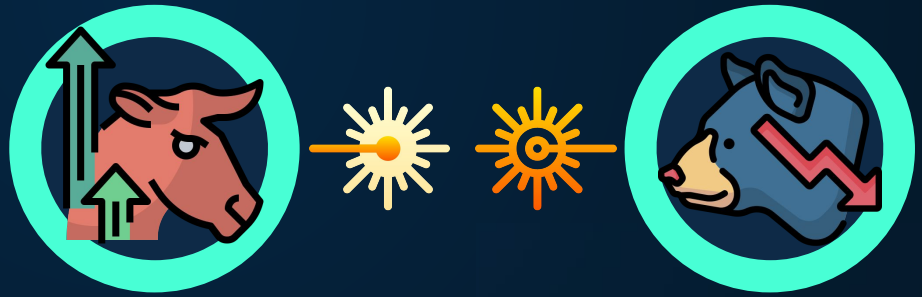
We use 12 candlestick patterns: 6 Bullish Reversal Patterns, 6 Bearish Reversal Patterns

Bullish:

- Hammer
- Inverted Hammer
- Piercing
- Morning Star
- 3 White Soldiers
- Bullish Engulfing

Bearish:

- Hanging Man
- Shooting Star
- Evening Star
- Dark Cloud Cover
- 3 Black Crows
- Bearish Engulfing



Machine Learning Models

Library: Scikit-Learn (https://scikit-learn.org/), TensorFlow (https://www.tensorflow.org/)

Support Vector
- Scikit-Learn Nu-Support Vector Classification (NuSVC)

Decision Tree
- Scikit-Learn Random Forest Classification (RF)
- Scikit-Learn Gradient Boosted Tree Classification (GBT)

Neural Network
- TensorFlow Keras Recurrent Neural Networks (RNN) with Drop

Conclusion

Accuracy
NuSVC, RF, and GBT provide approximately 50% accuracy whereas RNN provides a buy-and-hold strategy.

Profitability
We then calculated cumulative return. RF and GBT provide superior return when tested with down-trend and sideway stocks. We gain approximately 4% - 5% during downtrend and sideway, which NuSVC and RNN loss approximately 4% - 5%.

Significant Indicators
From the many features we use, we found that the top 3 most significant features are Sentiment, On-Balance Volume Indicator, and Stochastic Oscillators Indicator.

Retro

Unexpected Difficulties

- Sentiment data (1 month only)
- Execution of trading algorithm
- RNN data formatting requirements

If We had More Time

- Use OpenBlender dataset
- Training/Testing for each stock
- Optimize models configuration

Q & A