Quantinsti’s Algorithmic Trading Challenge - Inter IIT Tech Meet 9.0 (Gold Medal) - Low Prep

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This event involved paper trading in real-time on the US stock market(S&P 500) and generating trading orders with aim of maximizing profits. It was a low prep event at Inter IIT Tech Meet 9.0 hosted by IIT Guwahati in online mode. The problem statement was given to us on 20th March(Saturday) and the trading was open from 22nd March(Monday) to 26th March(Friday). Since it was based on a real-time market, the trading could be done only on weekdays so we had 2 days to come up with a strategy and code it so that we can begin running it from Monday itself. It was a team event with a cap of 5 members. Our team was: Vineet Ahuja (2nd Year), Aryan Goyal (2nd Year), Dheeraj Yadav (4th Year), Sanskar Gupta(3rd Year), Anshika Bajpai (2nd Year).

You can find the detailed problem statement with all the constraints, rules, evaluation criteria in the following link: **Complete Problem Statement**

Summary of the Problem Statement

- Develop a strategy to fetch real-time data and place orders in the US stock market, given an amount of 10,000$ (on paper obv)
- The strategy had to be implemented on the Blueshift platform in Python.
- The strategy could be tested on historical data to check for the performance
- You could submit another strategy (during the time in which the competition is active). That would replace and invalidate the performance of the previous one.

How did we begin?

We knew Python language but our team had no prior experience or knowledge in Algorithmic Trading. Our first goal was to get a basic understanding of technical analysis in the stock market and to come up with a strategy before starting to implement anything. We asked various friends and searched for people/students on LinkedIn who had prior knowledge in this area for guidance. We also consulted Hardeep Malik, IIT Mandi Alumnus and MD, Omnibulls. They all pointed to reading Varsity by Zerodha, especially the technical analysis part. We read the Fundamental analysis and Technical analysis portion of the book during the weekend. One of the teammates also read/skimmed over the Algorithmic trading book by Ernst P Chan to understand backtesting and various other peculiarities. As we only skimmed over the book, it didn’t help us much.

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Moving forward with what we did

After going through the book and getting some knowledge on trading, we came up with a basic strategy. So we began with the first phase or initial basic strategy and started implementing the code on Monday morning. Our goal was to get some strategy running up before the US market opened(7 PM IST). This phase came along with tons of challenges since the BlueShift platform on which we were supposed to code the strategy had its own API for fetching the data and making trading calls. The documentation of the platform was not at all detailed enough. Moreover, debugging the code and finding errors was nothing less than a nightmare since there was negligible support on the platform for that. Medium articles, reading documentation again and again and experimenting with the platform and its features were some ways we used to deal with it. We got some naive/basic strategy running on the live market which was giving us a loss. So now it was time to move to phase 2 and improve the strategy.

The Final Strategy

- The first step was to utilize candlestick patterns to identify what type of trade (long or short) is to be done at a particular minute.
- In order to do that, we first selected the top 20 candlestick patterns based on performance and gave them a priority. This site: **Candlestick Patterns** was referred for the same. Then, we fetched data for the past 6 minutes and used the TALIB library to match the candlestick patterns. The trading call (long or short) for that particular minute was decided on basis of the priority order of candlestick patterns matched. Bullish pattern meant that we had to long trade and bearish pattern meant that we had to short the shares.
- After identifying the type of trade (bullish or bearish), the next step was to identify the number of orders to long or short. It was based on two components:
  - The price of the stock was one of the factors since we had a limited budget. High-priced stocks were purchased in lower quantity and low-priced stocks were purchased in more quantity. For example, if the stock price was between 10$ to 30$, 100 shares would be bought and if the stock price was greater than 1000$, only 2 stocks would be bought.
  - Volume was the second influencing factor to decide the number of stocks to be traded. The mean volume of stocks traded over the past 10 minutes was calculated. If the current volume for that minute was greater than the calculated mean value then the number of orders were doubled, otherwise, the orders were halved.
- After calculating the quantity and type of trade (long or short) and taking a particular position for the particular stock, the next step was determining when to release the shares.
  - We identified a stop-loss price and whenever the share price dropped below it (in case of a long trade) or exceeded it (in case of a short trade) we released the shares (0 holdings). The stop-loss price for a long trade will be the lowest low and for a short trade, it will be the highest high in the candlestick pattern that was used to determine the position for that stock in the first place.
  - When our stocks profited, we decided that if profit exceeded 1% we would quit(0 holding for that stock) and book the profit.
- The stocks on which to invest were carefully selected by surfing on google about the top-[illegible] stocks of the week with strong fundamentals.

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Hence our strategy is complete with what to buy, when to buy, how much to buy, when to sell, how much to sell. The link to the code/strategy can be found here: **Github Repository**

Results

The results were announced based on the profit and stability of the algorithm(check the problem statement for the exact formula).

1st Position and Gold Medal: IIT Mandi
2nd Position and Silver Medal: IIT Bombay

The bronze medal was not awarded to anyone as the performance of other IITs was not upto the mark.

Learning Experience

The thing we learnt is that you should give your best efforts while not caring for the result. We weren't even expecting any profits from our strategy but eventually landed on Gold. The other IIT teams which participated had specific clubs devoted to Quantitative trading and some participants were ICPC world finalists while some of us were still in our 2nd year only. So stay motivated and keep working hard.

Amazon Internship Interview Experience 2022 - Vineet Ahuja