Documentation of Stock Volume Analysis Process

This paper describes the analysis procedure on stock trade data toward the precise calculation of both 30-day average volume of trades and the volume of cumulative trades per second at a particular date. This paper focuses on the results for two trading days-19 April 2024 and 22 April 2024.

OBJECTIVES

Calculate average 30-day trading volumes for the two stocks that reported before the announced dates.

Estimate the average daily cumulative trading volume per second based on intraday trading data.

Identify crossover times, when the cumulative volume exceeds the 30-day average volume for each stock.

Data Requirements

Input Files

Daily Trading Volume Data: SampleDayData.csv

Columns

Date: The date of the trading day. Format dd/mm/yy.

Name of Stock: The name of the stock.

Volume: The total trading volume for the stock on that day.

Intraday trading data 19thAprilSampleData.csv & 22ndAprilSampleData.csv:

Columns:

Date: Date of the intraday trading session in dd/mm/yyyy format.

Time: The time of each trade (format: HH:MM:SS).

Stock Name: Name of a stock.

The number of stocks that existed during the last time when it was traded.

Methodology:

Step 1: Data Loading and Preprocessing

Load in the volume of the daily trading and intraday trading from the respective CSV files.

Change date formats to a standard datetime format to support date manipulation and filtering.

2. Calculation of Date

Target dates: April 19, 2024, and April 22, 2024; calculate start dates: 30 trading days prior to filtering historical daily trading volume data.

Step 3: Compute for average volume

Filter the daily trading volume data so that only includes the last 30 days of trading preceding the target dates.

Calculate the average trading volume of each stock during this period of 30 days, using group-by operations.

Step 4: Intraday data processing

For each focus date:

Combine Date and Time columns into a single Timestamp column.

Filter out intraday data to include only trades executed after the market opens at 9:15 AM.

Replace missing values for Last Traded Quantity with 0 in order to get accurate cumulative volume.

Step 5: Calculate Cumulative Volume

For each stock

The cumulative trading volume of a running window of 60 minutes.

Identify the earliest date for which cumulative volume is greater than that derived 30-day average trading volume in the stock.

Step 6: Results Presentation

In PRINT 30-day average trading volumes for each stock on the dates below:

Plot the times of crossing for each stock, marking where the cumulative trading volume crossed the average.

Optionally, export the collected volume data for further processing or representation.

Performance Factors

The methodology is effective because it makes vectorized operations by libraries like Pandas in dealing with big data.

It runs on a per second basis so that all data points could be captured and analysed without any repeated iterating.

Conclusion

It would be possible to find the changes in trading volumes with time, and it is crucial for the traders as well as analysts in finding out trends based on historical data. This process can be easily changed by adding or removing the stocks or by changing dates according to need.