Creating a portfolio out of Nifty50 Stocks

The NIFTY 50 is a benchmark Indian stock market index that represents the weighted average of 50 of the largest Indian companies listed on the National Stock Exchange.

Objectives:

1. Create an active stock selection strategy. (Main Objective)
2. Compare the performance of the strategy with a benchmark.
3. Summarize the performance of active strategy and compare it with benchmark.
4. Create and host an app to present the above.

Use your OOP (Object Oriented Programming) skills to complete the task. Each functionality explained above except hosting an app should be the part of your main class.

Start by creating a class Stock and historical prices of each stock should be class properties. When you instantiate a class it should download the historical prices and compute necessary properties. Method of this class should be:

1. CurPrice(curDate) – Which gives the closing price of the date curDate.
2. MonthlyRet(curDate) – Which gives the monthly returns on curDate.
3. DailyRet(curDate) - Which gives the daily returns on curDate.
4. Last30daysPrice(curDate) – Which gives the array of last 30 days prices.

1. Benchmark Strategy:

   Our Benchmark is going to be Nifty50 index itself. Compare your active stock selection strategy.

2. Active stock selection strategy:

   Your task involves creating an investment strategy where, at the end of each month, the performance of each stock in the previous month is assessed. The criterion for selection is positive returns. For instance, on March 31st of a given year, the 30-day returns of all fifty stocks will be examined, and only those with positive returns will be included in the portfolio. This portfolio will be maintained until April 30th, when a revaluation will occur based on the same rule for the upcoming month. This process will be repeated monthly.

3. Summarize the performance:

Get the following performance metrics for Nifty Index, Benchmark Allocation & Sample Strategy

a. CAGR (%): $\left(\left(\frac{V_{final}}{V_{begin}}\right)^{\frac{1}{t}} - 1\right) * 100$;

   $V_{final}: Value\ on\ final\ day, V_{begin}: Value\ on\ begining\ day, t: number\ of\ years$

b. Volatility (%): $\left(\sqrt{252} * (standard\ deviation(daily\ returns))\right) * 100$

c. Sharpe Ratio: $\left(\sqrt{252} * \frac{mean\ (daily\ returns)}{Standard\ deviation(daily\ returns)}\right)$

   $daily\ returns: \left(\frac{V_t}{V_{t-1}} - 1\right)$; $V_t: Value\ on\ day\ (t), V_{t-1}: Value\ on\ day\ (t-1)$

4. App to host the performance:

Create & Host an app to which will have the following features.

Need to take the following as inputs:

1. Start date and end date of simulation
2. Number of days to measure the performance for stock selection required for the sample strategy. (We have described it to use 30 days returns but it can be generalized to have N days returns.)
3. Initial Equity

Need to display the following:

1. Equity Curves of Nifty index, benchmark, and the Sample strategy for the given period in a single plot.
2. Stocks that are selected for the sample strategy.
3. Performance metrics for all the 3 stocks

Sample Input:

Simulation Start date = '2019-01-01'

Initial Equity = 1000000

Sample Output:

(This is only a sample output not the actual output.)

Index	Sharpe	CAGR%	Vol%	MaxDD%	DD_Start	DD_End	DD_Vol
Strategy	1.13	20.48	19.02	-37	2020-01-14	2020-11-05	-1.93
Benchmark	0.86	15.05	19.41	-38	2020-01-14	2020-11-09	-1.98

Top Stocks Selected:

['RELIANCE', 'HCLTECH', 'TATAMOTORS', 'M&M', 'EICHERMOT', 'JSWSTEEL', 'BAJFINANCE', 'APOLLOHOSP', 'WIPRO', 'ADANIENT']

Note:

1. Deliverables are the code files and the link to the app if you have hosted it.
2. Please send it to ravindrababu.karanam@soothsayeranalytics.com
3. You can get the list of current nifty constituents from variety of places – Yahoo finance or NSE website - Wikipedia also has a list.
4. To get the stock data into python, you can use any module that will get the data from yahoo finance, it is one of the free sources for data.
5. You can create your app using the tool that you are familiar with (streamlit and dash are some of them).
6. You can host your app for free on any platform (Heroku is one free app hosting website).
7. It is **not** mandatory to answer all the questions. **Please make the submission with what ever progress has been made** – even if its not complete. We are looking for people who can take a challenging task and make progress on it.
8. Feel free to add any other insights or changes to the tasks once you are done with the given list.