INFERENCES

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I've tried my best to keep the code user friendly and bug free. If the user were to encounter any bug(s), I would be extremely grateful if the user could report the bug(s) and I'll try my best to rectify the code.

I coded two algorithms- one only goes long while one shorts and goes long. The algorithm which solely goes long, tends to net better returns than the one going short. I used trailing stop loss solely as an exit indicator as reverse signal was not giving decent returns while back-testing the strategy.

While going long, I open a position when the 10DMA rises above the 50 DMA. I've made use of trailing stop loss to close the position i.e. I assign a local max when I'm going long and when the price of the index falls more than 10% from this local max, I close the position. I also close the position when the closing price of a day drops by more than 6% when compared to the previous day.

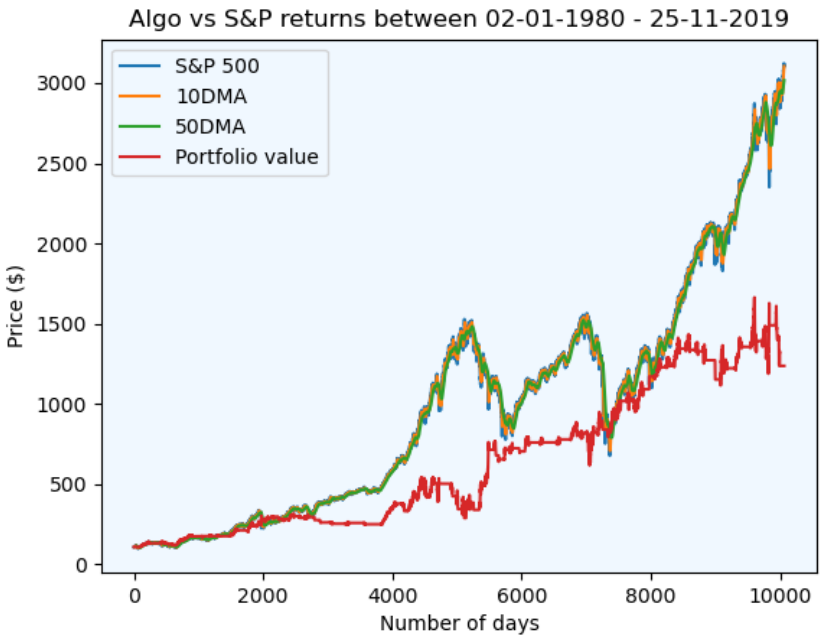
I open a short position when the 10DMA falls below the 50DMA and close the short position using trailing stop losses i.e. I assign a local minima when shorting and close the position when the closing price exceeds 1.1*local minima. There's one more condition to close the position that is when there's an intraday increase of more than 3%.

I've traded only when the portfolio had the adequate amount available to conduct a transaction and shorted/ held long only 1 unit. Also note that volatility is simply standard deviation of the index/portfolio during that period.

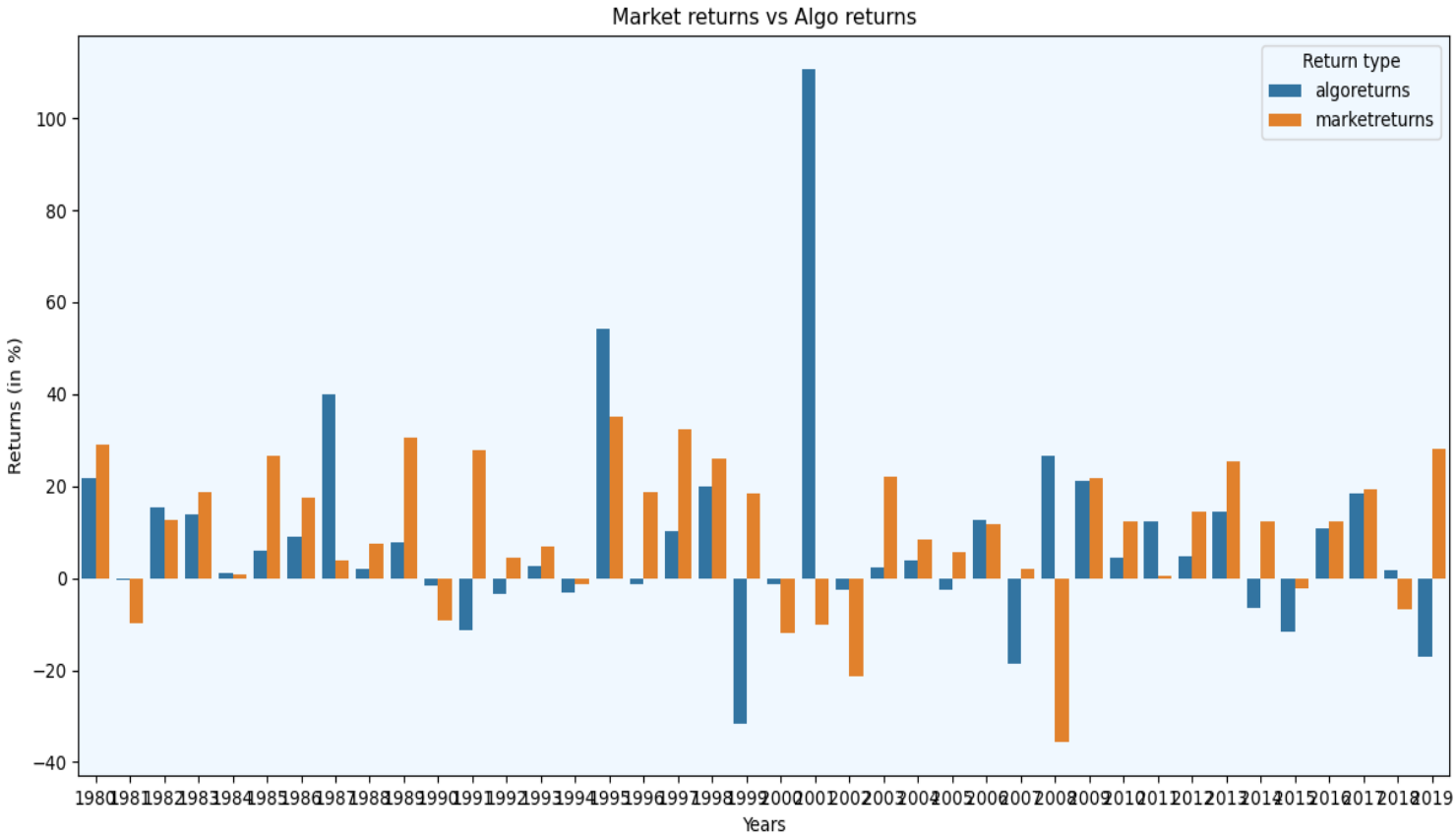
Graph contrasting the growth of portfolio and the market-

Performance of the long-short strategy between 1980-2020:

- Initial value of the portfolio= **108.00**
- Final value of the portfolio= **1236.71**
- Market returns= **2862.97%**
- Algo returns= **1045.10%**
- Win/Loss Ratio= **0.60**

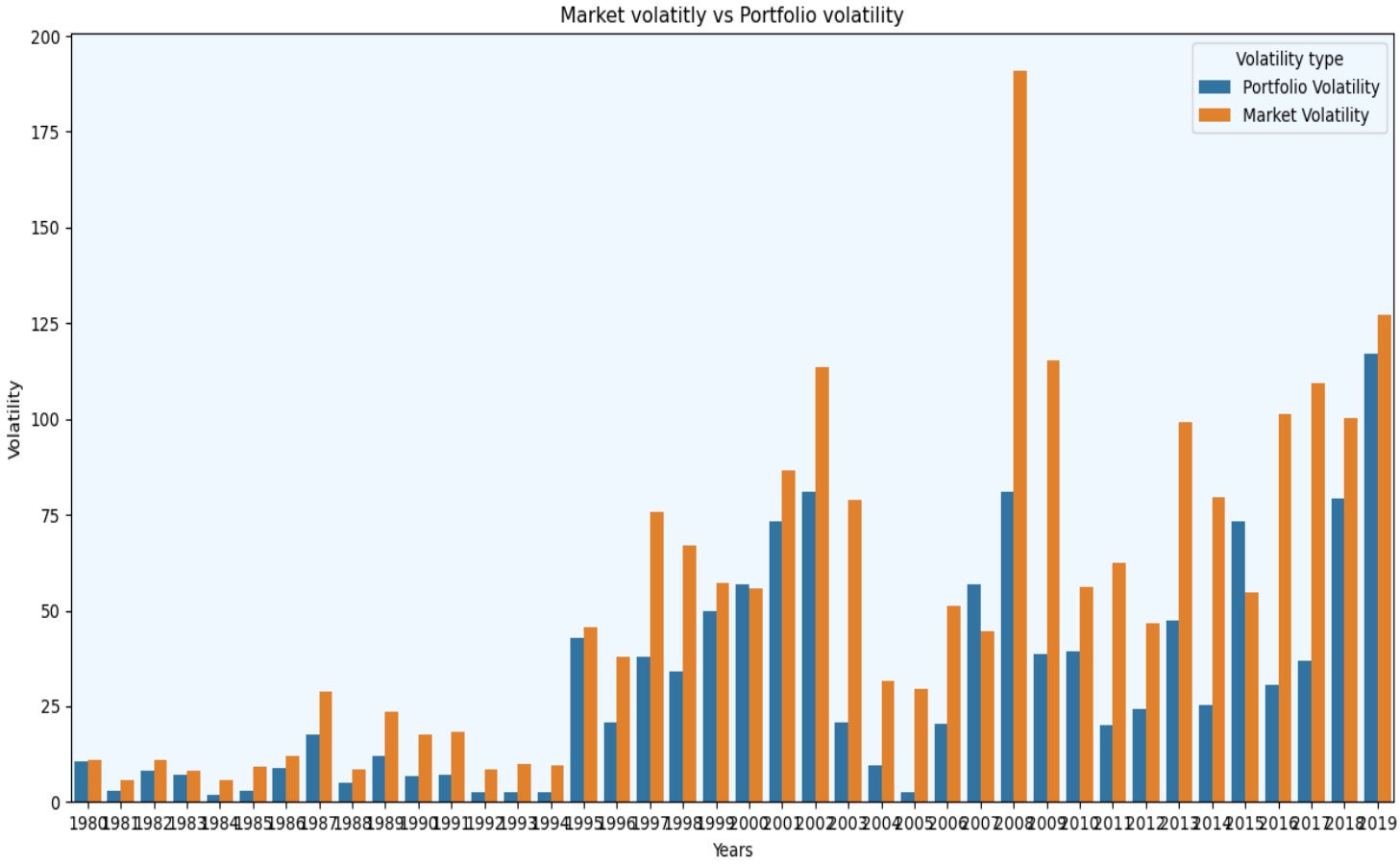


Graph contrasting yearly returns of the algorithm and the market-



Correlation between the market and algo returns= **-0.046**

Graph contrasting yearly volatility (standard deviation) of the portfolio and the market.



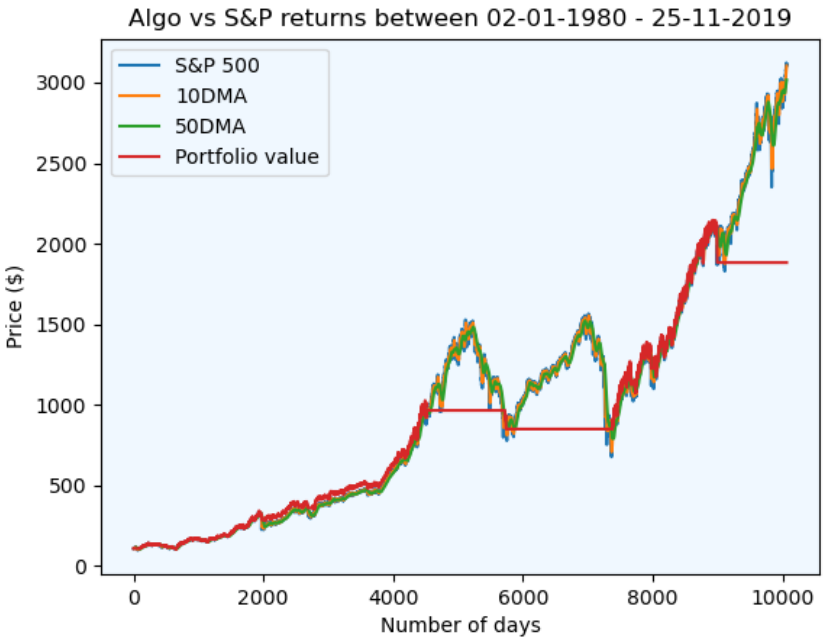
Correlation between the market and portfolio volatility= **-0.16**

Performance of strategy that goes long only during 1980-2020:

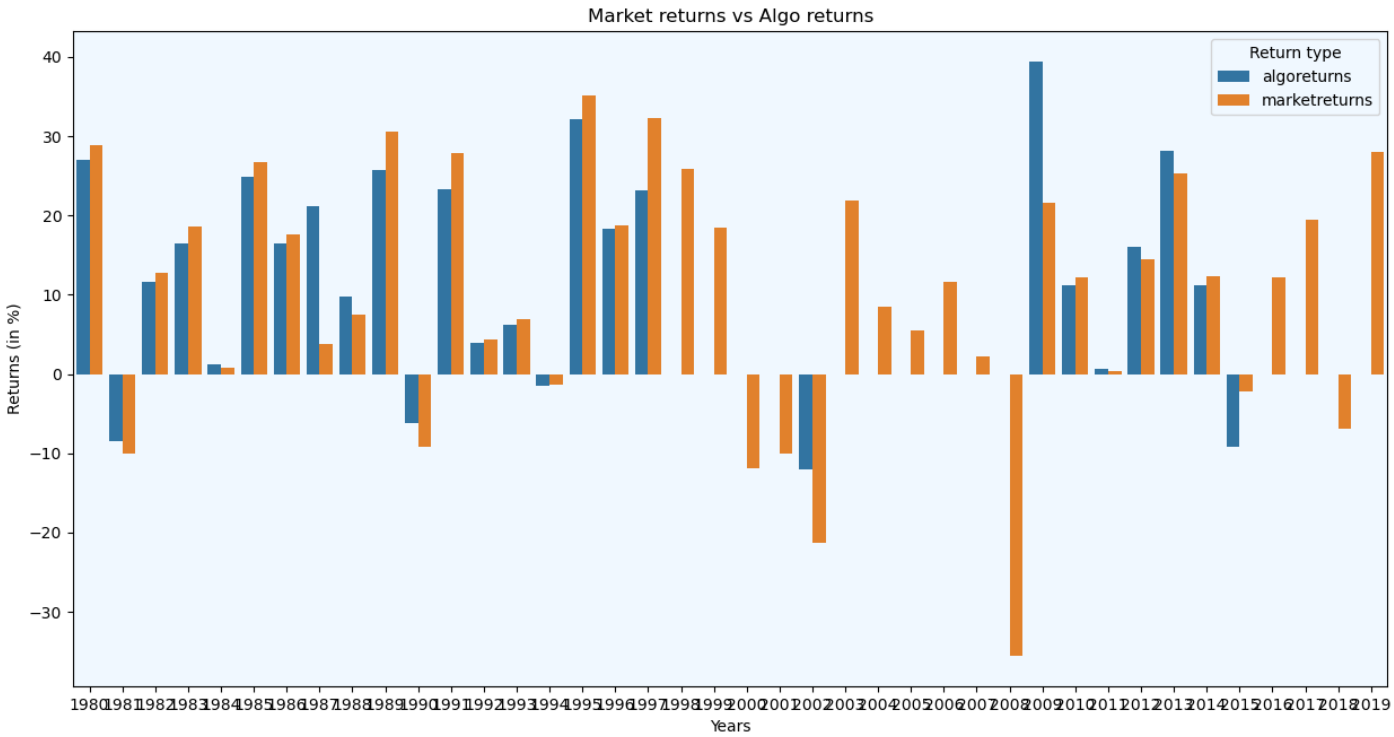
Case 1:

- Initial value of the portfolio= 108.00
- Final value of the portfolio= 1882.51
- Market returns= 2862.97%
- Algo returns= 1643.06%
- Win/Loss Ratio= 2.00

Graph contrasting the growth of portfolio and the market.

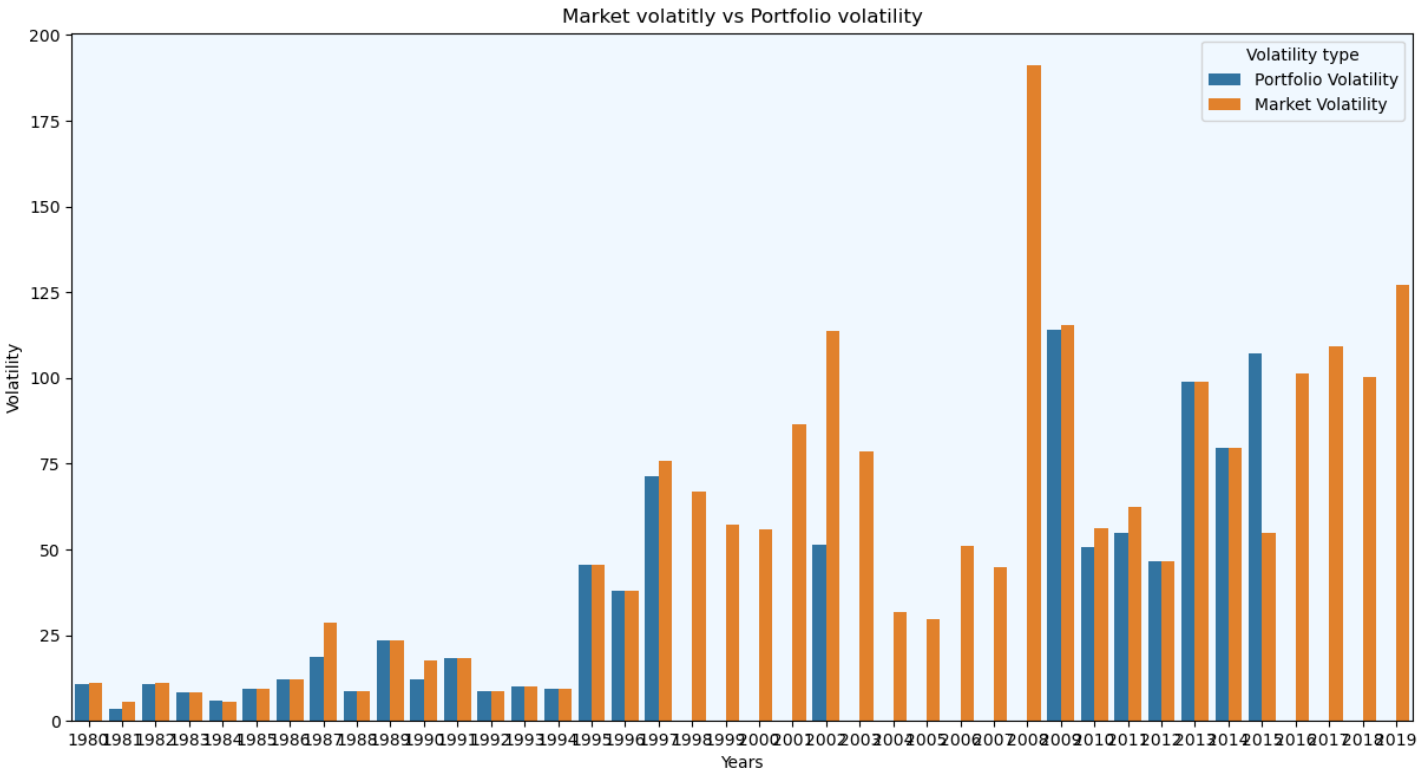


Graph comparing the yearly returns of the algorithm and the market.



Correlation between the market and algoreturns= 0.67

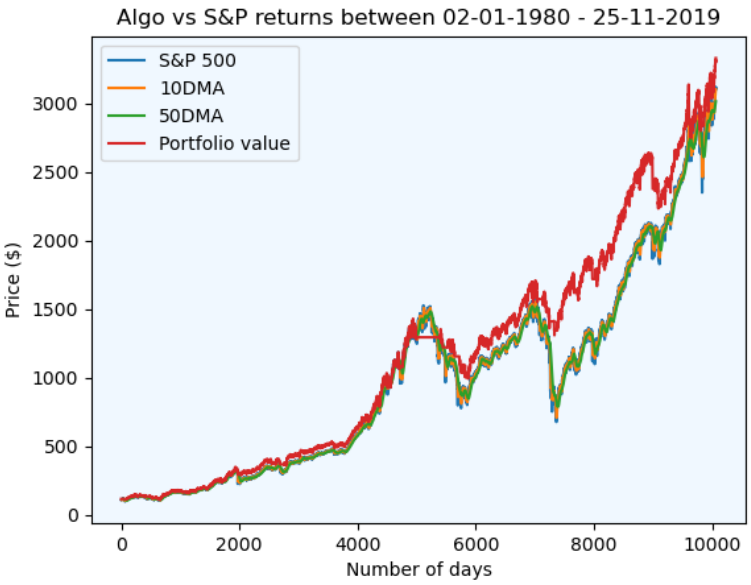
Graph contrasting the yearly volatility (standard deviation) of the market and the portfolio-



Correlation between the market and portfolio volatility= 0.22

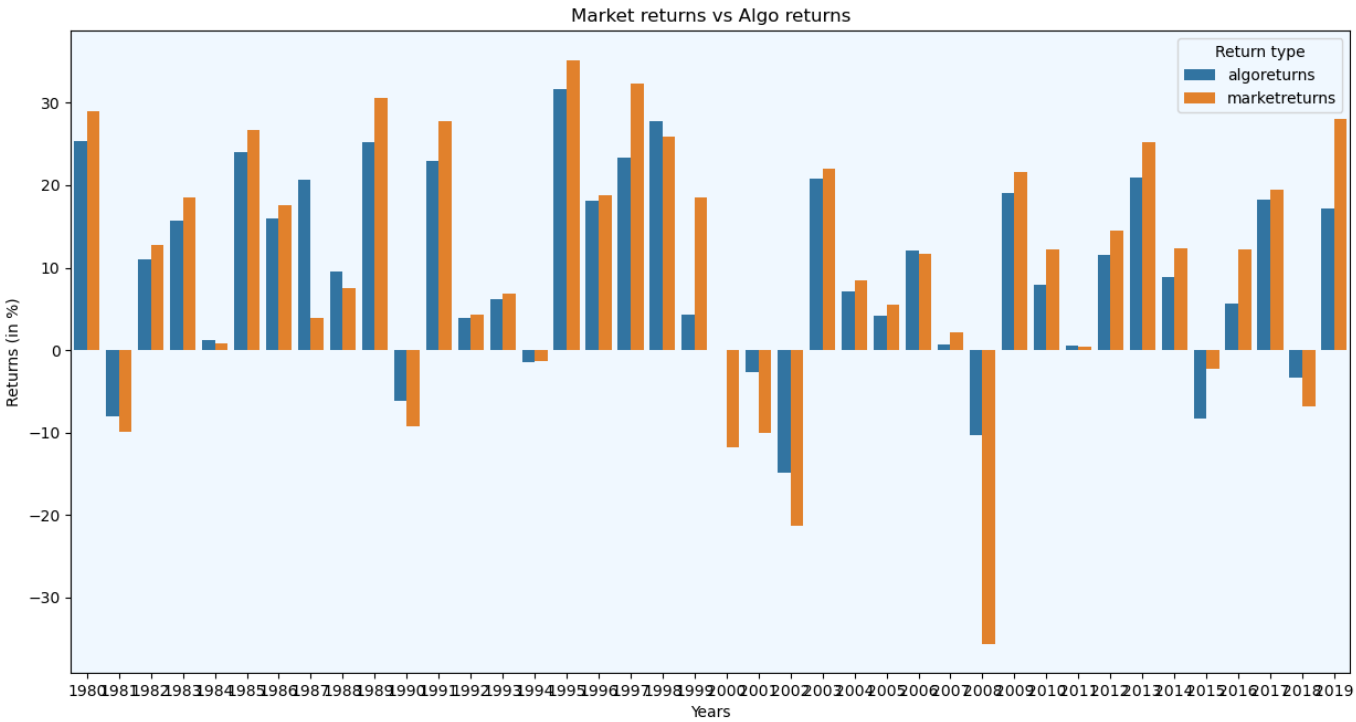
Case 2:

- Initial value of the portfolio= 115
- Final value of the portfolio= 3331.97
- Market returns= 2862.97%
- Algo returns= 2797.37%
- Win/Loss Ratio= 1.00



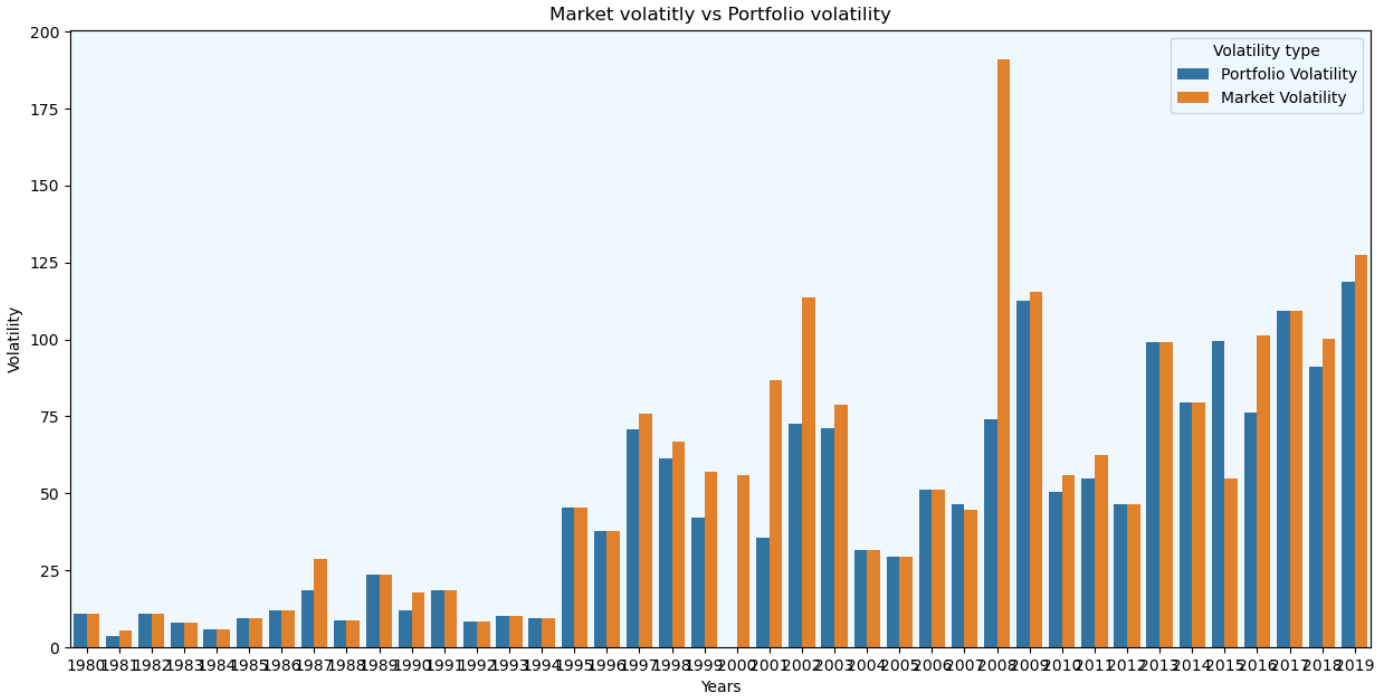
Graph contrasting the growth of portfolio and the market.

Graph comparing the yearly returns of the algorithm and the market.



Correlation between the market and algoreturns= 0.91

Graph contrasting the yearly volatility (standard deviation) of the market and the portfolio-

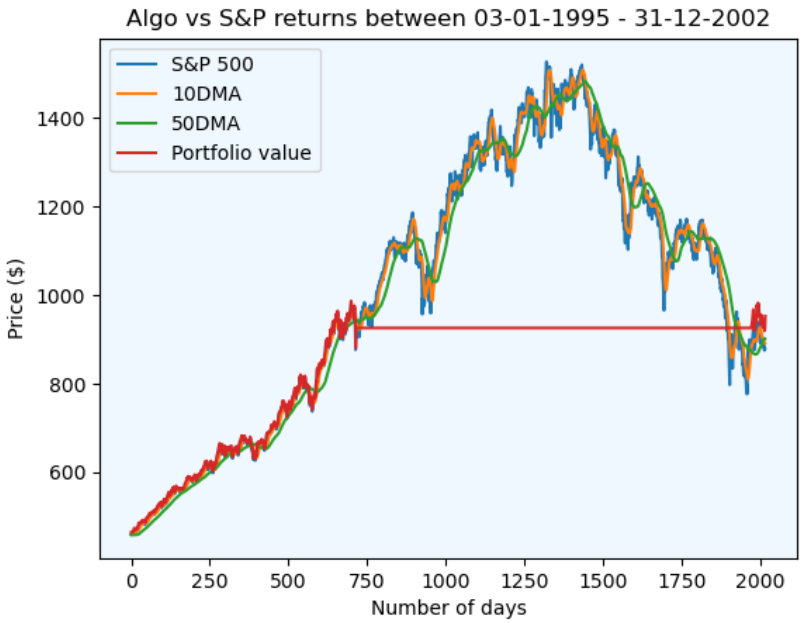


Correlation between the market and portfolio volatility = 0.84

I tested both the strategies during tumultuous times (**dot com crisis and sub-prime mortgage crisis**).

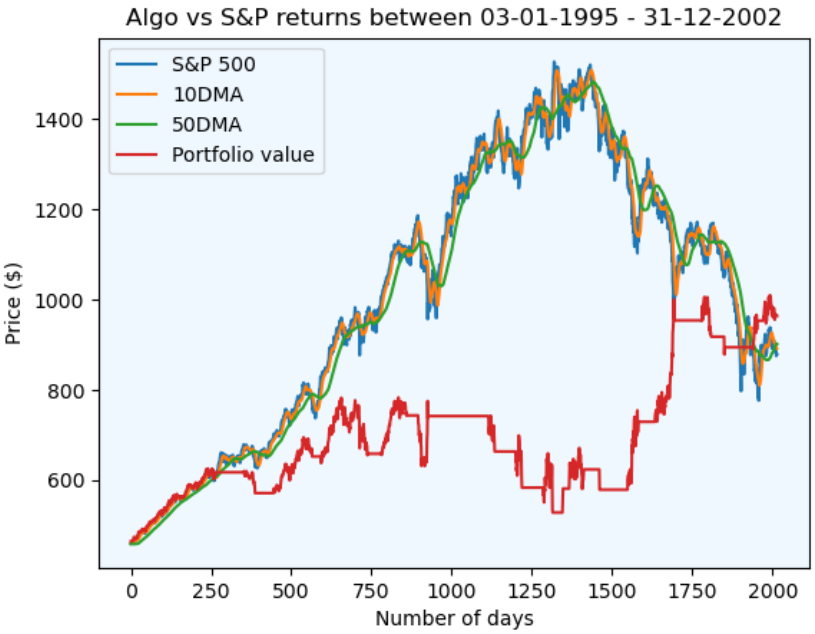
Performance of the strategy that goes long during the dot com crisis (between 1995-2003):

- Initial value of the portfolio= **465**
- Final value of the portfolio= **953.02**
- Market returns= **98.00%**
- Algo returns= **104.95%**
- Win/Loss Ratio= **∞** (no losing trades, 1 winning trade)



Performance of the long short strategy during dot com crisis (during 1995-2003):

- Initial value of the portfolio= **465.00**
- Final value of the portfolio= **964.03**
- Market returns= **98.00%**
- Algo returns= **107.32%**
- Win/Loss Ratio= **0.82**



Performance of the strategy that goes long during the subprime crisis (between 2005-2010):

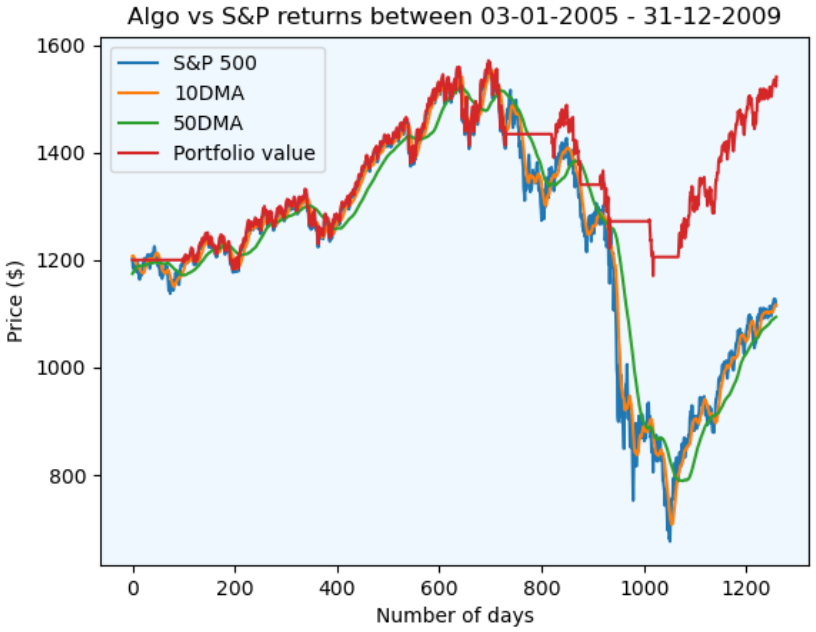
Initial value of the portfolio= **1200**

Final value of the portfolio= **1540.68**

Market returns= **-5.75%**

Algo returns= **28.39%**

Win/Loss Ratio= **0.33**



Performance of the long short strategy during the subprime crisis (during 2005-2010):

Initial value of the portfolio= **1200.00**

Final value of the portfolio= **1370.53**

Market returns= **-5.75%**

Algo returns= **14.21%**

Win/Loss Ratio= **0.38**