Hammer Pattern Candlestick Research

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1. Introduction

In this discussion I will cover:

1. What is a Hammer Candlestick?
2. Does the Theory translate to Practice?
3. Can a profitable trading algorithm be made only from these signals?

This is for educational purposes only, the writer takes no responsibility for any of your trading habits.

2. What is a Hammer Candlestick

A Candlestick is a way of relaying price information about an asset. They are made from 4 parts, the Open, High, Low and Close prices for a time period. For example, a 'Daily' chart will have a body represented by a rectangle (top and bottom of which showing the Open or Close for the day), with 'wicks' protruding above and below representing the Highest and Lowest price that day. The same may be used for different timescales, minute, hourly weekly etc. A Hammer candlestick is a specific type of candle representing a price level where there is an imbalance of supply and demand. A Hammer theoretically represents a strong buying power. Starting at the period Open, the price works its way down and makes a low before bouncing up to Close within a very small distance of the Open. This makes a very large wick down, and a small body between the Open and Close. The up-wick must also be negligible.

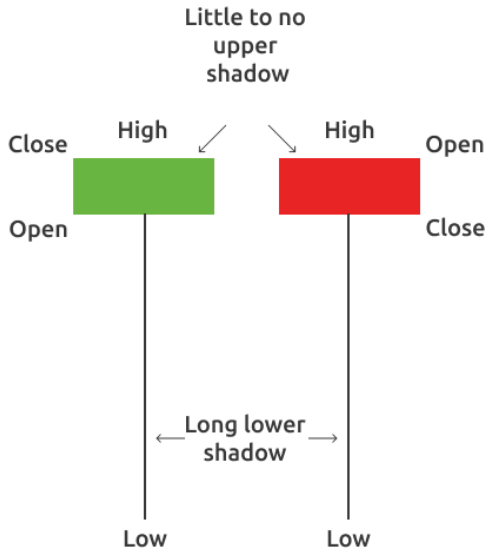


Figure 1: showing the parts to a Hammer.

Figure 2: shows the optimal trade post Hammer candle, with the down-wick representing an area of support.

3. Does the Theory translate to Practice?

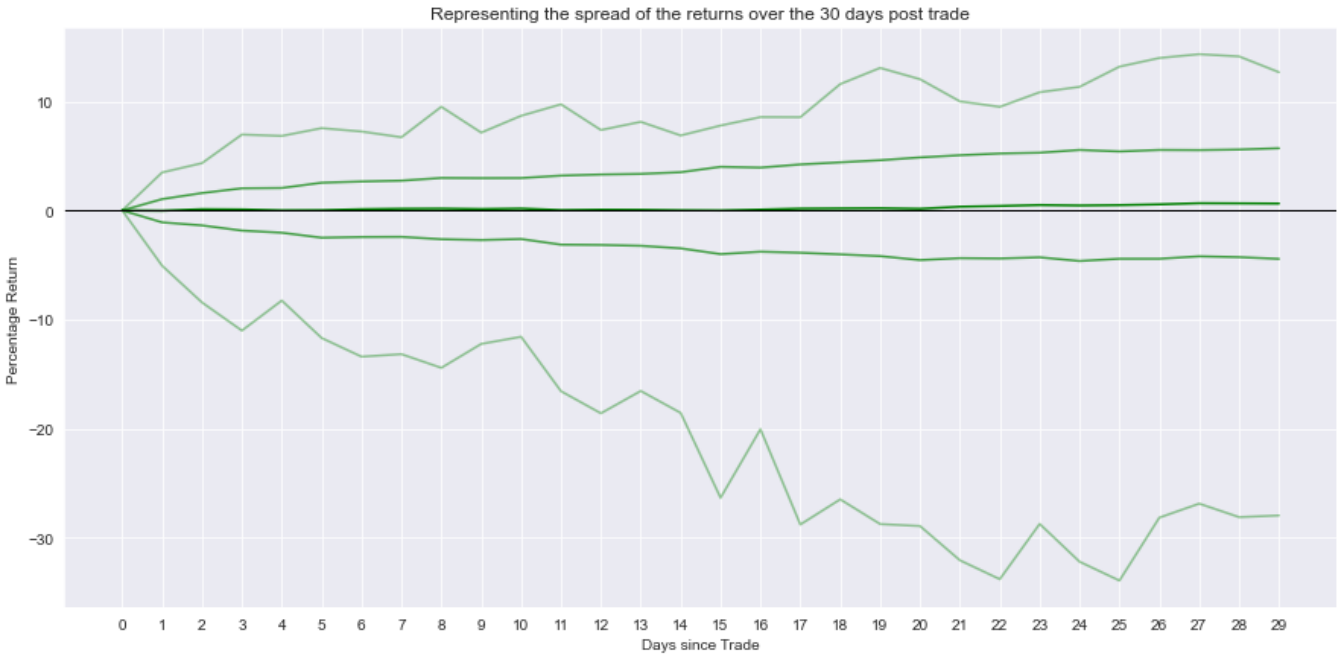
Running python code which selects hammers and gives the cumulative returns over the following 30 days, the average return is shown in Figure 3 on the next page. Here the algorithm is ran on SPY500 data from yahoo finance between the dates 1-1-2000 and 9-9-2021.
The algorithm worked like this. For each day, the up-wick, down-wick and body size were calculated. Days which obeyed the conditions:

1. down-wick $> 3 \times$ up-wick and
2. down-wick $> 3 \times$ body

are labelled as Hammers. The price changes between the day after the hammer and successive 30 days are calculated as the returns each day. For many Hammers, this is repeated and averaged. Python is available if the reader is curious.

This begs the question, what is the distribution around the mean? To calculate thus, the required python relies on sorting the returns and some basic standard deviation calculations. Please note that the standard deviation is the pair of solid green lines in Figure 4 which are symmetric about the mean. The highest and lowest lines are the maximum and minimum at each day. Please note that these are not representative of one trade following these equity curves, but the lowest of day 2, the lowest of day 3 etc. The large positive skew is obvious, as more trades end their 30 days within the -5% - 12%, a range of 17%. This implies that the spread of trades is to the profitable end, even if the average is low. This will be developed in the next section.

(a) Returns



(b) Returns Distribution

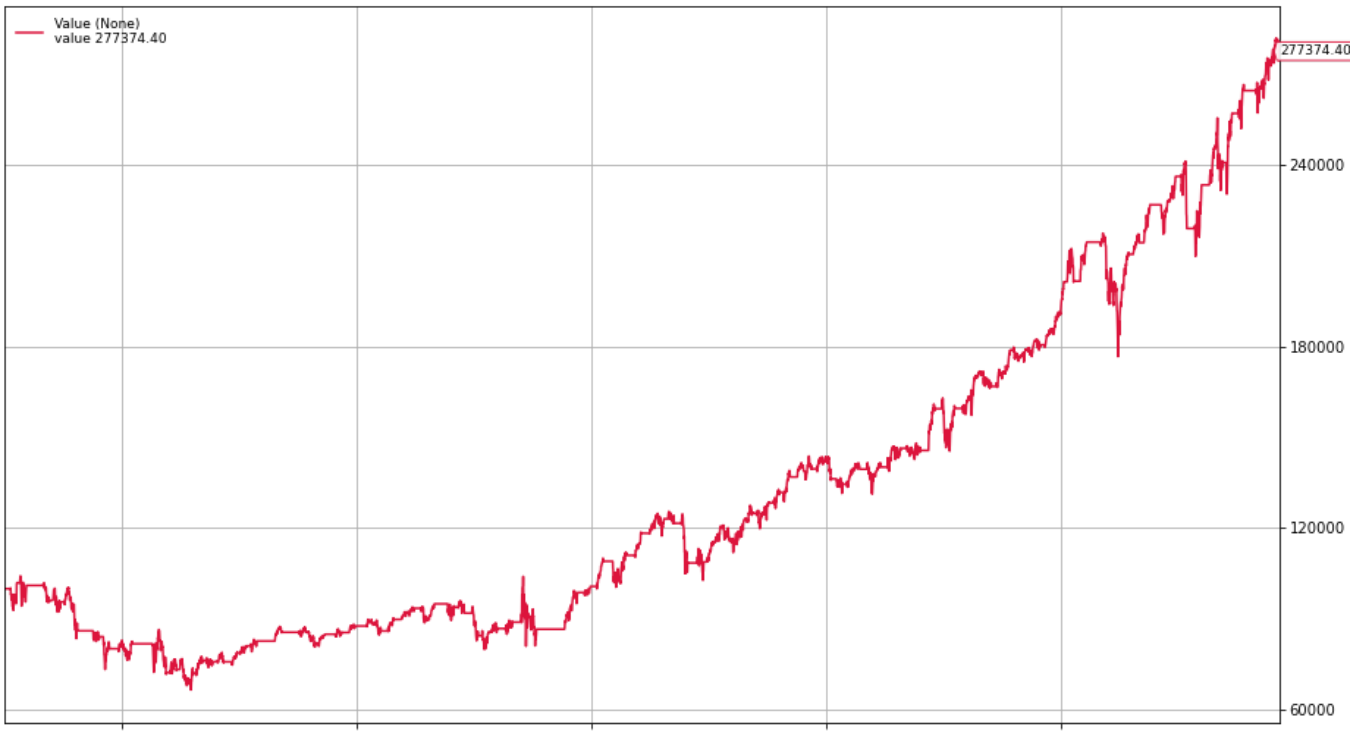


Figure 4: is the value of a £100,000.00 account trading the SPY with Hammer strategy.

4. Can a profitable trading algorithm be made only from these signals?

The strategy this algorithm is made in python with backtrader, and trades as follows:

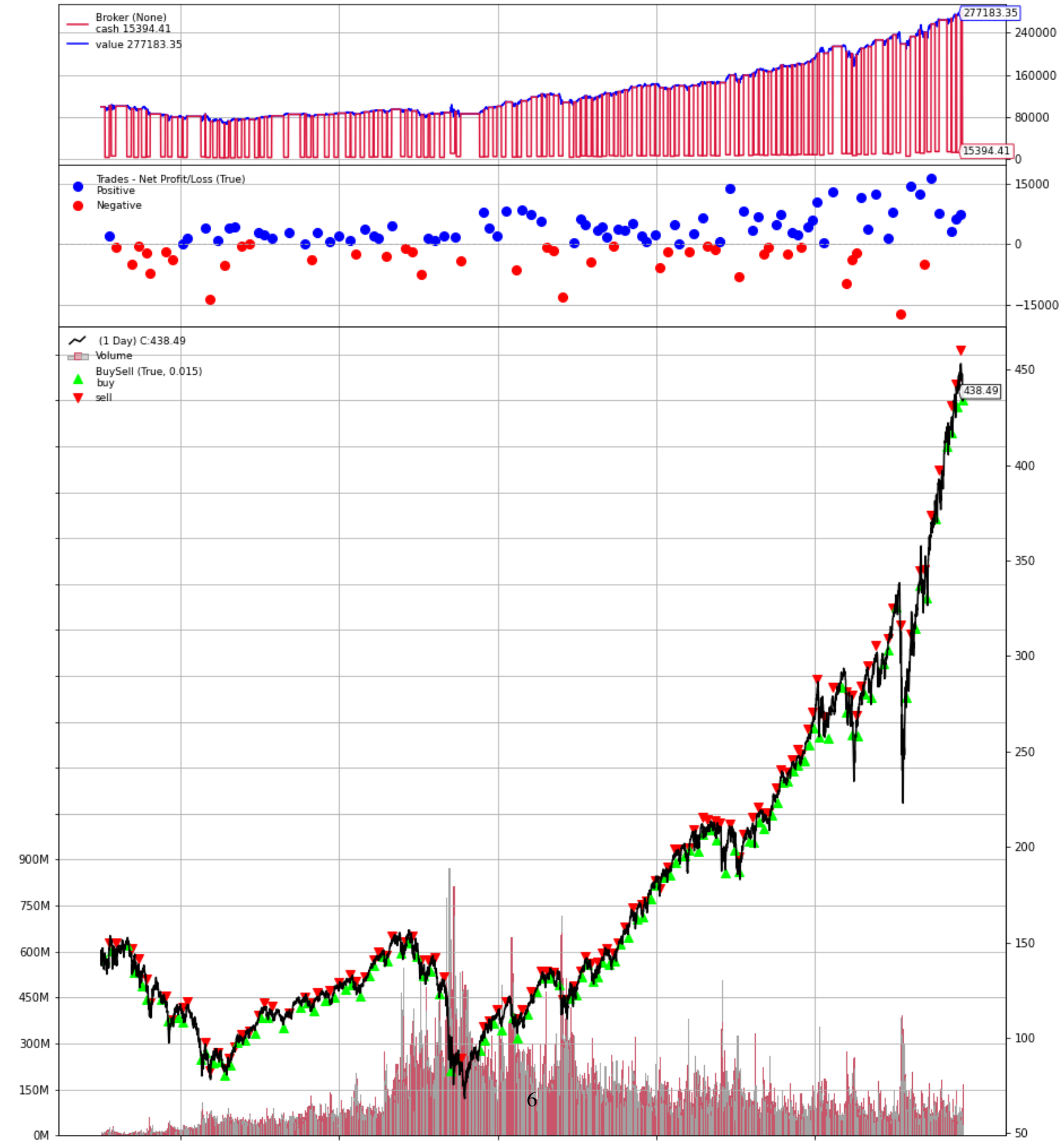
1. If there is a Hammer candle in the last day, allocate 95% of the available capital to the SPY, and begin counting.

2. when the count has reached 30 days, exit the trade.

The returns are impressive, as shown in Figure 5, and roughly mirror the returns of the SPY over that period. The SPY opened Jan 2000 at 1425, and closed 9 September 2021 at 4514, a return of 316% with a max downdraw of 58% (intra-year 2008 crash). The strategy returned 277% in that same time, with a max downdraw of 36%. So, the size of the returns are lower than buy-and-hold strategies, but the risks are reduced. How much downdraw do you experience for each percentage of return? 5.44% for the SPY and 7.69% for the strategy. The Sharpe ratio is 0.435 for the strategy.

So, is this a reasonable strategy? Yes, although no costs and slippage was considered - something worth noting. This was also a long only strategy, and had no diversification with other assets.

All in, Hammers can be a useful tool for a trader to identify trends, particularly when they appear around areas of support (Moving Averages, Pivot Points etc). The final page is a full read out from backtrader of the algorithm.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value 277183.35
277183.35
15394.41
240000
160000
80000
0
Trades - Net Profit/Loss (True)
Positive
Negative
15000
0
−15000
(1 Day) C:438.49
Volume
BuySell (True, 0.015)
buy
sell
438.49
450
400
350
300
250
200
150
100
50
900M
750M
600M
450M
300M
150M
0M

Figure 5