Task3- Final- Attempt 1

Task 3: Best Options-Based Strategy Development

Task:

- Describe your **most effective options strategy**, including the market conditions it suits best, key metrics for evaluation (e.g., Greeks, implied volatility), and its risk management components.
- Include examples of **historical performance or backtested results**, if applicable.
- Outline the **entry and exit criteria**, along with any adjustments made during the strategy's life.

One of my most effective options strategy is based on naked option buying during short covering and long unwind rallies.

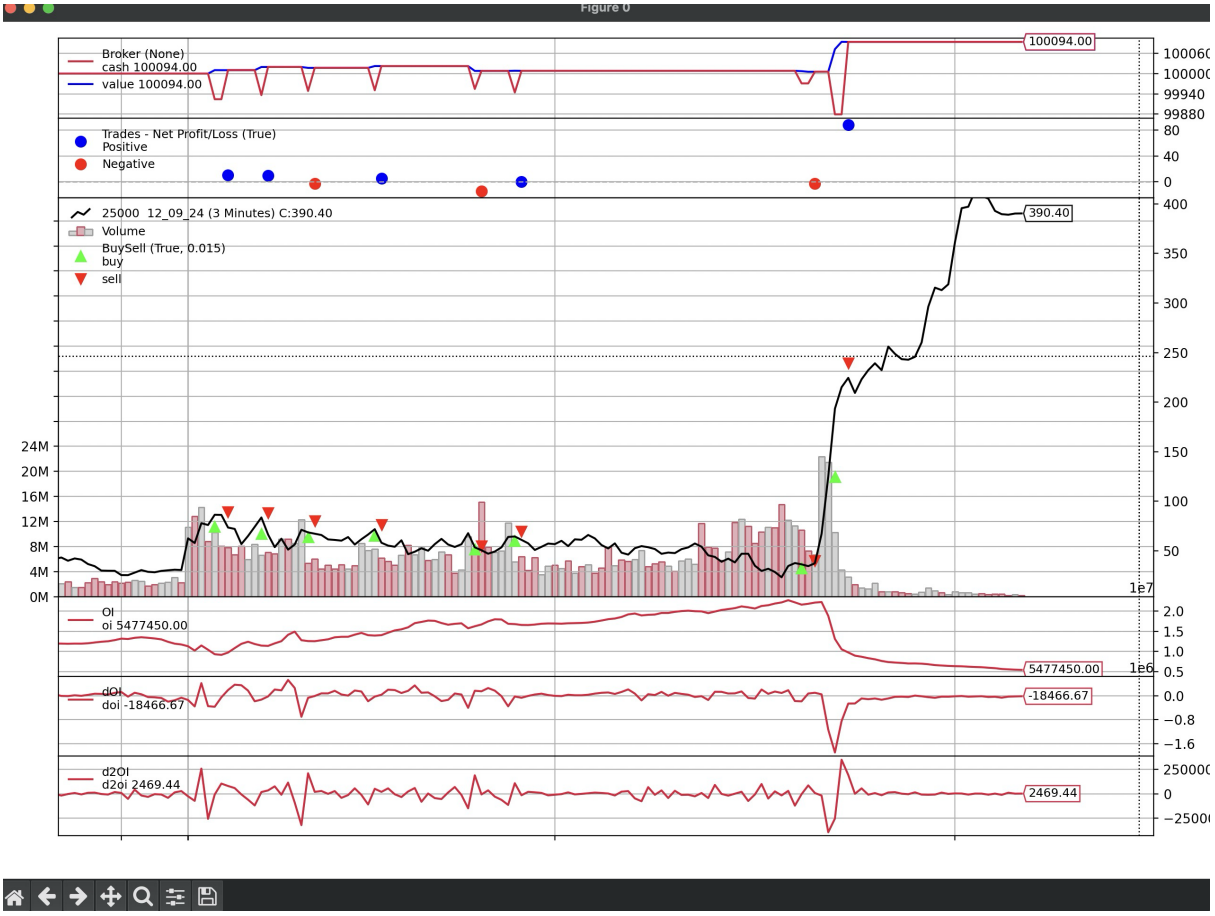
It is best suited for a market with low VIX(as most option buying strategies are) and with nearer term options, within 3/4 days from expiry, where effects of theta are smaller and large movements in the market lead to a significant gamma effect on the option price.

The premise of this strategy is that, colloquially, option sellers always win in the market.
When a short cover or a long unwind occurs in the market, it is because sellers' stop-losses are being hit, and they are forced to exit their positions. The piling up of stop loss hits leads to a much larger swing in the prices of options, from observation, I have seen the delta of options cross 1 at some rare instances(index options on expiry day especially).

We can measure the amount of option sellers in the market using open interest. A rate of change of open interest with respect to time gives us the rate at which sellers are closing/opening their positions, and a second derivative in time gives us the rate of rate of change of number of sellers in the market.
I have used the combination of the first derivative and the second derivative of open interest to create buy and sell signals for the algorithm, as the rate of change of OI decreases, we buy, and from charts we notice that the price increases, when the rate of change of oi settles, and a significant enough chunk of sellers have exited their positions, we will exit. as shown in the example below-

The chart below is for nifty 12th september 25000 ce on 12th september(0 ETD)-


NIFTY 12th SEP 25000 CE
325.00
308.15
275.00
247.54
236.57
225.00
200.00
175.00
147.30
125.00
91.08
75.00
62.75
50.00
25.00
volume-2
ma (5,Volume,m...
30.0m
20.0m
10.00m
1.15m
Open interest
20.0m
15.0m
10.00m
6.66m
13:00
13:30
14:00
14:30
15:00



this was my backtest across the same chart as above- note how the algorithm found multiple points of entry and exit, during these instances,
there was a significant first and second derivative when the trade entered, but the movement did not lead to a short covering rally, from experience, i have seen these movements and it is common on expiry day, but we don't know which will be the harshest rally.
from these smaller moves, there was enough of a market movement(not desired amount, but enough) to create profitable trades 4/7 times.

But the primary trade we are looking at is the final trade, when the short covering occurred in 25000 sep 12 nifty call, the option price shot up, along with a sharp decrease in open interest, i measured the first and second derivative of open interest, and from it I created buy and sell signals.
These buy signals are namely-
Buy- if first derivative is negative, and second derivative is less than negative of 0.5% 50 period(3 minutes) open interest moving average.
Sell- if first derivative is much less negative(-1 multiplied by 0.1% of 50 day moving average of open interest) or if second derivative is more than negative of 0.5% of 50 day moving average of open interest)

Note:- the parameters of a reference OI(50 period sma as of now), the multipliers on it are subejct to more backtesting and understnading what works for different underlyings.
These values work for nifty options nearer to expiry(2/1/0 DTE).

What I am trying to do, is understand the shape of the open interest curve, and decide when the when the rally is beginning to enter, and rally has cooled off to exit.
At the end of rallies, normally there is a gradual closing of positions, since it is expiry day and sellers will be forced out of their positions either way, they might as well book early and guarantee their profits. My first derivative exit condition is derived from this
This regulates the strategy as an inbuilt target and SL in the form of an exit criterion.

The next complication to this strategy is to try and identify which strikes are best for short covering, I have done this discretionarily in the past, but it should be possible to do it algorithmically.

On the 12th of September the entire call side option chain witnessed short covering- and this can be seen across many strikes, so for the next part of the strategy, we must effectively choose which strikes and expiry we must look for these opportunities.

For strike selection, we would keep our eye on ATM and OTM options,
In case of short covering, the move will be on the call side and In case of long unwind, the move will be on the put side.
Depending on the size of the move, ATM +- 1 or 2 or 3 strikes could be affected, the larger the move the more strikes it affects, and the greatest effect is felt at the outer most strike, due to the delta drifting of the OTM option

For the 12th september, we can analyse the difference between ITM ATM and OTM options and this strategy.

our strikes are- 24800 25200 25400 , and their respective charts are-

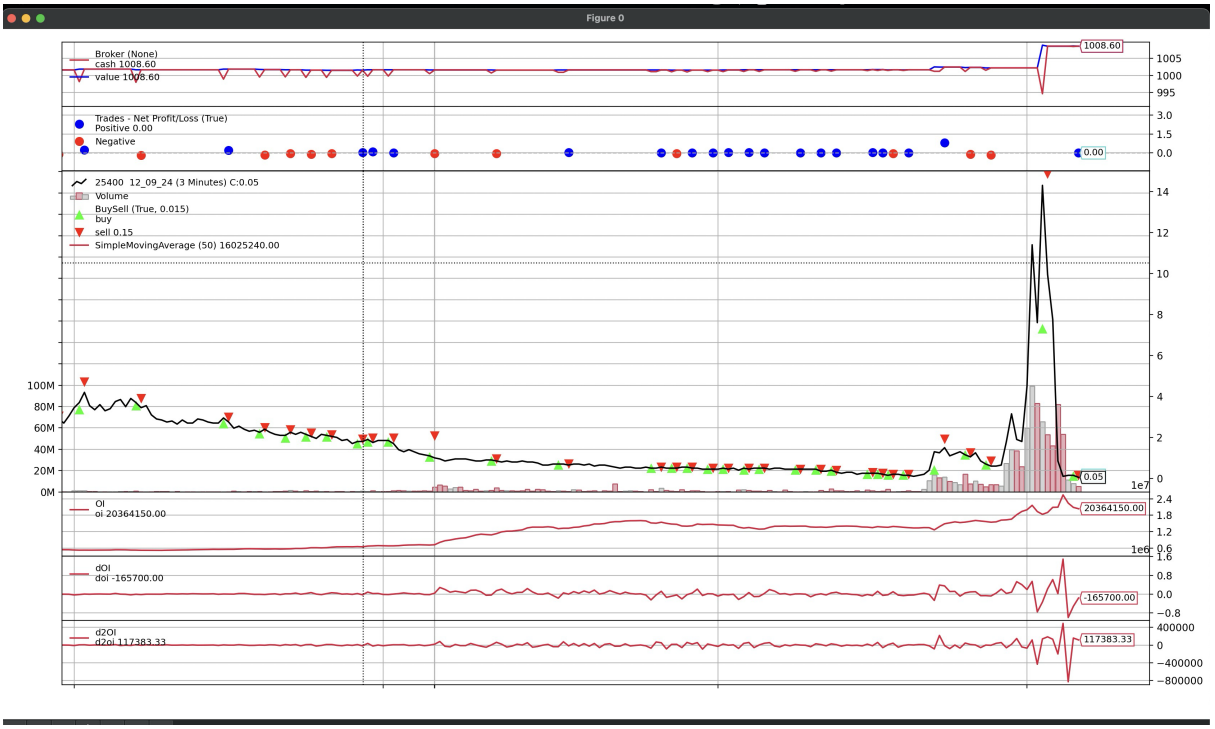
24800-


Figure 0
Broker (None)
cash 1105.60
value 1105.60
1105.60
Trades - Net Profit/Loss (True)
Positive 0.00
Negative
0.00
24800 12_09_24 (3 Minutes) C:587.65
Volume
BuySell (True, 0.015)
buy
sell 598.90
SimpleMovingAverage (50) 1026480.00
587.65
1e6
OI
oi 727750.00
727750.00
dOI
dOI -7641.67
-7641.67
d2OI
d2oi -1725.00
-1725.00

25200-


Figure 0
Broker (None)
cash 1040.80
value 1040.80
1040.80
Trades - Net Profit/Loss (True)
Positive
Negative
25200 12_09_24 (3 Minutes) C:189.10
Volume
BuySell (True, 0.015)
buy
sell
SimpleMovingAverage (50) 15409022.50
189.10
60M
50M
40M
30M
20M
10M
0M
1e7
OI
oi 7128100.00
7128100.0
dOI
doi -191258.33
-191258.33
d2OI
d2oi -31827.78
-31827.78

25400-

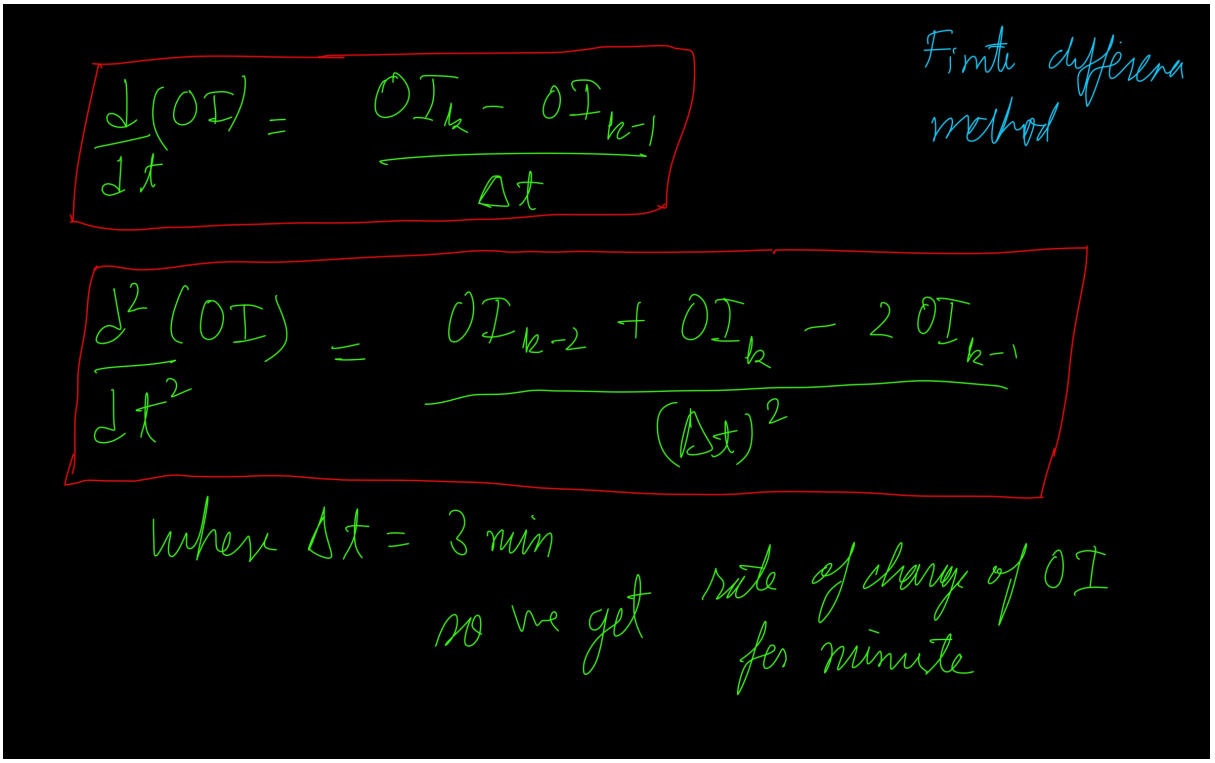


As I discussed- the efficacy of the strategy is larger on OTM options for both call and put, as we benefit from delta drifting from these large rallies.
There is a sense of diminishing returns the further OTM we go, so ATM + 1/2/3 strikes works best.

As a part of strike selection, we have to decide which strike works best- in general for all options, the fundamentals of the strategy do apply, but nearer to expiry the short cover and long unwind rallies tend to be more pronounced.
On expiry day, from experience, we see that more often price movements come before open interest movement, so we are better suited to using this strategy not on 0 DTE(days to expiry) but 1 or 2 days to expiry. On these days, price is more reactive to open interest and so the strategy works better.

To backtest this strategy i have used a python library called backtrader and i have taken data from kiteconnectapi for specific expired options.
The python script and the datasets used for testing are attached in the github- my dataset is limited since i cannot find expired options data very easily, but provided with more options data of short cover/long unwind rallies we can see that this strategy is highly effective.

To calculate rate of changes of open interest I have used the formulae-



In my current example i have shown this strategy working with index options on expiry day, This strategy is also effective on stock options in the middle of month of its expiry, provided we tweak the parameters because the underlying has changed. Short covering and long unwind rallies are not as aggressive in these cases, and we must adjust to account for that in the entry and exit conditions, but if we apply the same principles, this strategy could be effective too.