Development of Trading Software for Back-testing

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Developed by **Roman Michele**
as **Portfolio project** (showcase of software development capabilities)

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The problem

Manual creation of trading strategies can be slow and prone to **errors**, leading to **issues** with both time efficiency and reliability.

The solution

A software that **speeds up** the process of **creating and evaluating trading strategies**, reducing errors and increasing efficiency.

STRUCTURE

CODE

PROCESS

Main characteristics of this project

1. Simple Moving Average strategy evaluation through **backtesting on hystorical data**
2. **Optimization** of strategy parameters
3. Generation of **detailed reports** and **summary**

Tools

1. The software is developed in Matlab* and it is structured through general "code block" and "functions".
2. The raw data are download from Trading view*.
3. Reports can be displayed in Matlab and in Microsoft Power BI
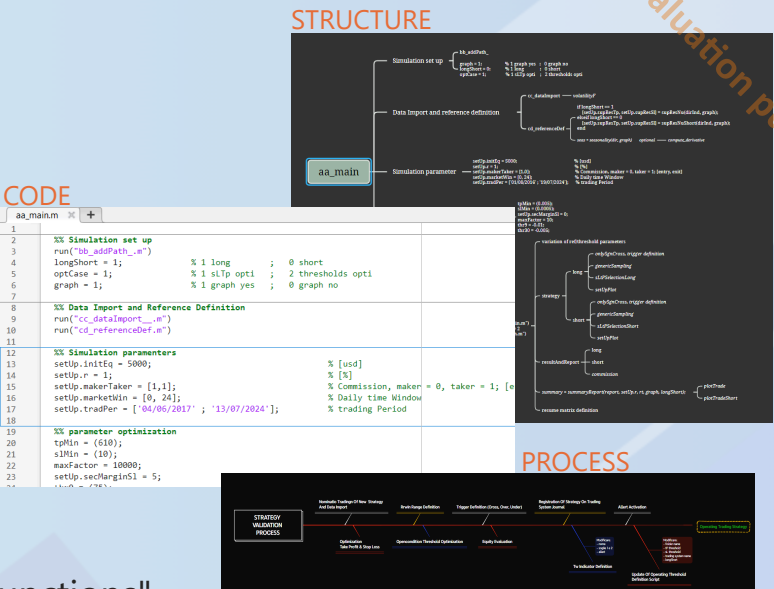
*The purpose of this presentation is to showcase software development capabilities. No software or data is intended to be sold.
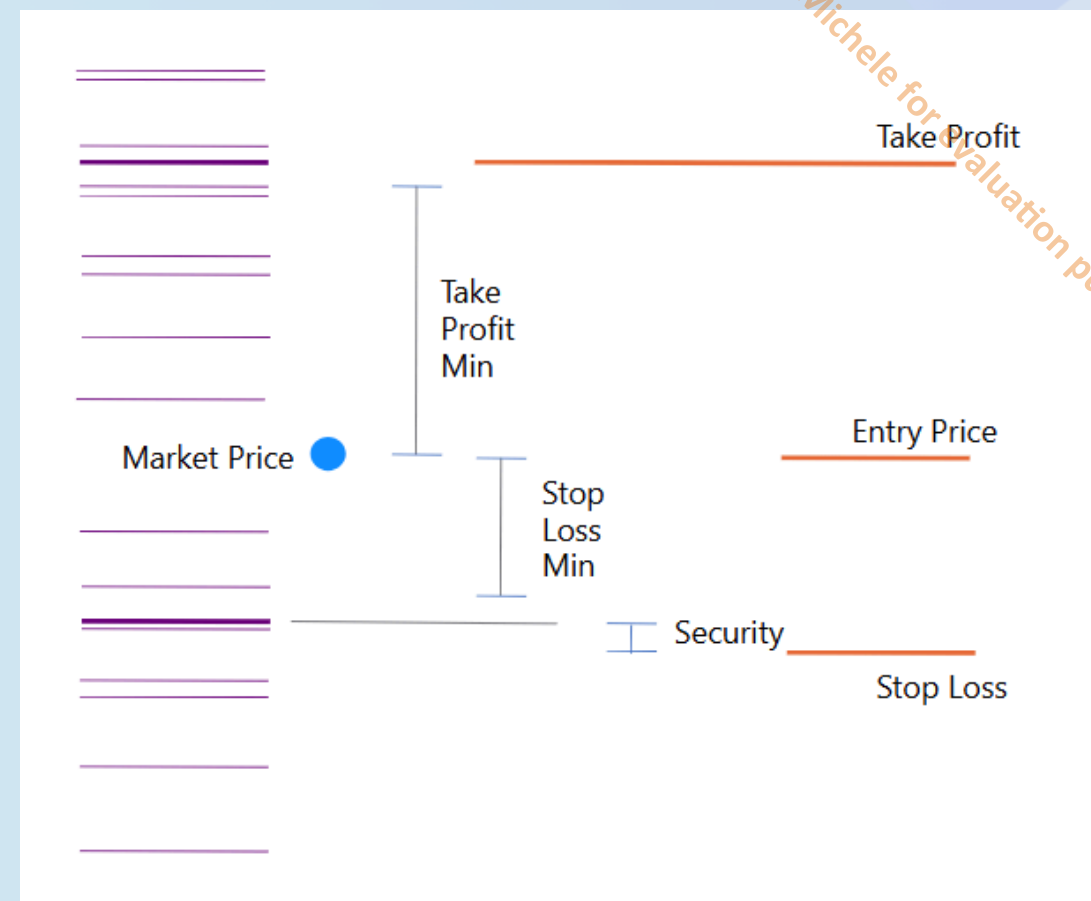
Definition of Take Profit and Stop Loss

When a trade is opened at a certain 'Market Price,' it is necessary to set Take Profit and Stop Loss levels. When one of these levels is reached, the trade is closed: a profit is made if the Take Profit is hit, and a loss occurs if the Stop Loss is reached.

In this strategy, the levels are determined by considering the next relevant level after a 'Min' threshold ('Take Profit Min' and 'Stop Loss Min'). These levels correspond to all significant price reversals in the closing price on a 1D time frame.
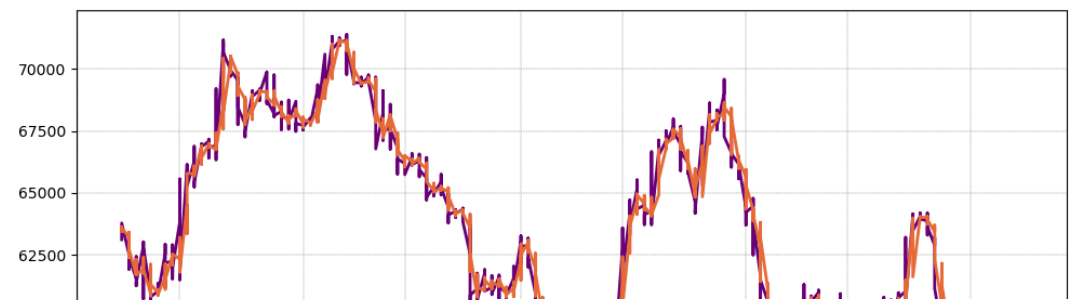
Price reversal areas with their occurancy
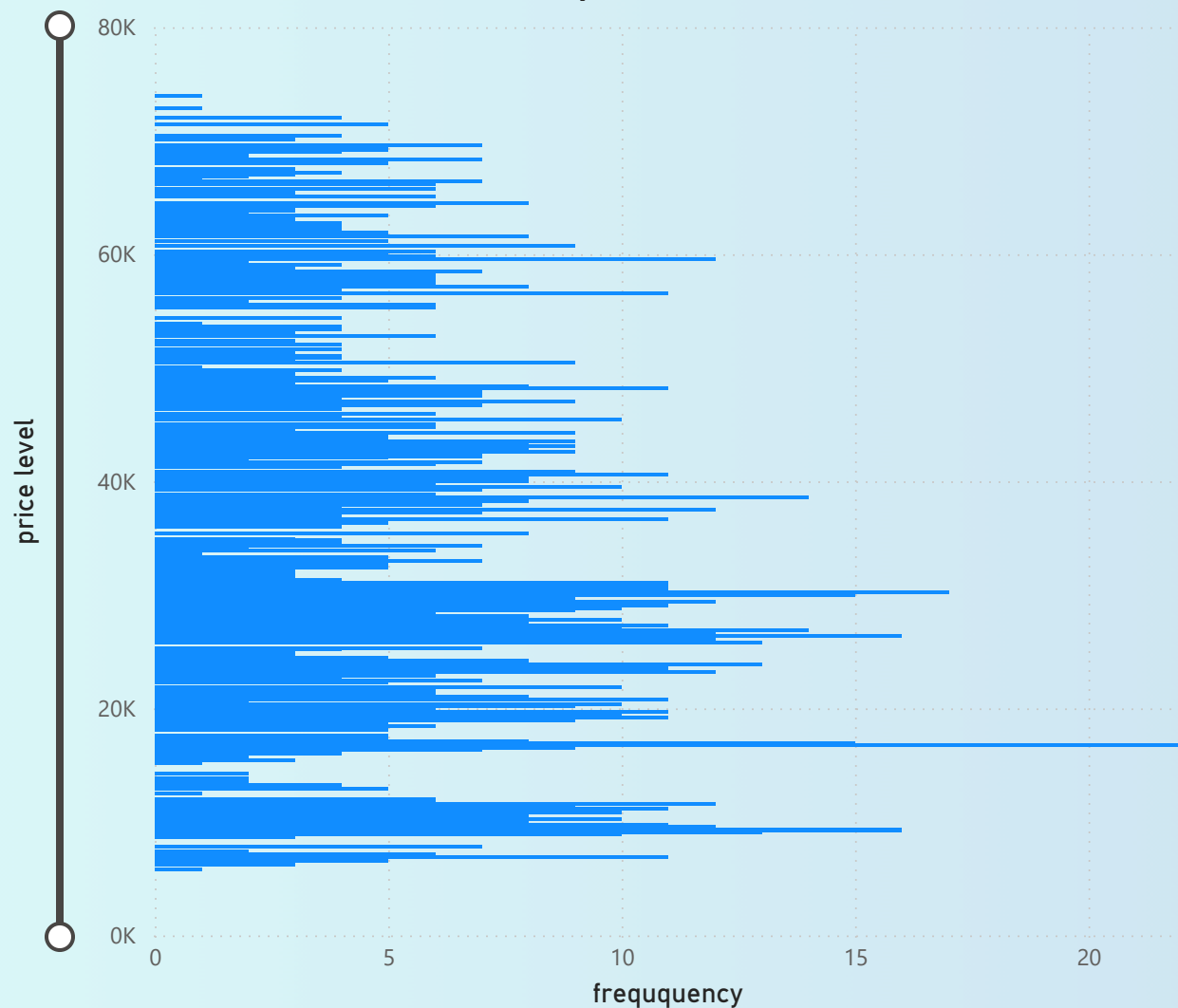
Selection of take profit and stop loss

Trading condition (refering **1h** timeFrame):

1 – sma9 > sma30
2 – d(sma9) > thr9
3 – d(sma30) > thr30

SMA9 & SMA30

Oscillator SMA9 & Threshold 9
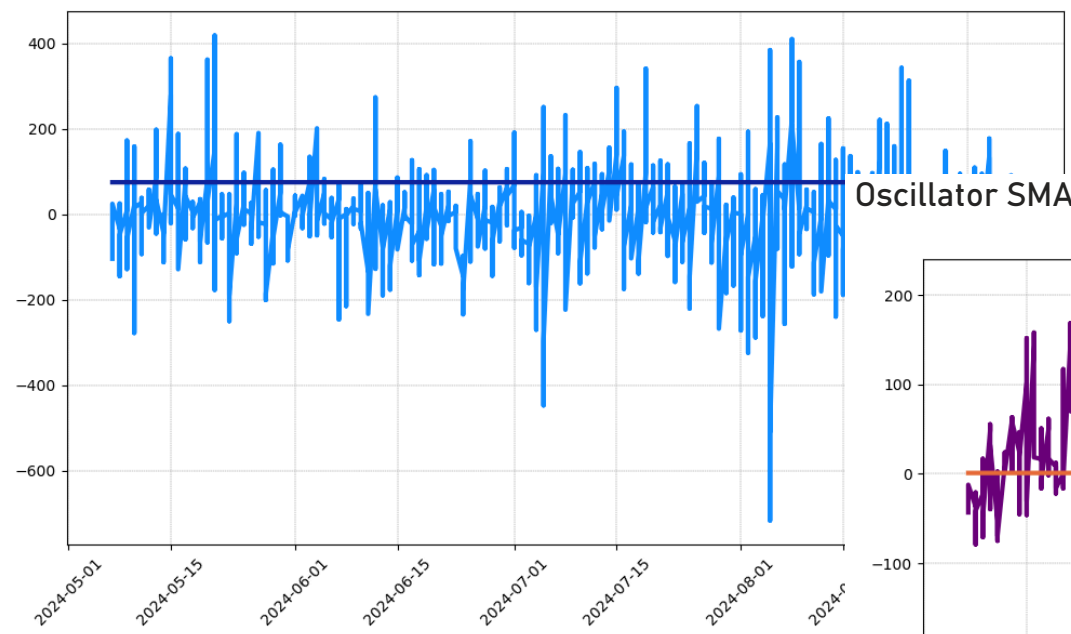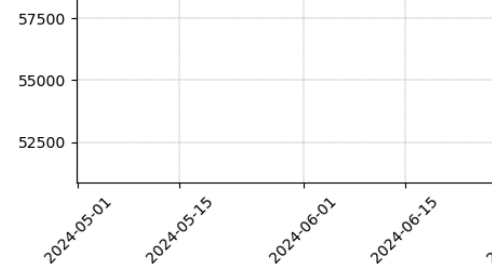
Oscillator SMA30 & Threshold 30

Trigger condition:

The **price cross** (upper lower or both) the **SMA9** on
15m time frame

Trigger Condition

Simulation paramenters

Initial equity	5000 $
Risk	1 %
Maker or Taker	Maker
Time Windows	0 - 24
Trade Period	01/07/2019 – 15/05/2024

Threshold Optimization

Th 9	Th 30	Drawd (%) ▼	Dur (h)	Occ Wk	Perf ($)	ROI (%)	Tot Trade	Win Rate (%)	RR (win)
70	0	27,45	1,50	0,57	19.292,39	385,85	133	22,56	13,41
70	1	27,45	1,50	0,57	19.292,39	385,85	133	22,56	13,41
70	2	27,45	1,50	0,57	19.292,39	385,85	133	22,56	13,41
70	3	27,45	1,50	0,57	19.292,39	385,85	133	22,56	13,41
70	4	27,45	1,51	0,57	16.169,14	323,38	132	21,97	13,31
75	0	24,06	1,51	0,47	27.123,58	542,47	110	25,45	13,96
75	1	24,06	1,51	0,47	27.123,58	542,47	110	25,45	13,96
75	2	24,06	1,51	0,47	27.123,58	542,47	110	25,45	13,96
75	3	24,06	1,51	0,47	27.123,58	542,47	110	25,45	13,96
75	4	24,06	1,52	0,47	22.993,48	459,87	109	24,77	13,87
80	0	18,50	1,64	0,40	27.538,74	550,77			
85	0	18,50	1,35	0,36	21.317,33	426,35			
80	1	18,50	1,64	0,40	27.538,74	550,77			
85	1	18,50	1,35	0,36	21.317,33	426,35			
80	2	18,50	1,64	0,40	27.538,74	550,77			
85	2	18,50	1,35	0,36	21.317,33	426,35			
80	3	18,50	1,64	0,40	27.538,74	550,77			
85	3	18,50	1,35	0,36	21.317,33	426,35			
80	4	18,50	1,65	0,40	23.355,26	467,11			
85	4	18,50	1,36	0,35	17.933,74	358,67			

Take Profit & Stop Loss Optimization

| tp ($)	sl ($)	Drawd (%)	Occ Wk	Perf ($)	ROI	Tot Trade	Win Rate (%)	RR (win)
560	10	24,87	0,46	23.614,03	472,28	107	26,17	13,50
560	15	24,87	0,46	23.193,85	463,88	108	25,93	13,50
560	5	22,52	0,44	24.018,16	480,36	102	26,47	13,81
610	10	24,06	0,47	27.123,58	542,47	110	25,45	13,96
610	15	24,06	0,48	26.651,86	533,04	111	25,23	13,96
610	5	21,68	0,45	27.577,28	551,55	105	25,71	14,28
660	10	31,14	0,48	16.712,96	334,26	111	21,62	14,62
660	15	32,14	0,49	16.082,38	321,65	113	21,24	14,62
660	5	28,99	0,45	17.323,67	346,47	105	21,90	15,03

Trading strategy report and summary

Once the Take Profit and Stop Loss levels, along with the oscillator thresholds, are optimized, it is possible to run an extensive simulation over the selected period. This generates a detailed report of all the trading operations performed, including all relevant details.
On the next page, you will find the summary values and visuals obtained from the simulation.

Back Testing Report

Id	Take Profit ($)	Stop Loss	RR	Year	Month	Day	Entry Price	Duration (h)	Exit Price ($)	W/L	Total Com ($)	Outcome ($)	Equity Risk ($)	Leverage	Qty Coin	Qty Usdt	Drawdown ($)
1	29417,8	28674,73	13,93	2020	December	31	28.724,50	0,25	28.674,73	0	31,72	-81,72	50,00	5,77	1,00	28.857,24	0,00
2	34958,5	33953,525	6,39	2021	January	3	34.089,50	0,25	33.953,53	0	13,54	-62,72	49,18	2,51	0,36	12.330,34	81,72
3	34958,5	34130,285	26,87	2021	January	6	34.160,00	0,50	34.958,50	1	62,12	1.242,67	48,56	11,50	1,63	55.818,98	144,43
4	35072,9	34368,4	19,97	2021	January	6	34.402,00	0,25	35.072,90	1	69,35	1.148,30	60,98	10,24	1,81	62.437,91	0,00
5	37791	36745,14	12,61	2021	January	7	36.822,00	1,50	36.745,14	0	38,15	-110,61	72,47	4,79	0,94	34.716,59	0,00
6	39696,5	38720	6,15	2021	January	7	38.856,50	0,25	38.720,00	0	22,31	-93,66	71,36	2,85	0,52	20.313,32	110,61
7	39174,5	38465,3	27,14	2021	January	7	38.490,50	0,25	39.174,50	1	119,37	1.792,10	70,42	15,27	2,79	107.563,42	204,28
8	40357,5	39434,775	10,80	2021	January	7	39.513,00	0,25	39.434,78	0	49,04	-137,38	88,34	5,05	1,13	44.624,05	0,00
9	41137	40264,675	8,60	2021	January	9	40.355,50	1,25	40.264,68	0	42,46	-129,43	86,97	4,44	0,96	38.642,50	137,38
10	37893,9	37134,95	7,92	2021	January	14	37.220,00	2,00	37.893,90	1	41,62	637,24	85,68	4,38	1,01	37.493,69	266,81
11	39900,1	39001,325	6,54	2021	January	14	39.120,50	0,25	39.001,33	0	33,19	-125,23	92,05	3,28	0,77	30.215,69	0,00
12	37291,5	36308,025	9,47	2021	January	18	36.402,00	0,25	36.308,03	0	38,64	-129,43	90,80	3,87	0,97	35.170,37	125,23
13	33556	32824,725	18,62	2021	January	22	32.862,00	0,25	32.824,73	0	86,75	-176,25	89,50	8,82	2,40	78.905,05	254,67
14	35650	34747,5	16,19	2021	February	2	34.800,00	0,50	34.747,50	0	63,93	-151,66	87,74	6,63	1,67	58.158,18	430,91
15	35377,5	34625,65	7,23	2021	February	2	34.717,00	0,50	34.625,65	0	36,00	-122,22	86,22	3,80	0,94	32.768,13	582,58
16	36638,2	35942,175	13,26	2021	February	3	35.991,00	0,50	35.942,18	0	68,88	-153,88	85,00	7,37	1,74	62.656,99	704,80
17	38394	37663,5	5,96	2021	February	4	37.768,50	2,00	38.394,00	1	33,30	463,89	83,46	3,60	0,79	30.020,94	858,67
18	49715,5	48907,805	5,11	2021	February	16	49.040,00	0,50	48.907,81	0	35,90	-124,00	88,10	3,71	0,67	32.682,19	394,78
19	52287,1	50643,315	7,71	2021	February	17	50.832,00	5,00	52.287,10	1	26,11	643,74	86,86	2,69	0,46	23.400,19	518,78
20	57369,5	56683,55	10,07	2021	February	20	56.745,50	1,00	56.683,55	0	93,95	-187,25	93,30	9,16	1,51	85.459,30	0,00
21	51304,7	50001,875	5,80	2021	February	25	50.193,50	0,25	50.001,88	0	26,29	-117,72	91,42	2,62	0,48	23.947,46	187,25
22	47719,5	47059,9	27,55	2021	February	27	47.083,00	0,25	47.059,90	0	202,29	-292,54	90,25	20,38	3,91	183.945,02	304,97
23	48689,5	48027,775	13,16	2021	March	1	48.074,50	0,75	48.689,50	1	99,46	1.049,89	87,32	10,29	1,87	89.844,29	597,51

Equity over Time
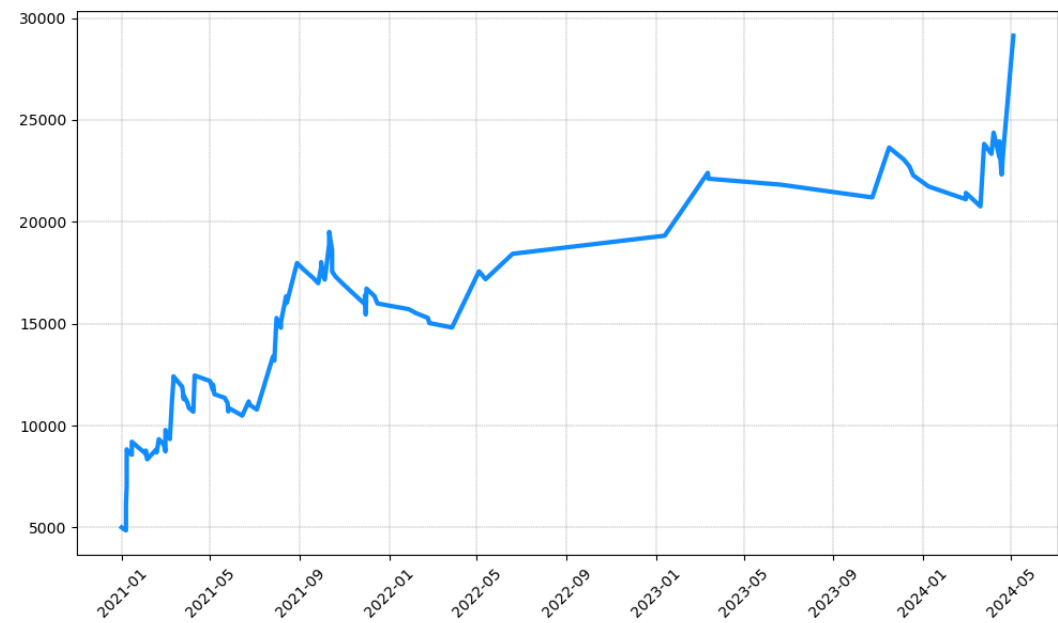
Drowdown (%)
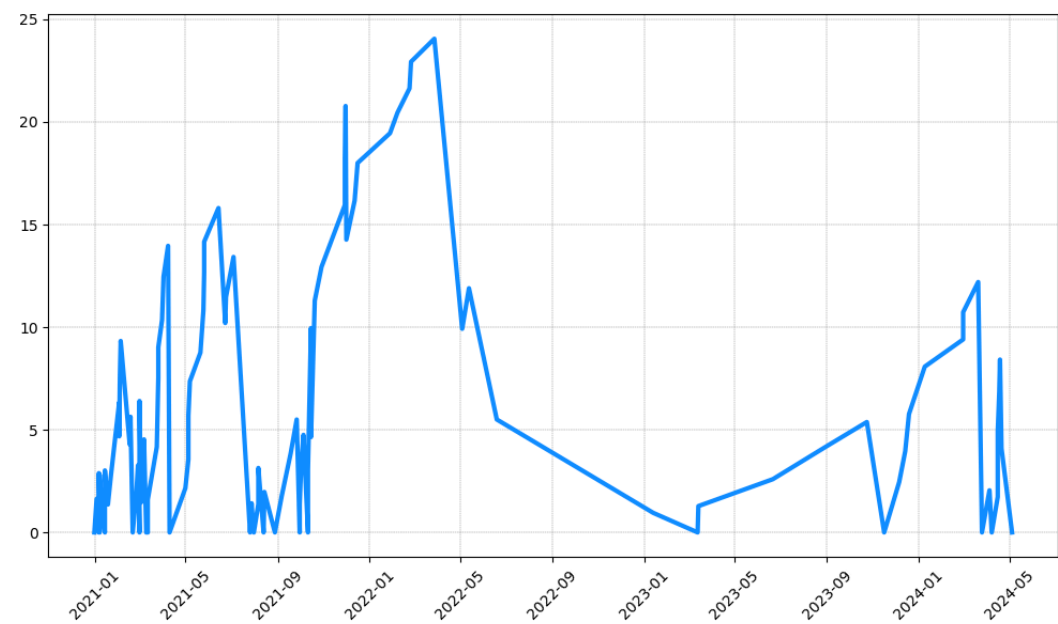
winRate (%)	Total outcome ($)	Total trade
25,45	27,12K	110

Average RR (win)	occWk	Max Drowdawn (%)
12,36	0,47	24,1

Average Duration (h)	Total Commission ($)	Average Leverage
1,51	14,13K	7,82

Plot Trade per Trade
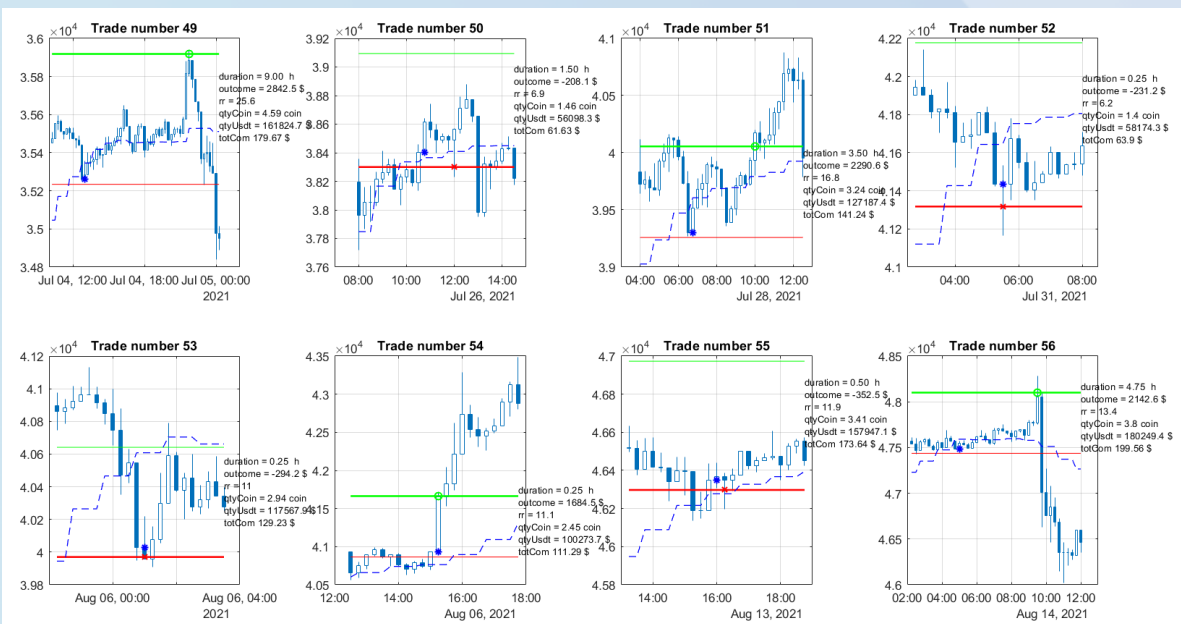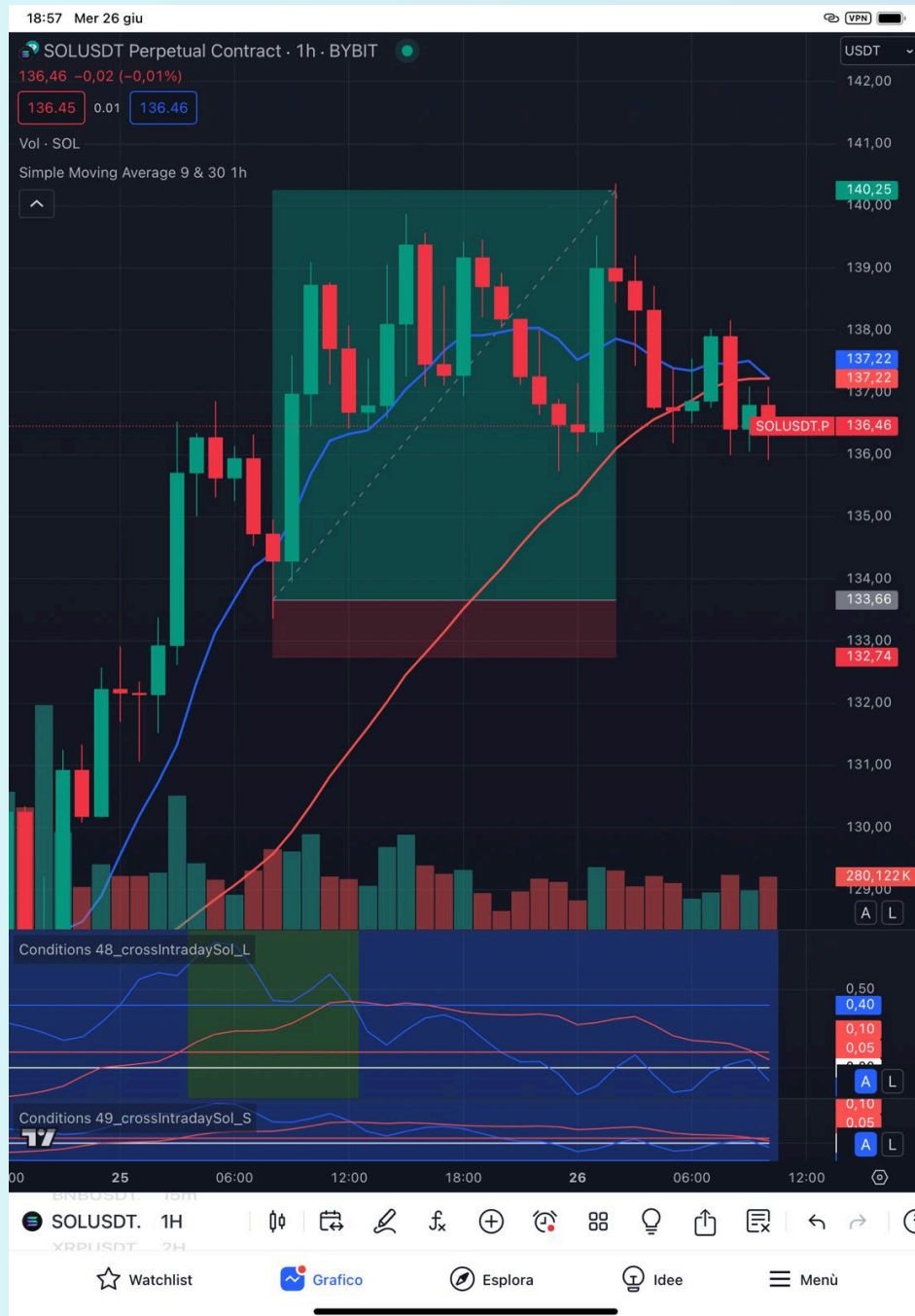
Operation

1. Insert the alert
2. Wait the trigger
3. Open the position

Note

Implement for more assets (stocks indexes ecc..) or strategies for increase the operative occurancy.