# Design and Backtest

# of a

# Market trading Strategy

So , the strategy used is **Trend following strategy**

A trend-following strategy seeks to capture gains by identifying assets that are moving in a consistent direction (uptrend or downtrend) and riding that momentum until signs of reversal appear. Instead of predicting tops or bottoms, the strategy reacts to market strength and follows the flow.

This strategy is long-only and aims to re-enter during strong uptrends and exit at take-profit or stop-loss levels.

| **Indicator used** | **Purpose** |
|---|---|
| **EMA 20 & EMA 50** | Trend detection |
| **MACD & MACD Signal Line** | Momentum & Entry timing |
| **ADX** | Trend strength filter |
| **ATR (Average True Range)** | Volatility-based risk management |

**ENTRY CONDITIONs**

First is when,

EMA20>EMA50 , confirms short-to-medium term uptrend

& MACD>MACD_SIGNAL, MACD crossover (MACD > signal) shows bullish momentum

& ADX > 15, filters for strong trends only

Another entry condition is used that is when,

EMA20>EMA50 ONLY ! , this will make the re-entry in the market when we are riding the uptrend its possible that after one entry we don't get to re-enter because MACD crossover is not taking place or the uptrend is not that strong so we are applying another buy signal so that we gain continuous profit in the uptrend whether its small or big.

One more buying signal that we have used is quite interesting that is ,

Macd < macd_signal , it might seems weird to hear but yes when checked on the stock prices this condition found to show better results than the normal crossover , MACD is a lagging indicator. Sometimes, when it gives a bullish signal (MACD > Signal), the best part of the move is already underway or even ending. Buying slightly before the crossover (i.e., when MACD < Signal but closing the gap) can:

~Give **early entry**.

~Capture more of the trend before confirmation.

In the strategy, we're using multiple indicators:

> If **EMA(20) > EMA(50)** and **ADX > 15**, we already know we're in a strong uptrend.
>
> So even if MACD < Signal, the market context may still favor buying.

This becomes a filtered contrarian entry , we're buying on weakness *within strength*.

**EXIT CONDITION**

we are using only one selling signal when ,

EMA20<EMA50 & MACD < MACD_SIGNAL which is the ideal case and we are not adding the signal when ADX<15, as we do not want to wait for the downward signal to grow strong then exit the position if we suspect a decrease in prices we sell , just to avoid losses.

ATR was used to dynamically calculate stop-loss and take-profit levels

We devised the formula for stop loss and take profit as

take_profit = entry_price + 4*atr

stop_loss = entry_price - 2*atr

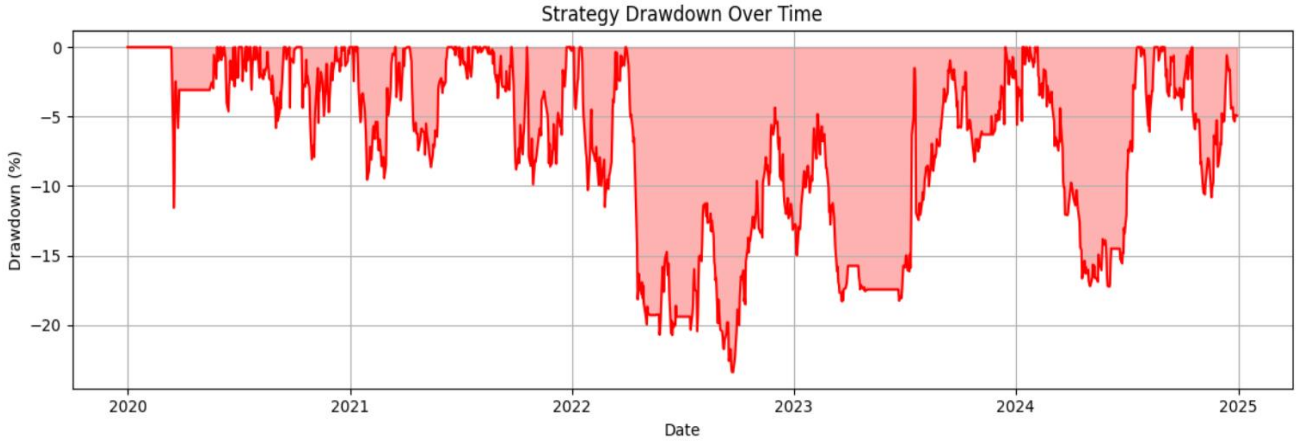
the values are taken on which we were getting better results .

AND yes the use to **talib** and **backtesting** did saved a lot of work we can compute ema , macd, macd_signal , atr directly using **talib** no need of writing the formula or defining the functions

**backtesting** provide platform to perform backtest directly on our strategy with interactive graph which help to analyse the strategy more easily like where to increase the trade when to prevent yourself from buying or selling.

**THE STRATEGY IS MAINLY FOCUSED ON GETTING HIGHER RETURNS WHILE KEEPING YOURSELF FROM NOT GETTING INTO MAJOR LOSSES, AS WE ARE ENTRYING AND EXITING THE MARKET OFTENLY WE CAN SEE A LARGE NUMBER OF TRADES.**


Strategy Equity Curve
Strategy Equity Curve
Equity (Portfolio Value)
400000
350000
300000
250000
200000
150000
100000
2020
2021
2022
2023
2024
2025
Date


Strategy Drawdown Over Time
Drawdown (%)
0
−5
−10
−15
−20
2020
2021
2022
2023
2024
2025
Date


Price with Trade Plot
Close Price
Buy
Sell
Price
2000
1800
1600
1400
1200
1000
800
600
400
2020
2021
2022
2023
2024
2025
Date

**PERFORMANCE MATRICS**

| | |
|---|---|
| Exposure Time [%] | 86.014551 |
| Equity Final [$] | 384086.385623 |
| Equity Peak [$] | 404027.288943 |
| Return [%] | 284.086386 |
| Buy & Hold Return [%] | 188.261522 |
| Return (Ann.) [%] | 31.540377 |
| Volatility (Ann.) [%] | 31.201496 |
| Sharpe Ratio | 1.010861 |
| Sortino Ratio | 2.148627 |
| Calmar Ratio | 1.34758 |
| Max. Drawdown [%] | -23.405191 |
| Avg. Drawdown [%] | -3.812948 |
| Max. Drawdown Duration | 624 days 00:00:00 |
| Avg. Drawdown Duration | 33 days 00:00:00 |
| # Trades | 129 |
| Win Rate [%] | 55.03876 |
| Best Trade [%] | 13.953067 |
| Worst Trade [%] | -8.772305 |
| Avg. Trade [%] | 1.052008 |
| Max. Trade Duration | 96 days 00:00:00 |
| Avg. Trade Duration | 12 days 00:00:00 |
| Expectancy [%] | 1.168678 |
| SQN | 2.005214 |

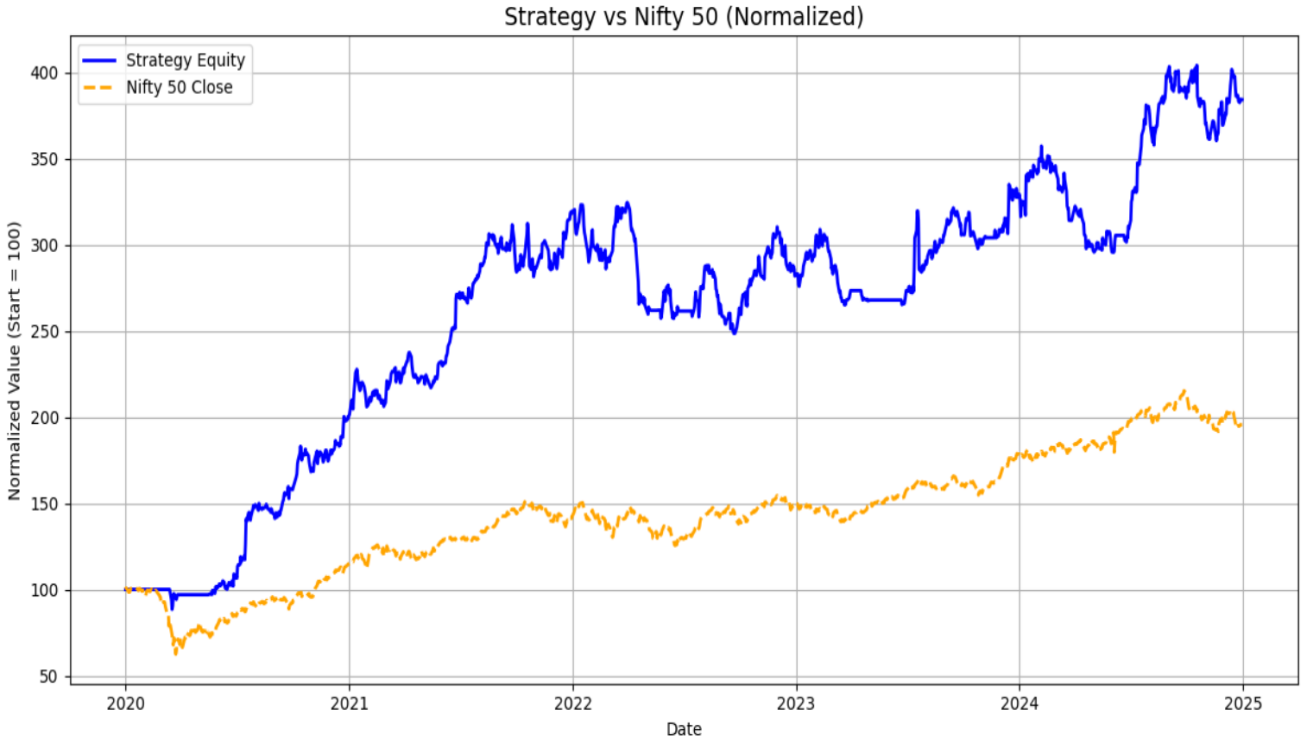
Profit Factor 1.942523

Average Profit per Winning Trade: 10375.01

Average Loss per Losing Trade: -7802.41

Maximum Profit in a Trade: 32900.98

Maximum Loss in a Trade: -26666.81




Some india-related metrics

Strategy CAGR: 30.91%

Nifty CAGR: 14.19%

Alpha (vs Nifty): 16.71%

Beta (vs Nifty): 0.46

Correlation with Nifty: 0.37

References

https://www.youtube.com/playlist?list=PLnSVMZC68_e48lA4aRYL1yHYZ9nEq9AiH

https://www.incrediblecharts.com/indicators/technical-indicators.php

ChatGPT for understanding a basic framework of strategy,  solving errors & improvement of the strategy.