FINTECH
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PYTHON WORKSHOP

FINTECH CLUB

"CONTENT SHARED IS FOR INFORMATION AND EDUCATIONAL PURPOSES ONLY AND SHOULD NOT BE TREATED AS INVESTMENT OR TRADING ADVICE”

INTRODUCTION TO

TECHNICAL ANALYSIS

Technical analysis is a method used to evaluate securities and forecast future price movements by analyzing historical market data, primarily price and volume.
Focusing on **short-term market trends.**

WHY TA??

- Not boring as FA
- Everything is logical & mathematical
- Remains same for different commodities/stocks/etc etc
- We can automate this :)
- less intuition

ASSUMPTIONS / LOOPHOLES :(

1. Markets discount everything
2. The ‘how’ is more important than the ‘why’
3. Price moves in trend
4. History tends to repeat itself

TYPES OF CHART

TOO MANY CHARTS

1. Line chart
2. Bar Chart
3. Japanese Candlestick

1. LINE CHART

The line chart is the most basic chart type, and it uses only one data point to form the chart. When it comes to technical analysis, a line chart is formed by plotting a stock's closing prices.

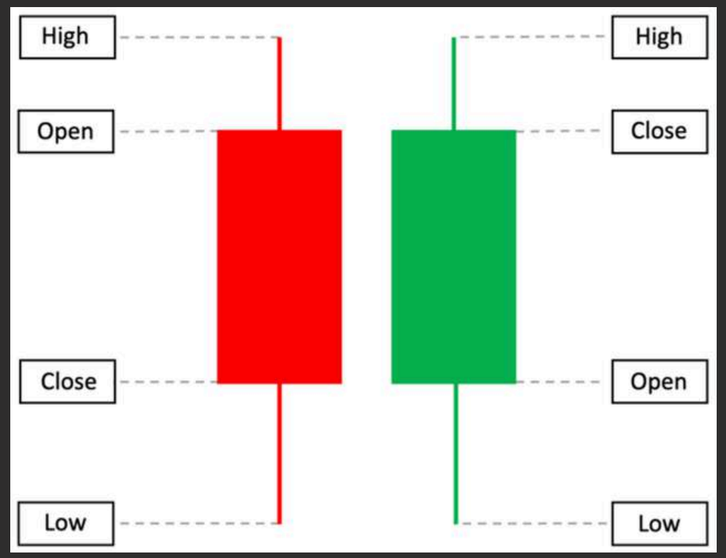
LOOKS GOOD BUT WE CAN GET BETTER

DON'T TELL US ABT PARTICULAR TIME DURATION STOCK MOVENEMNT

WE WANT MORE INFO

2. BAR CHART

The bar chart, on the other hand, is a bit more versatile. A bar chart displays all four price variables: open, high, low, and close



3. CANDLESTICK

1. The Central real body – The real body, rectangular connects the opening and closing price.
2. Upper shadow – Connects the high point to the close.
3. Lower Shadow – Connects the low point to the open.

MARKET SENTIMENTS

First we should understand types of market sentiments

BEARISH SENTIMENT

Bearish sentiment refers to a market condition where investors and traders anticipate declining prices for an asset or the overall market

(Market / stock price girne se fayda uthane vaale)
generally use shorting strategy

BULLISH SENTIMENT

Bullish sentiment refers to a positive market attitude where investors expect asset prices—such as stocks, commodities, or cryptocurrencies—to rise in the future.

(Sabka sath sabka vikas type)

use long as primary trading strategy

EVERYTHING IN MARKET IS GOVERNED BY THESE TWO TYPES OF PEOPLE ONLY

back to candlestick chart.....

We have two types of candles just like sentiments

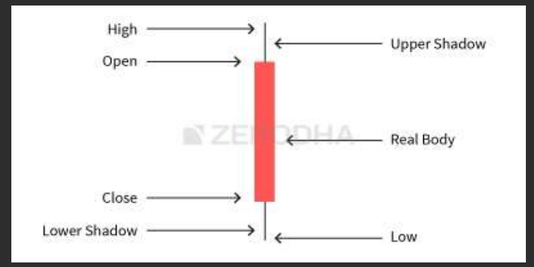
- Bearish candle
- Bullish candle

Bullish candle

open < close

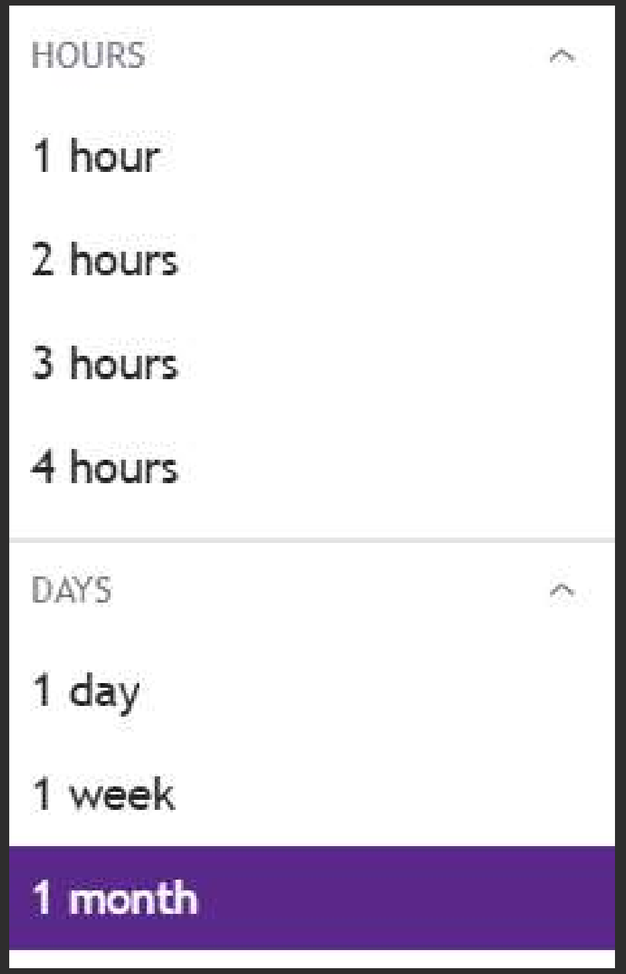
Bearish candle

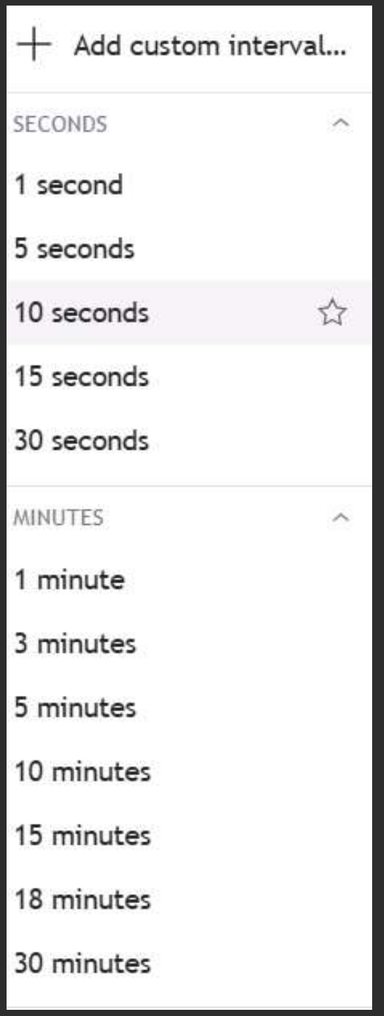
open > close



bearish candle indicated by red and bullish candle by green or blue

Each candle represent a particular time interval range from seconds to months


HOURS
1 hour
2 hours
3 hours
4 hours
DAYS
1 day
1 week
1 month


Add custom interval...
SECONDS
1 second
5 seconds
10 seconds
15 seconds
30 seconds
MINUTES
1 minute
3 minutes
5 minutes
10 minutes
15 minutes
18 minutes
30 minutes

Nifty 50
D
Indicators
Instant Order
Tradingview Platform
Upstox Layout
Nifty 50 · 1D · NSE
O25,648.55 H25,791.75 L25,603.95 C25,665.60 −66.70 (−0.26%)
26,450.00
26,400.00
26,350.00
26,300.00
26,250.00
26,200.00
26,150.00
26,100.00
26,050.00
26,000.00
25,950.00
25,900.00
25,850.00
25,800.00
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% log auto

CANDLESTICK PATTERN

SINGLE -

- Marubozu
  - Bullish Marubozu
  - Bearish Marubozu
- Doji
- Spinning Tops
- Paper umbrella
  - Hammer
  - Hanging man
- Shooting star

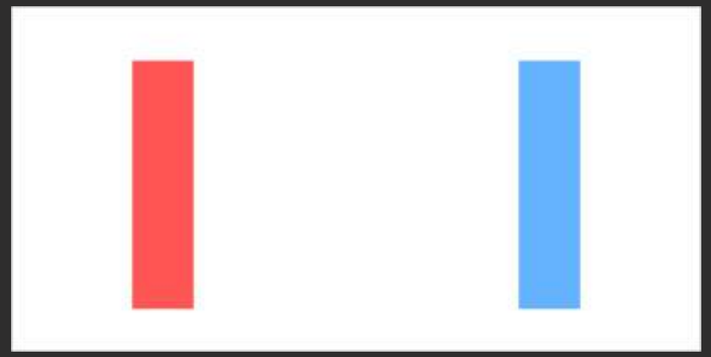
MULTIPLE-

- Engulfing pattern
  - Bullish Engulfing
  - Bearish Engulfing
- Harami
  - Bullish Harami
  - Bearish Harami
- Piercing Pattern
- Dark cloud cover
- Morning Star
- Evening Star

AND LIST GOES ON.....

MARUBOZU (BULLISH)

Open = Low and High = close

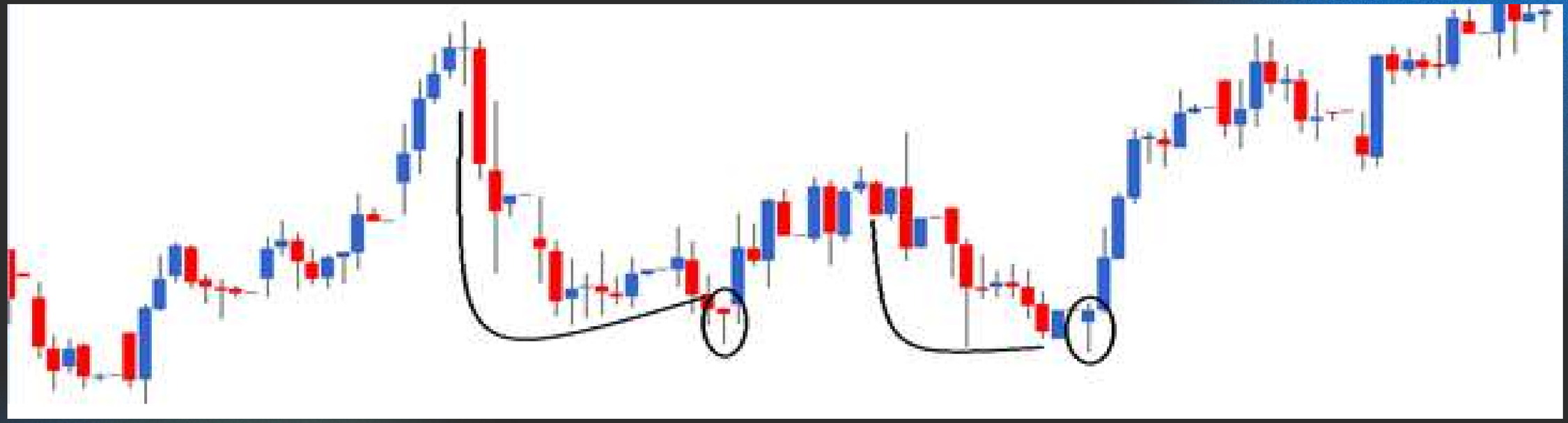


A **bullish marubozu** indicates that there is so much buying interest in the stock that the market participants were willing to buy the stock at every price point during the day, so much so that the stock closed near its high point for the day.
The action on the marubozu day suggests that the sentiment has changed and the stock is now bullish.

HAMMER

Small real body at the upper end of the trading range with a long lower shadow.

The longer, the lower shadow, the more bullish the pattern.



PRIOR TREND FOR THE HAMMER SHOULD BE A DOWNTREND

ENGULFING (BEARISH)

You will find a small candle on day 1 and a relatively long candle on day 2, which appears as if it engulfs the candle on day 1

APPEARS AT THE TOP END OF THE TREND

The bearish engulfing pattern is a two candlestick pattern that appears at the top end of the trend, making it a bearish pattern.

The prerequisites for the pattern are as follows:

- The prior trend should be a uptrend
- The first day of the pattern (P1) should be a blue candle reconfirming the bullishness in the market.
- The candle on the 2nd day of the pattern (P2) should be red, long enough to engulf the blue candle.

EVENING STAR

THREE CANDLE FORMATION

appears at the top end of an uptrend.

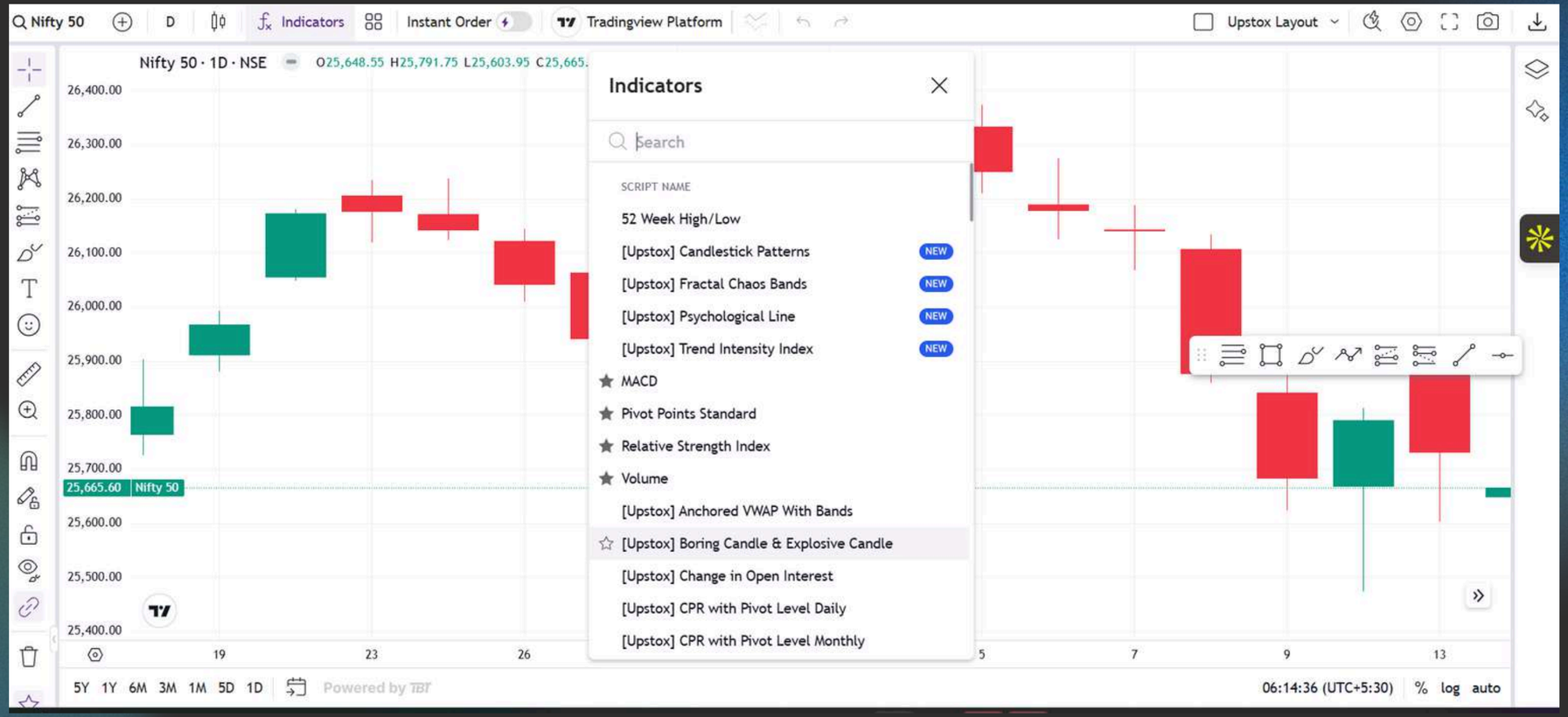
MORNING STAR

THREE CANDLE FORMATION

appears at the bottom end of a downtrend

INDICATORS (5)

Technical indicators are mathematical calculations based on a security's historical price, volume, or open interest, used by traders to forecast future market movements and identify trends, momentum, or volatility for making buy/sell decisions, typically displayed as lines on a chart alongside the price. They help analyze market sentiment and patterns.



TYPE:-

- **LEADING**
- **LAGGING**

RELATIVE STRENGTH INDEX (RSI)

Relative strength Index or just RSI, is a prevalent indicator developed by J.Welles Wilder. RSI is a leading momentum indicator which helps in identifying a trend reversal. RSI indicator oscillates between 0 and 100 and based on the latest indicator reading, the expectations on the markets are set.

$$RSI = 100 - 100/(1 + RS)$$

$$RS = \text{Average gain} / \text{Average Loss}$$

Sl No	Closing Price	Points Gain	Points Lost
1	100		
2	102		
3	105		
4	107		
5	103		
6	100		
7	99		
8	97		
9	100		
10	105		
11	107		
12	110		
13	114		
14	118		
Total			

Nifty 50
30m
Indicators
Instant Order
Tradingview Platform
Upstox Layout
Nifty 50 · 30 · NSE
O26,184.40 H26,206.10 L26,180.45 C26,203.40 +19.40 (+0.07%)
26,400.00
26,300.00
26,200.00
26,100.00
26,000.00
25,900.00
25,800.00
25,700.00
25,669.10
Nifty 50
25,600.00
25,500.00
25,400.00
RSI 14 67.12
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70.00
60.00
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5Y 1Y 6M 3M 1M 5D 1D
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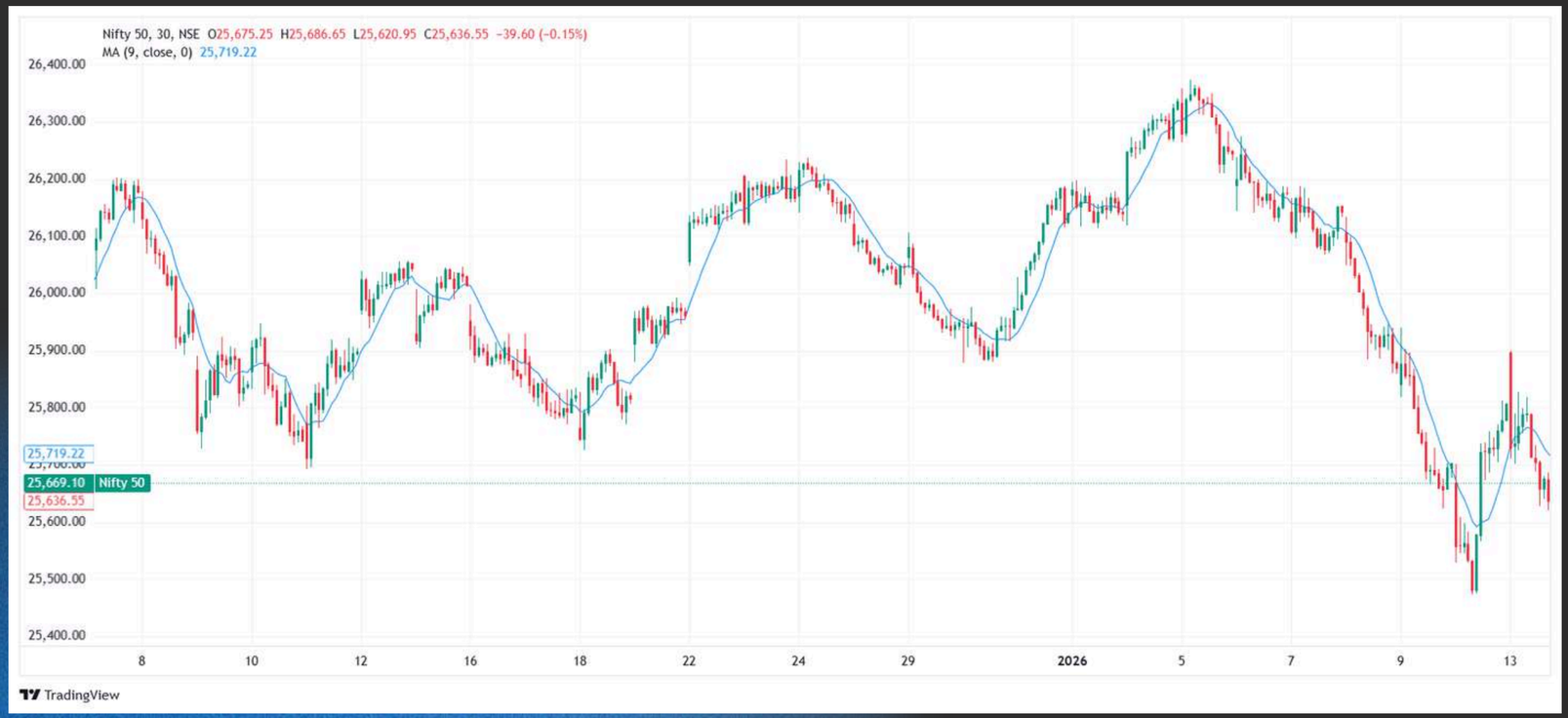
% log auto

SIMPLE MOVING AVERAGE(SMA)

A Simple Moving Average (SMA) indicator is a core technical analysis tool that smooths price data by calculating the average price of an asset over a specific period (e.g., 50 days, 200 days), creating a single flowing line on a chart to help identify trend direction, reversals, and potential support/resistance levels, making it easier to see underlying market movement by reducing price volatility.



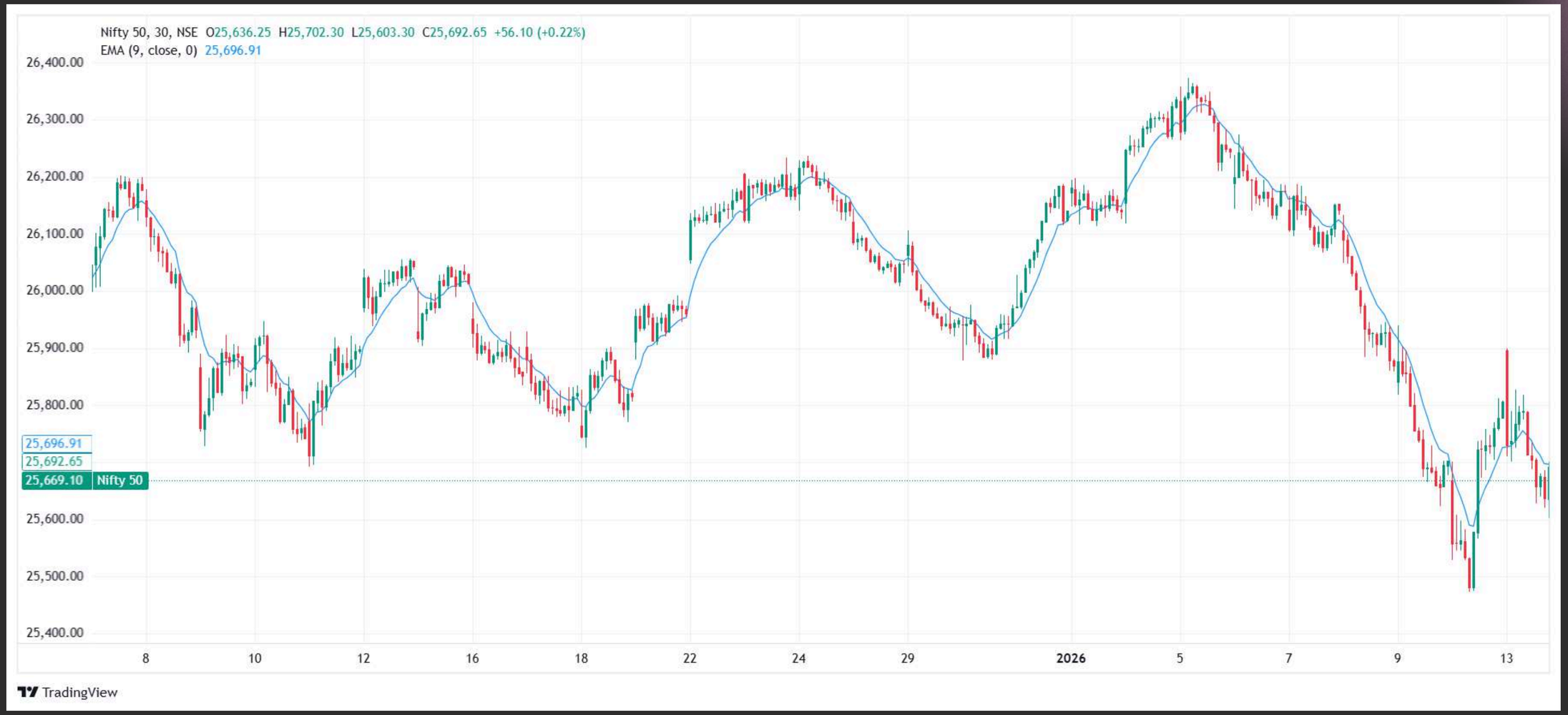
Close Price	5 Day Average
1287.7	
1279.25	
1258.95	
1249.7	
1242.4	
1268.75	
1231.2	
1201.75	
1159.2	
1157.25	
1141.35	
1152.5	
1139.6	
1140.6	
1166.35	
1165.4	
1168.25	

We use SMA through crossover of various sma lines where the line with less time interval behaves more volatile and sensitive to stock movement then the other line

EXPONENTIAL MOVING AVERAGE(EMA)

An Exponential Moving Average (EMA) is a technical indicator that tracks an asset's price trend, giving more weight to recent prices for faster responsiveness, unlike a Simple Moving Average (SMA), making it ideal for capturing current market momentum and identifying trend changes or reversals more quickly, using a multiplier to emphasize newer data.

$$EMA_{Today} = (Value_{Today} * \left(\frac{Smoothing}{1 + Days}\right)) + EMA_{Yesterday} * (1 - \left(\frac{Smoothing}{1+Days}\right))$$



SIMILAR TO SMA....EMA ALSO WORKS BY DOING CROSSOVER OF VARIOUS EMA WITH DIFFERENT TIME INTERVAL

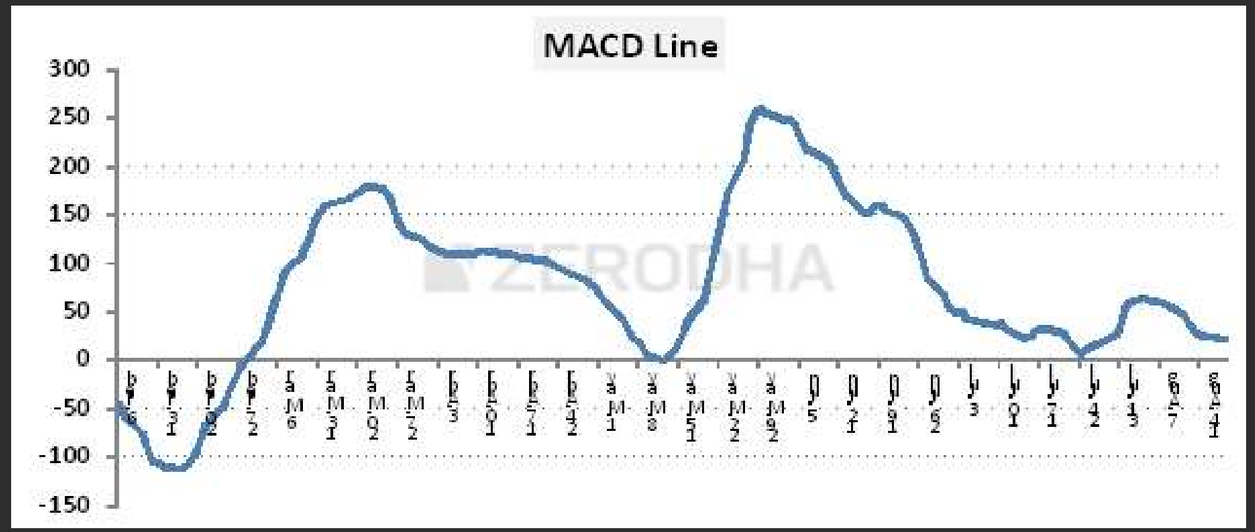
MOVING AVERAGE CONVERGENCE AND DIVERGENCE(MACD)

In the late seventies, Gerald Appel developed the Moving Average Convergence and Divergence (MACD) indicator. Traders consider MACD as the grand old daddy of indicators. Though invented in the seventies, MACD is still considered one of the most reliable momentum traders' indicators.

STANDARD PARAMETERS OF MACD:

- 12 day EMA of closing prices
- 26 day EMA of closing prices
- MACD line (12D EMA – 26D EMA) represented by the black line
- 9 day EMA of the MACD line represented by the red line

Date	Close	9 Day EMA	15 Day EMA	MACD Line
Jan 1, 2014	6302			
Jan 2, 2014	6221			
Jan 3, 2014	6211			
Jan 6, 2014	6191			
Jan 7, 2014	6162			
Jan 8, 2014	6175			
Jan 9, 2014	6168			
Jan 10, 2014	6171			
Jan 13, 2014	6273			
Jan 14, 2014	6242			
Jan 15, 2014	6321			
Jan 16, 2014	6319			
Jan 17, 2014	6262			
Jan 20, 2014	6304			
Jan 21, 2014	6314			
Jan 22, 2014	6339			
Jan 23, 2014	6346			
Jan 24, 2014	6267			
Jan 27, 2014	6136			
Jan 28, 2014	6126			
Jan 29, 2014	6120			
Feb 13, 2014	6001			



Nifty 50
30m
Indicators
Instant Order
Tradingview Platform
Upstox Layout
26,451.75
Nifty 50 · 30 · NSE
O25,940.90 H25,956.15 L25,878.00 C25,939.75 −10.05 (−0.04%)
26,400.00
26,300.00
26,200.00
26,100.00
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25,788.60
25,700.00
25,669.10
Nifty 50
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25,500.00
25,400.00
MACD 12 26 close 9 −1.18 −42.07 −40.89
75.00
50.00
25.85
0.00
−6.52
−25.00
−32.36
−50.00
−75.00
−100.00
−125.00
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30 Dec '25 09:15
2026
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7
9
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5Y 1Y 6M 3M 1M 5D 1D
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06:31:09 (UTC+5:30)
% log auto

BOLLINGER BANDS

Introduced by John Bollinger in the 1980s, Bollinger Bands (BB) is perhaps one of the most useful technical analysis indicators. BB is used to determine overbought and oversold levels, where a trader will try to sell when the price reaches the top of the band and will execute a buy when the price reaches the bottom of the band.

COMPONENTS OF BB

The middle line which is The 20 day simple moving average of the closing prices
An upper band – this is the +2 standard deviation of the middle line
A lower band – this is the -2 standard deviation of the middle line

Nifty 50, 30, NSE O25,675.25 H25,686.65 L25,620.95 C25,636.55 −39.60 (−0.15%)
BB (20, 2) 25,702.23 25,871.96 25,532.50
26,450.00
26,400.00
26,350.00
26,300.00
26,250.00
26,200.00
26,150.00
26,100.00
26,050.00
26,000.00
25,950.00
25,900.00
25,871.96
25,850.00
25,800.00
25,750.00
25,702.23
25,669.10
Nifty 50
25,636.55
25,600.00
25,550.00
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25,450.00
25,400.00
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TradingView

USE OF MULTIPLE INDICATORS

YFINANCE

From where we can get data???

- Through different brokers,API etc
- What u will use - YAHOOFINANCE

Dataset format will be .csv

```
# Install the Yahoo Finance library to fetch market data
!pip install yfinance
import yfinance as yf

tickers = ['AAPL', 'GS', 'MSFT', 'TLT']

data = yf.download(tickers, start="2020-01-01", end="2023-12-30", auto_adjust=True)

data.head()
```

To explore other utilities of yfinance, refer this

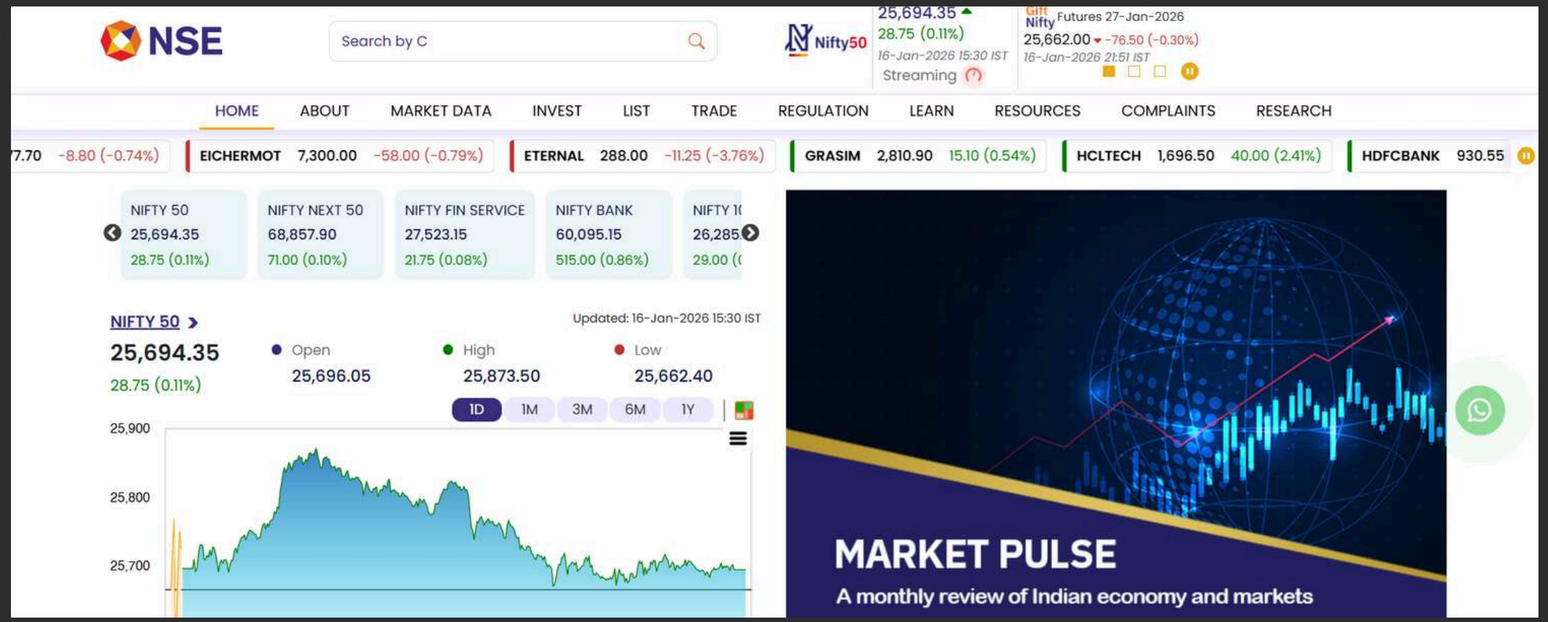
https://ranaroussi.github.io/yfinance/index.html

USEFUL TOOLS

NSE Website

www.nseindia.com

- Track live prices of
- stocks and derivatives
- Tracking various Indices
- like NIFTY and
- BANKNIFTY
- Company announcements
- and information
- Historic Data



TRADINGVIEW

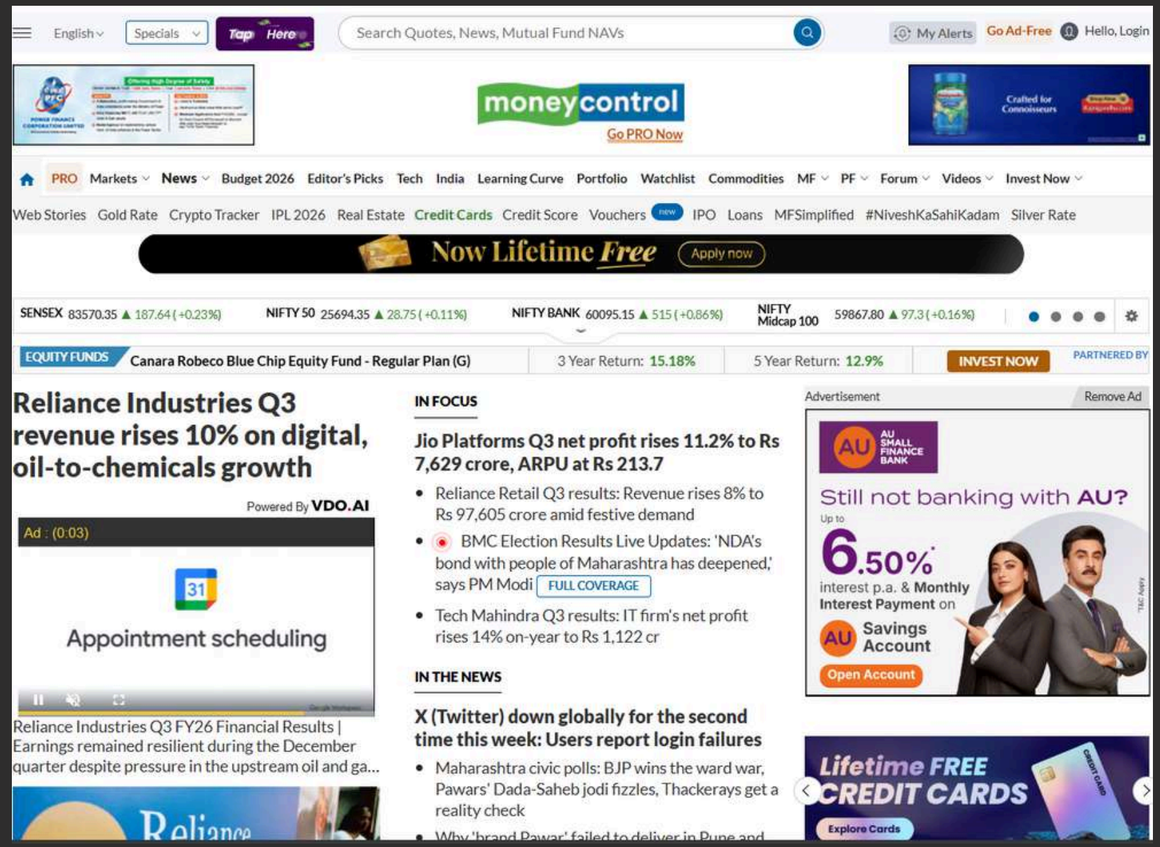
in.tradingview.com

- Track live prices across
- asset class like equity, forex,
- fixed income, commodities,
- crypto
- Company Fundamentals and
- Technicals
- Built in charting tools with
- lots of indicators
- Real trading on connecting
- with broker accounts and
- paper tradin

MONEYCONTROL

moneycontrol.com

- Helps to track domestic and
- global news and key events
- Interviews of market
- professionals, government
- officials and company
- management
- Tracking stocks and mutuals
- funds made easy
- Real trading on connecting with
- broker accounts and paper
- trading



TIME TO RELEASE THE PS

PS DISCUSSION

Multi-Indicator Buy–Sell Signal Generator Using Python & Technical Analysis

Project Overview

This project focuses on building a rule-based quantitative trading system that generates Buy, Sell, and Hold signals using a combination of five widely used technical indicators. The system is designed to demonstrate practical knowledge of financial markets, technical analysis, and Python-based data analytics, aligned with competitive problem-solving and industry-ready standards.
The outcome is a clear tradebook derived from systematic indicator-based logic, ensuring transparency, reproducibility, and analytical rigor.

Objective

The primary objective of this project is to:

- Fetch historical stock price data using Python
- Compute five key technical indicators
- Combine multiple indicators to generate Buy (1), Sell (-1), and Hold (0) signals
- Maintain a daily tradebook for the defined time horizon
- Present a clean, interpretable signal-generation framework suitable for academic and competitive evaluation

Technical Indicators

Each indicator is implemented independently to ensure modularity and clarity.

1. Simple Moving Average (SMA)
2. Exponential Moving Average (EMA)
3. Relative Strength Index (RSI)
4. Moving Average Convergence Divergence (MACD)
5. Bollinger Bands

Data Specifications

- Stock Universe: NSE or BSE listed equity
- Time Horizon: 1 January 2025 – 31 December 2025
- Frequency: Daily trading data
- Permitted Columns Only:

1. Open
2. High
3. Low
4. Close
5. Volume

All data processing strictly adheres to the allowed OHLCV structure.

Buy–Sell Signal Logic

Trading signals are generated using a minimum of two confirming indicators to reduce noise and false entries.

Signal Encoding (Daily):

- Buy: +1
- Sell: -1
- Hold: 0

Signals are evaluated for every trading day, ensuring a continuous and well-documented trading log.

Tradebook Structure

The tradebook records daily signals generated by the strategy and includes:

- Date
- Closing Price
- Indicator Values
- Final Trade Signal (Buy / Sell / Hold)

This enables easy validation, backtesting, and performance interpretation.

Deliverables

- Complete Python source code
- Modular implementation of all five indicators
- Multi-indicator signal generation logic
- Daily Trade book for the full time period
- A document explaining strategy (max 2 page)
- Clean, readable, and reproducible workflow

WHAT ABOUT STOCKS????

No market expertise? Confused about stock selection?
What if the stock you choose gives poor or noisy signals?

Don’t worry – **Fintech has already taken care of this**.
The stock universe is pre-defined to eliminate bias and uncertainty, letting you concentrate on technical analysis and decision-making.

Stock Universe

- Reliance (RELIANCE.NS)
- HDFCbank (hdfcbank.ns)
- ONGC(ongc.ns)
- TRENT (trent.ns)
- INFOSYS(infy)

Choose one stock and start building your strategy!

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THANK YOU

ANY QUERIES?

JOIN US

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