

Stock Analysis

The study of historical and present data of a stock with the goal of making financial forecasts is called stock analysis

Some of the more common objectives of performing analysis are:

To study a company's stock valuation, and predict possible price evolution

To make projections of a company's performance

To calculate its credit risks

To evaluate its business decisions

Each of the above goals help us in answering the ultimate question of making profitable trading decisions of that company on the stock market.

When the objective is to determine what stock to buy/sell and at what price, there are two distinct methodologies used

Fundamental Analysis

Technical Analysis

Fundamental Analysis: Fundamental analysis involves analyzing a business' financial statement, its health, management, competitive advantages, and the markets in general to determine what might be the true value of a share of that company.

Once this value is determined, a trading decision is made by simply checking if the stock is currently underpriced, at par, or overpriced. Underpriced stocks maybe bought, at par ones held, and overpriced ones sold, all in the hope that the expected price of the stock will eventually be reached and when they do, profits can be booked by squaring up the trades.

Technical Analysis: Technical Analysis on the other hand believes that all price information of the stock is held in its current price, and that the market always moves in trends. Riding these trends will generate profits. Thus in technical analysis, a large sample of the historical data of the price trends is studied, trends are sought, and one hopes to be able to make profits by correctly identifying the future movement of the markets.

Using indicators derived essentially from price movements and volumes of stock traded in the markets, technical analysts try to mine two extremely basic principles of trading

The General Psyche of the market – that is if the markets are generally bearish or bullish, whether the investors are currently in fear of the market movement or feel otherwise

The Supply/Demand – one of the basic laws of economics applied here as to whether the investor is currently acting or willing to act based on his view of the market.

The above two methodologies are deeply contrasting in the way that a Technical Analyst believes that all information of the stock is already reflected in market movements before an investor is alerted of it, where as a fundamental analyst looks to uncover hidden information and hopes that he is able to do so before most others.

Technical Indicators:

A technical indicator or a technical is one of many performance metrics derived from the historic and current behaviour of a stock in terms of price, volume, or other measureable quantities.

These are used to identify current market trends, market sentiment, and or predict the future movement of the stocks, and thus aid decision making.

Technicals are distinguished by the fact that they do not analyze any part of the fundamental business, like earnings, revenue and profit margins. Technical indicators are used most extensively by active traders in the market, as they are designed primarily for analyzing short-term price movements. The most effective uses of technicals for a long-term investor are to help identify good entry and exit points for the stock by analyzing the long-term trend.

Technical Indicators and broadly be classified into

Price Based Indicators such as

Advance decline line — a popular indicator of market breadth

Average Directional Index — a widely used indicator of trend strength

Commodity Channel Index — identifies cyclical trends

MACD — moving average convergence/divergence

Relative Strength Index (RSI) — oscillator showing price strength

Stochastic oscillator — close position within recent trading range

Trix — an oscillator showing the slope of a triple-smoothed exponential moving average

Momentum — the rate of price change

Volume-based indicators such as

Accumulation/distribution index — based on the close within the day's range

Money Flow — the amount of stock traded on days the price went up

On-balance volume — the momentum of buying and selling stocks

Moving Average

Moving Average is the most basic of all charts. It is simple the average price of the stock over a given trading period.

A simple moving average is the algebraic average price of the stock of the prices over the latest N observations.

Since stock data is time sensitive and it is observed that the future price of the stock is dependent on the current price, one might want to use the Exponential Moving Average as a better indicator of the average price. Exponential Moving average does not entirely discount the historical price of the stock, but instead it gradually reducing its effect over time.

The Exponential Moving Average of any data set is calculated using N-1 set of terms for N periods, but as the value of these decrease exponentially we use a simplified version of the formula:

$$s_T = \alpha y_T + (1 - \alpha)[s_{T-1}]$$

S_T = Current Moving Average

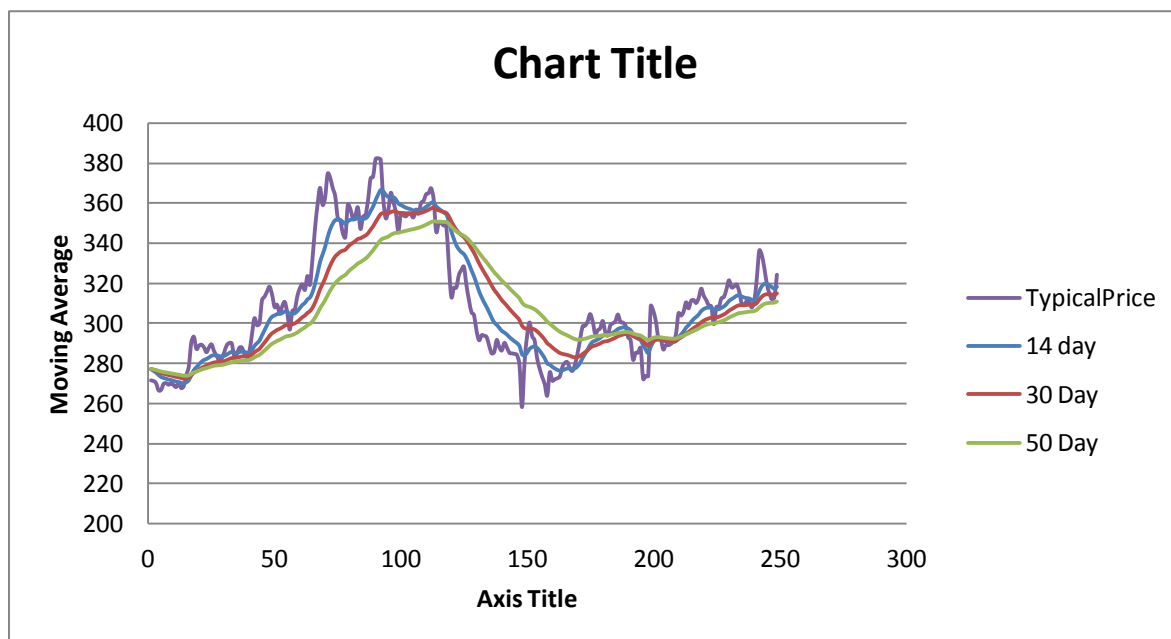
S_0 = Undefined

S_1 = Average of first 5 terms

y = Current Observation

$$\alpha = \frac{2}{N + 1}$$

N = Number of Observations in the Periods



Ex: Moving Average of Glenmark, showing a clear uptrend

Observing Moving Averages of a stock is useful as it smoothes out any uncharacteristic daily movement in prices and helps identifying the underlying trend of the security. Once we are able to determine the way in which the stock is trending, it helps us make trading decisions on whether we want to be in a net short position in the stock or a would we rather hold the stock or hold a long position in it.

RELATIVE STRENGTH INDEX – RSI

RSI is a momentum based oscillator that measures the speed of price movements. It was developed by Welles Wilder

RSI oscillates between 0 and 100.

Traditionally a stock is considered to be overbought when its RSI reaches a value above 70, and a trend change is hence imminent.

Similarly when the RSI value is under 30, the stock is considered oversold, and is hence indicates that it might be a right time to buy.

RSI is an extremely popular indicator and though it was developed before the age of computers, it has stood the test of time and if anything has only become more effective with increased computational power.

In the current analysis, the RSI of the stock has been calculated in the following way:

Calculate the Typical Price of a stock as the average of the Day's High, Low, and Close.

Calculate daily loss or gain of the stock for each day of the dataset.

Calculate the Exponential Moving Average of the daily losses and daily gains over the desired time period – 14 days in our case

Relative Strength of the stock is calculated as the ratio of average daily gain to average daily loss

$$Rs = \frac{EMA(Gain)}{EMA(Loss)}$$

Relative Strength Index is calculated as

$$RSI = 100 - \frac{100}{1 + Rs}$$

A table showing the RSI of TCS over the last 20 days

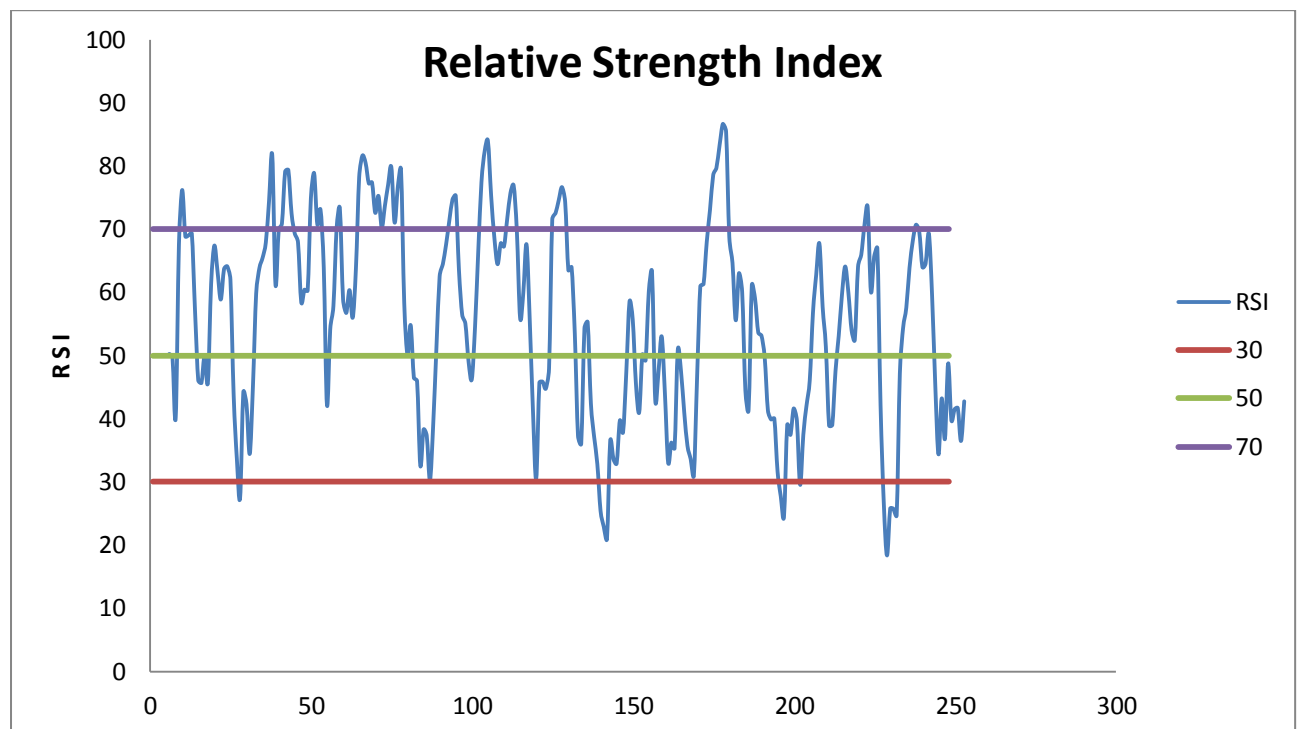
Typical Price	Change	Gain	Loss	EMA Gain	EMA loss	RS	RSI
1142.4	16.6	16.6	0.0	8.9	7.5	1.2	54.4
1150.6	8.1	8.1	0.0	8.8	6.5	1.4	57.6
1167.8	17.3	17.3	0.0	9.9	5.6	1.8	63.9
1181.1	13.2	13.2	0.0	10.4	4.9	2.1	68.1
1189.9	8.8	8.8	0.0	10.1	4.2	2.4	70.7
1188.6	-1.3	0.0	1.3	8.8	3.8	2.3	69.7
1181.3	-7.3	0.0	7.3	7.6	4.3	1.8	64.0
1182.5	1.2	1.2	0.0	6.8	3.7	1.8	64.6
1193.0	10.5	10.5	0.0	7.3	3.2	2.3	69.3
1182.0	-11.0	0.0	11.0	6.3	4.3	1.5	59.7
1160.4	-21.6	0.0	21.6	5.5	6.6	0.8	45.4

1135.4	-24.9	0.0	24.9	4.7	9.0	0.5	34.4
1149.4	13.9	13.9	0.0	6.0	7.8	0.8	43.2
1133.8	-15.6	0.0	15.6	5.2	8.8	0.6	36.8
1155.0	21.2	21.2	0.0	7.3	7.7	1.0	48.8
1133.1	-21.9	0.0	21.9	6.3	9.6	0.7	39.8
1136.2	3.0	3.0	0.0	5.9	8.3	0.7	41.5
1136.4	0.3	0.3	0.0	5.1	7.2	0.7	41.7
1125.0	-11.4	0.0	11.4	4.5	7.7	0.6	36.5
1133.7	8.7	8.7	0.0	5.0	6.7	0.7	42.8

As is can be seen in the table, an ideal time to sell the stock was when the price was at the 1188 - 1192 level, when the RSI had gone to levels of 70, and then made and have fallen.

Though RSI levels show good entry points to a trade, they do not always indicate the corresponding exit, and hence one must use supports and resistance levels, and also monitor the RSI levels as they approach exit levels, and exit the trade

The following is the chart of the RSI levels of TCS over the last one year. Charting makes it easier to observe trends. Levels marked at 70 to indicate that a selling opportunity will present itself soon, and also at 30 to show that the stock is getting oversold, and one should look for a price to enter trade. This chart must be used along with a chart showing the current price of the security to judge when to enter or exit a trade. The chart also indicates whether the stock is currently trending upwards, downwards, or sideways.



Supports Resistances and Fibonacci Retraction:

A **support level** is a price level where the price tends to find support as it is going down. This means the price is more likely to "bounce" off this level rather than break through it. However, once the price has passed this level, by an amount exceeding some noise, it is likely to continue dropping until it finds another support level.

A **resistance level** is the opposite of a support level. It is where the price tends to find resistance as it is going up. This means the price is more likely to "bounce" off this level rather than break through it. However, once the price has passed this level, by an amount exceeding some noise, it is likely that it will continue rising until it finds another resistance level.

These levels help determine the range in which the current price is more likely to stay in, and hence help in determining the target prices for the stock.

Fibonacci Retracement is one of the mathematical ways of determining Support and Resistance levels for a stock. It has been observed that a stock trending upwards will peak, and then retrace to a lower price, before moving up again. Similarly a stock trending downwards will hit a low and retrace upwards before continuing its fall.

The levels at which these bounce occur have appeared to be extremely close to Fibonacci Ratios.

Fibonacci ratios are derived from the Fibonacci sequence and are calculated to be the following

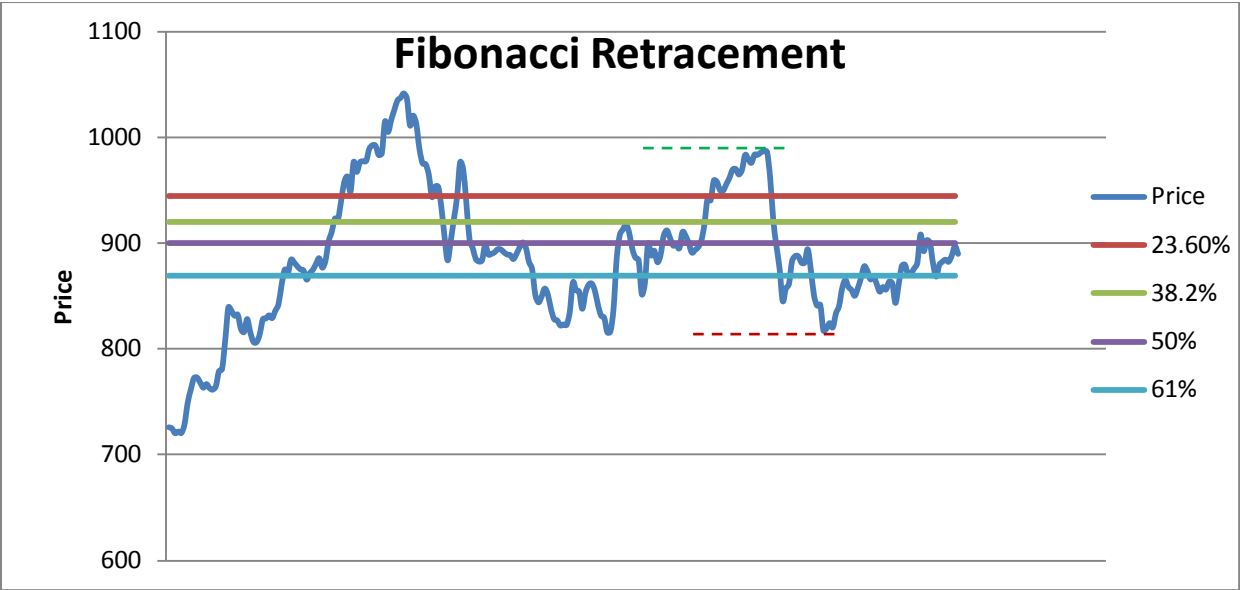
76%, 68%, 50%, 32%, 23%

Fibonacci resistances and supports are found as levels which correspond to these values in the current trend's range that is the difference between the highest price that the stock has seen at in the current trend and the lowest price the stock has seen.

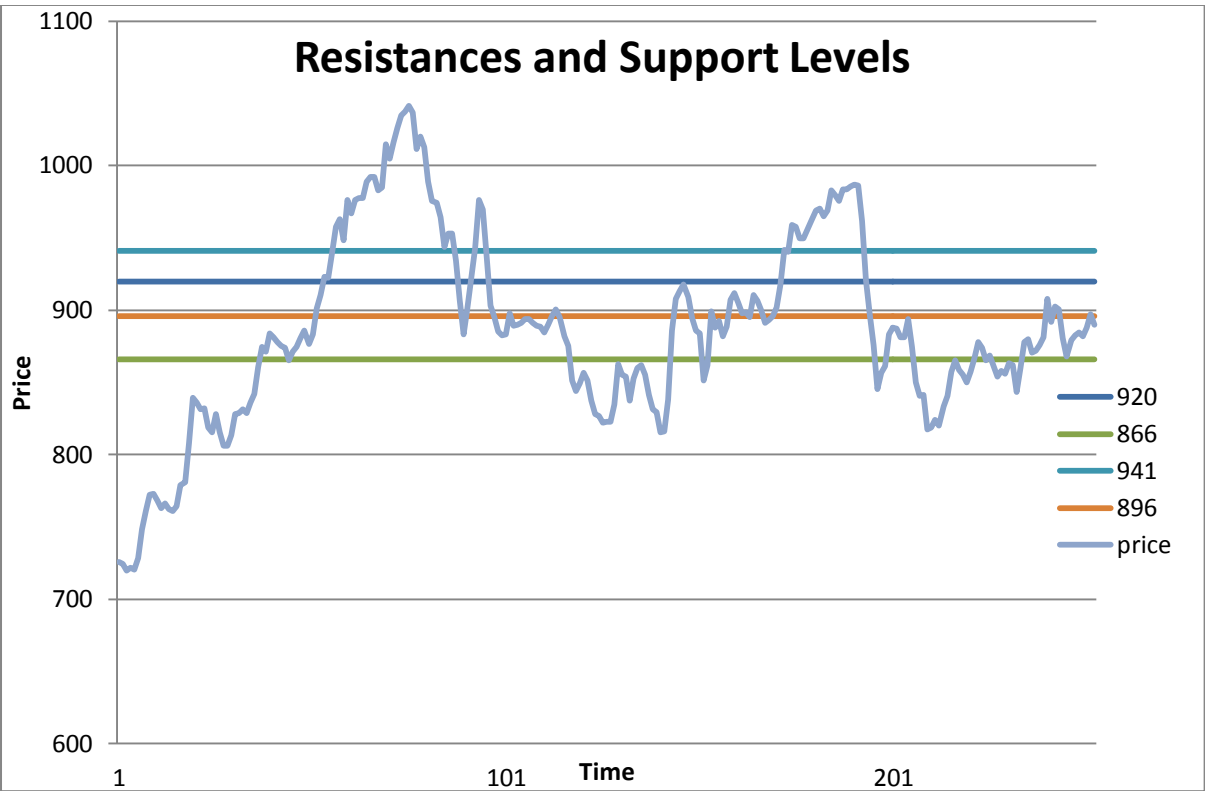
The values of the 76%, 68%, 50%, 32% and 23% of the range is subtracted from the highest stock price and these levels are marked as Fibonacci levels.

Though there is a high degree of correlation between Fibonacci levels and resistance levels, it is always advisable to use observed levels of support and resistance in the vicinity of the Fibonacci levels to predict the price at which the stock is likely to bounce back. It is important to identify the high and low of the recent trend and not that of the life of the stock.

Observed resistance/support levels are marked as the price at which the price has turned the most number of times



Fibonacci retracement levels for Bank of Baroda



Observed Support and Resistance Levels – Bank of Baroda

Volume Price Trend

Volume Price Trend – VPT is a simple technical indicator that combines both volume and price of the share being traded.

It has been observed that changes in volumes precede changes in prices; hence volume based indicators lead stock price changes by a few periods.

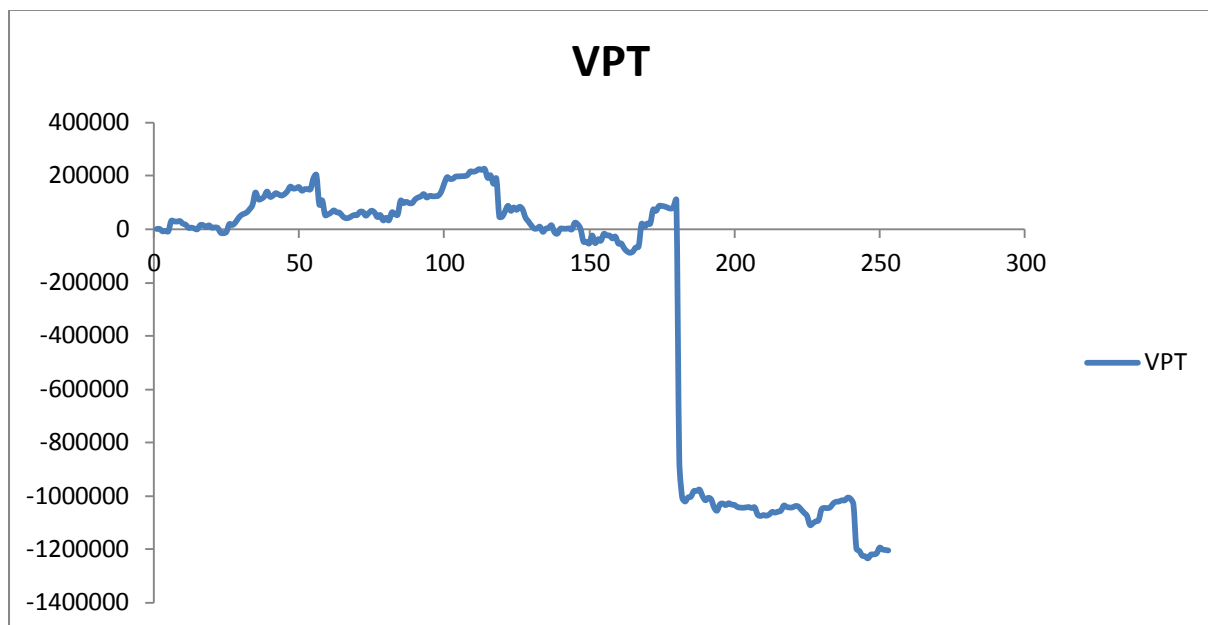
VPT is calculated as

$$vpt = vpt + (volume) * \frac{close - prevclose}{prevclose}$$

A rise in price accompanied by a rise in VPT indicates an upward trend and vice versa

A rise in prices with not rise in VPT is indicative of a weak move

VPT like most volume indicators must be read only as the shape of the curve, and not its value.



VPT Infosys for the last year

Average Direction Index

The Average Direction Index is a quantity that is used to measure the strength with which a stock is trending. Since the indicator only indicates the strength and not direction, it is used in collaboration with 2 other values called +DI – Positive Direction Indicator and –DI – Negative Direction Indicator

The following algorithm is used to calculate the ADI for a stock

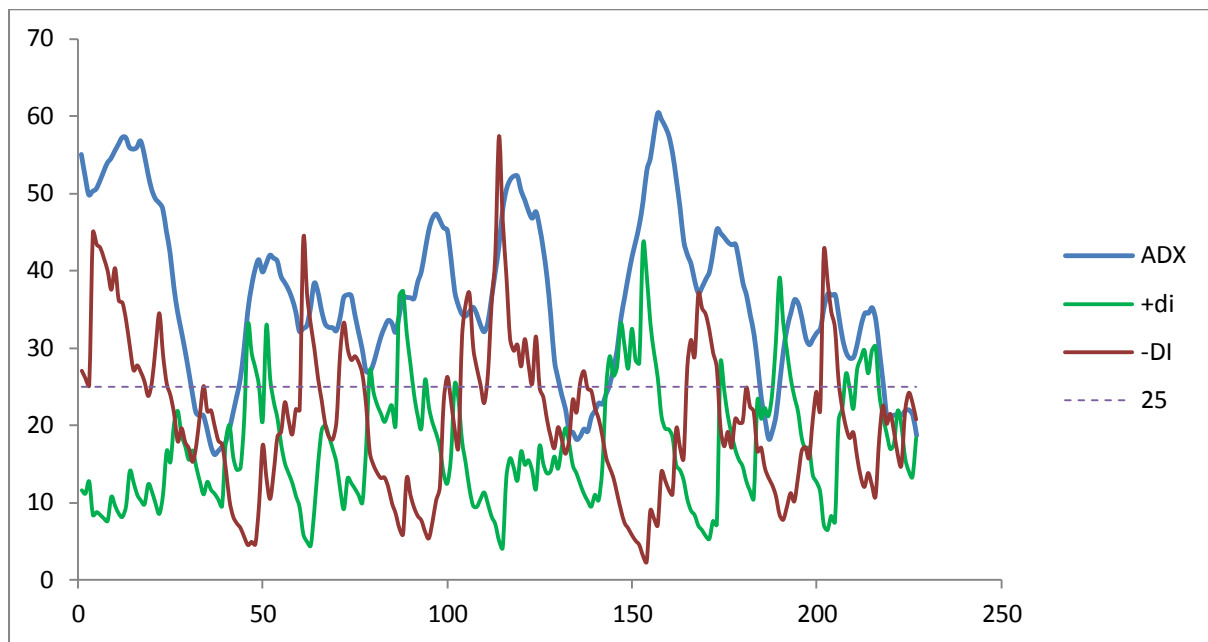
1. Calculate the True Range (TR), Plus Directional Movement (+DM) and Minus Directional Movement (-DM) for each period.
2. Smooth these periodic values using the Wilder's smoothing techniques. These are explained in detail in the next section.
3. Divide the 14-day smoothed Plus Directional Movement (+DM) by the 14-day smoothed True Range to find the 14-day Plus Directional Indicator (+DI14). Multiply by 100 to move the decimal point two places. This +DI14 is the Plus Directional Indicator (green line) that is plotted along with ADX.
4. Divide the 14-day smoothed Minus Directional Movement (-DM) by the 14-day smoothed True Range to find the 14-day Minus Directional Indicator (-DI14). Multiply by 100 to move the decimal point two places. This -DI14 is the Minus Directional Indicator (red line) that is plotted along with ADX.
5. The Directional Movement Index (DX) equals the absolute value of +DI14 less - DI14 divided by the sum of +DI14 and - DI14.
6. After all these steps, it is time to calculate the Average Directional Index (ADX). The first ADX value is simply a 14-day average of DX. Subsequent ADX values are smoothed by multiplying the previous 14-day ADX value by 13, adding the most recent DX value and dividing this total by 14.

At its most basic the Average Directional Index (ADX) can be used to determine if a security is trending or not. This determination helps traders choose between a trend following system or a non-trend following system. Wilder suggests that a strong trend is present when ADX is above 25 and no trend is present when below 20. There appears to be a gray zone between 20 and 25. Once we know that the Stock is trending, we must observe the direction which is stronger ie +di or – di

Table for ADI

Close	High	Low	Typical Price	Average Trading Range	Average Directional Index
244.9	253.9	240.35	245.3	13.55	21.96337
241.65	244.9	241	242.6	3.9	22.46922
241.9	245.95	241.25	243.9833	4.7	23.28243
244.75	263.4	244.5	255.7	18.9	26.36645
259.2	266.8	248.65	255.3	18.15	28.65707
250.45	248	241.3	243.9833	9.15	28.0605
242.65	247.5	241.1	243.5333	6.4	30.36856
242	245	238.05	242.05	6.95	30.46929
243.1	244.8	236.55	240.4667	8.25	30.69868
240.05	243.75	231	237.2833	12.75	30.97247
237.1	237	228.5	232.2	8.6	31.87153

231.1	236.4	230	232.9833	6.4	32.11264
232.55	240.25	232.6	237.3333	7.7	31.92282
239.15	245.2	235.3	239.25	9.9	33.3326
237.25	240.7	236.6	238.5667	4.1	31.93541
238.4	241.7	238.05	239.75	3.65	30.81502
239.5	241.9	229	236.1	12.9	28.78789
237.4	241.7	232.7	236.0833	9	24.48995
233.85	237.8	233.3	235.7167	4.5	20.00439
236.05	246.5	236	242.5667	10.5	18.75092
245.2	249.9	245.1	247.3167	4.8	18.29769

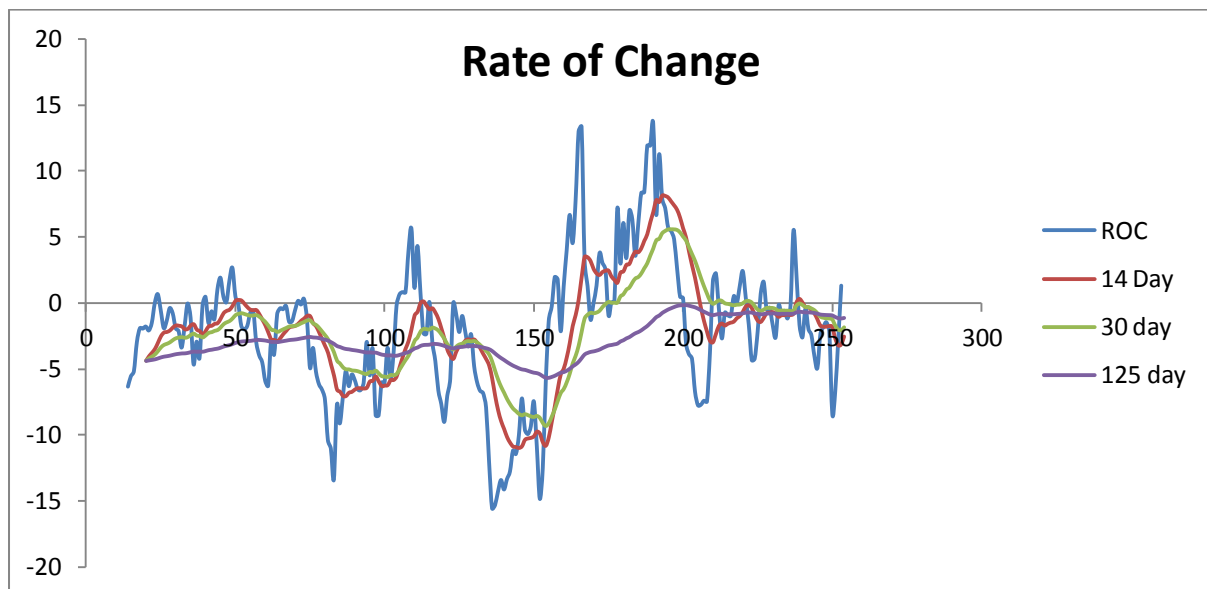


Average Directional Index – Indian Hotels

Rate of Change

Rate of Change referred to also as simply 'Momentum' is a pure momentum oscillator that measure the percent change in price from one period to the next. The plot of ROC is an oscillator which is centred at zero and fluctuates above and below this centre line

The Rate-of-Change indicator is momentum in its purest form. It measures the percentage increase or decrease in price over a given period of time. Think of it as the rise (price change) over the run (time). In general, prices are rising as long as the Rate-of-Change remains positive. Conversely, prices are falling when the Rate-of-Change is negative. ROC expands into positive territory as an advance accelerates. ROC dives deeper into negative territory as a decline accelerates. There is no upward boundary on the Rate-of-Change. The sky is the limit for an advance. There is, however, a downside limit. Securities can only decline 100%, which would be to zero. Even with these lopsided boundaries, Rate-of-Change produces identifiable extremes that signal **overbought** and **oversold** conditions.



Rate of Change – Torrent Power

Trading Based on Technicals

Technical Indicators in effect help give us a clear picture of the market from a certain point in history until the current trading day. While these indicators in themselves do not forecast the market, they give us a view based on which decision making becomes easier.

They reflect strongly the current sentiment in the market, and the markets view of a stock. Technical Analysts believe that all the information about a stock is already reflected in its price, and hence trading based on pure mathematical indicators is a good choice.

While opinion on the effectiveness of such trading is divided, technicals have proved to be effective when trading intra-day or for a fixed short periods.

Some of the major drawbacks of such trading are

- Large amounts of historic trading data is required
- They cannot be used to days when 'news' such as declaration of reports is expected
- They do not adapt quickly to sudden and unexpected market reactions, and take about one period to stabilize and become reliable again
- They do not work when a stock is trending extremely strongly, and is breaking into new highs, or falling to new lows

Method

The method I used for making trading decisions was based on the following guidelines

1. To identify if the stock was trending strongly in either short term, long term or both. If it was, were they both trending in the same direction – less risk or opposite directions a little more risk. This was done using moving averages, and Average Direction Index.
2. Once a trend was identified to check whether it was a good time to enter a trade either short or long. For this RSI was observed. RSI seems to lead a price change by a few days, and hence instead of entering a trading the moment the RSI hit the 70 or 30 level, it is better to allow the RSI to peak or dip the most, and enter the trade after the RSI trend has reversed.
3. If a trade is already open, RSI does indicate good exit points, but there are times when the RSI will not drop to 30 levels, to rise to 70 levels, for this one should look at the strength of the trend, and if the stock seems to be oscillating or trending sideways, exit points for the trade must be sought at levels of 50.
4. RSI must be used in combination with the shape of the VPT graph to better gauge if money is flowing into or out of the stock.
5. Once the RSI indicates of a good time to enter or exit a trade, one should look at support and resistances to determine and what price would be a good exit. One must watch both the mathematically derived Fibonacci Levels and the observed resistance and support levels and choose the exit point at their comfort.
6. Resistance levels can also help determine what stop losses one must have in case the stock does not behave in the way it is expected to.