Major Project Report

On

Business Intelligence Analytics Report

“Analysis of the stock performance of Banks”

Submitted to Delhi Technological University in partial

Fulfilment of the requirement for award the degree of

Master of Business Administration (Executive)

Submitted by:

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I also take this opportunity to convey sincere thanks to all the faculty members for directing and advising during the course.

Saurabh Pandey

2K17/EMBA/539

Certificate

This is to certify that the project entitled "**Analysis of the stock performance of Banks'** has been successfully completed by Saurabh Pandey -2K17/EMBA/539

This is further certified that this project work is a record of bonafide work done by him under my guidance. The matter embodied in this report has not been submitted for award of any degree.

Saurabh Pandey

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Mr. Chandan Sharma,

Asst. Professor (DSM)

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About Industry

Banking Sector

The banking or financial sector is the section of the economy devoted to the field of financial resources for others, investing those financial assets as leverage to create more capital from the market and the guideline of those activities by government regimes. This is the elemental of all banking and money sector, and wherever it began—though it's distended way on the far side the times of holding gold coins for Holy Land guests in exchange for dedication notes. A bank holds resources for its purchasers, with ability the cash could also be withdrawn if the individual or business desires same assets reciprocally. Avoiding overwhelming bank runs that might destroy the world as a full is why banks are needed to stay a minimum of eightfold of their book values as initial cash. The banking sector's core is trust. Without it, nobody would deposit cash, and it might be incapable to use that cash to present lends, invest and drive economic process, and regulation is employed to form that belief.

Banking sector is sufficiently capitalized and well-regulated. The monetary and economic things within the country are so much superior to the other country across the world. Matters of credit market and liquidity risk studies recommend that Indian banks are usually sturdy and have survived the worldwide recession well.

Industry within the Indian banking surroundings had recently discovered the roll out of innovative banking models like on-line dealings, payments and tiny finance banks. New measures prescribed by run might go an extended manner in serving to the arrangement of the domestic banking system.

The payments system through digital mode in Bharat has grew the foremost among twenty five countries with India’s payment Service (IMPS) being the sole system at level 5 within the quicker Payments Innovation Index (FPII).

Quick implementation of comes, Improved disbursement on infrastructure and reforms are expected to supply any impulse to growth. It depicts that banking sector in Bharat is dignified for sturdy growth because the quickly growing economy would address banks for his or her credit wants.

The development in cloud technology like NFC, contactless credit and debit has even have brought the quality and net banking services to the fore. The Indian banking sector is putting bigger importance on providing increased services to their customers and conjointly makeshift their technology infrastructure, so as to reinforce the shoppers overall expertise furthermore as provide banks a viable growth.

Introduction

Our Project comprises of the historical data sets of the 2 Banks i.e. SBI and HDFC on which we are going to apply various technical analysis to find out the past and current market trend of stocks.

Objective of Project

The Objective of this project will be:

1) To get the useful insights by forecasting future stock prices through historical data.
2) To check the stock performance of the banks.
3) To analyze the current market trends through historical data.
4) To know about the past trends of banks

Description of Project/ Project Methodology

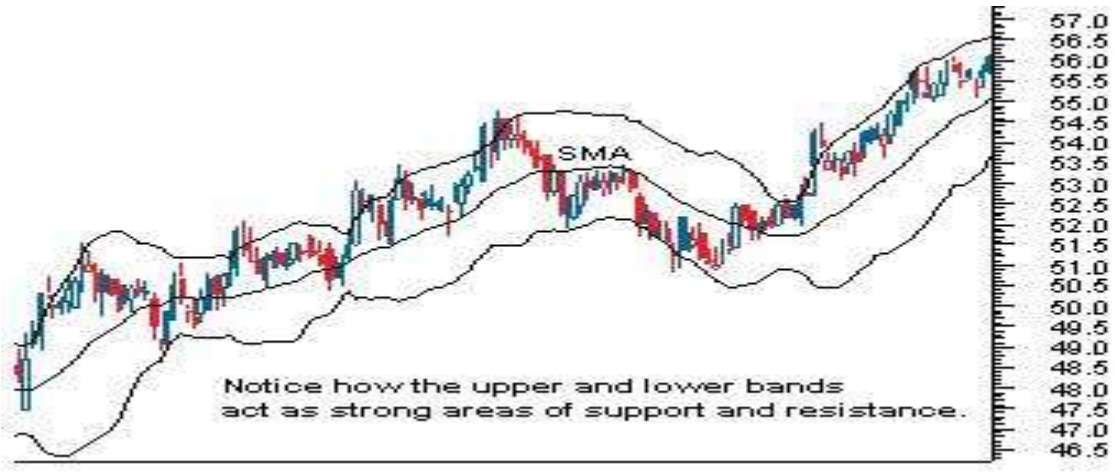
Our project will comprise of the historical data of the two leading banks i.e. SBI and HDFC bank. The data contains the 4 constraints which are closing price, opening price, high price and low price of the stock. This will calculate the risk and return on each of the data set and after calculating risk and return we will perform technical analysis on the historical data to evaluate the past trend. We will be computing the current market drifts of the banks and the factors that affect the stock concert of any bank.

Various technical analyses that will be using are-

- Candle-stick Analysis
- Bollinger Bands
- Moving- Average
- Relative- Strength Index
- Fibonacci Retracements
- Stochastic Oscillators

Candle Stick Analysis: Candle chart is a "Technical Analysis" tool and that packs knowledge for manifold time frames into sole worth bars. This makes them a lot of helpful than customary open-high, low-close bars (OHLC) or straightforward lines that connect the dots of last worth. Candlesticks kind pattern that foresee price trend once completed.

Bollinger-Bands: Bollinger Band is an extremely rife "Technical Analysis" technique. Many traders believe the nearer the costs move to the higher band, the additional overbought the market, and also the closer the prices move to the lower band, the more exaggerated the market.



Moving- Average: "A moving average may be a loosely used indicator in technical analysis that helps unembarrassed value action by separation out the "noise" from random price variability. It may be a trend-following, or lagging" [www.investopedia.com], pointer as a result of it's supported past prices.

Relative Strength Index (RSI): This could be a drive indicator that compares the extent of recent gains associate and losses over a definite fundamental quantity to live speed and alter of worth movements of a precise "Stock". It is primarily used to try to spot overbought or oversold things within the commercialism of a plus available market.

Fibonacci Retracements: This is that the "Technical Analysis" that refers to areas of support (price stops going lower) or resistance (price stops going higher) in Fibonacci retracements. The horizontal lines employed in Fibonacci retracements, it indicate areas of support or resistance at the key Fibonacci levels before the trend lasts within the distinctive direction.

Stochastic Oscillators: It is a motion indicator examine the damage of a security to vary of its costs over a specific amount of time. The sensitivity of the oscillator within the market movements is reducible by adjusting that point period or by taking a moving average of the consequence.

Need for Big Data

Indian Stock Market

"As we have a tendency to tend to enter the new millennium, innovations and competitive pressures force organizations to rethink the approach at intervals that they conduct business and to redefine the important constituents for achieving authentic attainment within the Stock market analysis. The basis of competition is being basically altered through the introduction of the Internet and totally different advance technologies. The phrases 'big knowledge' and 'open information', two specific manifestations of this break of day of awareness, are merely 2 terms which appear to be cropping up everywhere. Big data, clearly enough, refers to giant data sets, but quite what's meant by 'big' depends on the context. 'Big', in associate case, is maybe reaching to grow over time. However, one quick definition is that it's an information set that is simply large to suit into the computer's memory in one go. It is true that massive information offer us with analytic opportunities. These are out there varied shapes and forms. One is that the possibility of sleuthing deviations, anomalies, or structural characteristics that are so little they can be invisible or swamped by noise in one thing but a large data set". [research.ijcaonline.org]

"According to the efficient market hypothesis, market reacts and discounts each and every news flow comes from every nook and corners of the globe. By considering efficient market hypothesis, it is quite natural that data comes at any time irrespective of the market conditions must be noticed for the market forecasting. Irrespective of the nature, format and behavior of the data, markets discount news by considering its implications in near future. After globalization, news and information is coming very fast and it is in the different format i.e. text, picture, image, matrix, word files, jpeg etc. It quite complicated to incorporate all information coming every second from all corners in the traditional database. According to the data from SEBI (Security and Exchange Board of India), there are more the 80,000 intermediaries registered in India and its growing day by day. Intermediaries are developing its own repositories and due to it, same data has been saved at all places. That is using power, space, energy and cost. In current market scenario, future forecasting requires mammoth of data comes from every corners of the globe. Data repetition of data at all databases of interested parties is the great concern for green computing practitioners. Indian as well as world market had witness many down falls in the past. Mayhem in the financial market downgrades the confidence of the middle class population. In year 2008, subprime lending in the America had impacted all over the world market and a global recession or slowdown had witnessed. Similarly in 2008 – 09, information about Satyam created a vacuum in the market and small investor's committed suicide. Little and slow access of information became big reason for the big loss in the market for small investors. All information need to integration very fast and provide information to the small and medium investors at very reasonable & affordable cost".[research.ijcaonline.org]

"As per the efficient market hypothesis, stock market must react on all of the information's. Small and Middle class investors haven't such type of resources to know all happenings

instantaneously and take their positions respectively. By boys have edge over it and they are always making money. Loss fear factor had been played crucial role for the small and middle class population and that's why they are keeping distance from the market. Easy availability of this integrated data from all corners of the globe is the key issue. Due to temporal nature of the data required in the stock market, big data architecture is being implemented in such a way that all data must be updated and integrated on timely basis and reports should be generated based on the current information. To achieve efficient market hypothesis, these information must reached to all participates of the market. Due to shared resources and other above discussed benefits of big data technologies, small investors too have equal opportunity to excess relevant data. This will increase participation, participation will increase more investments, investments will increase more stable market with market hypothesis, more realistic market hypothesis will leads to more accurate prediction of the market and finally it leads to stable and mature markets".[research.ijcaonline.org]

LITERATURE REVIEW

Title: "Foundations of Technical Analysis: Computational Algorithms, Statistical Inference, and Empirical Implementation"

Authors: Andrew W. LO, Harry Mamaysky and Jiang Wang

Published in: "The Journal of Finance, Volume 4"

The analysis paper focuses on the extremely subjective nature of "Technical Analysis" and also the presence of geometric shapes in historical worth charts within the eyes of the beholder. In this paper, the authors planned a scientific and automatic approach to technical pattern recognition victimization statistic kernel regression, a regression technique applied to a historical information of huge variety of U.S. stocks from 1962 to 1996 to gauge the effectiveness of technical analysis. By scrutiny the unconditional empirical distribution of daily stock returns to the conditional distribution-conditioned on specific technical indicators like head-and-shoulders or double-bottoms-they found that over the 31-year sample period, many technical indicators do give progressive data and should have some sensible value.

Title: "Performance analysis of Indian stock market index using neural network time series model"

Authors: D. Ashok Kumar; S. Murugan (2013)

Published in: "International Conference on pattern recognition, Informatics and Mobile Engineering"

This research paper illustrates "some basic ideas of time series data, need of ANN, importance of stock indices, survey of the previous works and it investigates neural network models for time series in forecasting. The forecasting accuracy is analyzed and measured with reference to an Indian stock market index such as Bombay Stock Exchange (BSE) and NIFTY MIDCAP50 in this study" [ieeexplore.ieee.org].

Title: "A study on stock's volatility in Banking Sector using Technical Analysis"

Authors: T.Deva Prasad, C.Chaitanya, A.Thulasi Kumar

*Published in: "*International Research Journal of Engineering and Technology (IRJET)*"*

This research paper analyses the volatility of the stocks of the banking sector using the technical analysis. The various inflection points on the analysis represent when to buy or sell the required stock. The research paper mainly talks about the Bollinger Bands and Relative Strength Index (RSI). It helps us to analyze which bank is under performing and which bank is over performing and whether it is right time to invest or not. The study basically reflects the 2 known banks i.e. Canara Bank and Vijaya Bank and depicts which will yield higher compared to other banks.

Title: "Network approach for Stock market data mining and portfolio analysis"

Authors: Susan George, Manoj Changat

Published in: "2017 International Conference on Networks & Advances in Computational Technologies (NetACT)"

In this paper, network based data mining of stock market is done to identify crucial players. Stock market network in United States created based on dynamics of stocks over one year captured as daily time series, is used for the analysis. Along with structural aspects of the market, our analysis revealed highly influential players based on their relationships with other high influential players.

Title: "A Data mining algorithm to analyze stock market data using lagged correlation"

Authors: Cicil Fonseka, Liwan Liyanage

Published in: "International Journal of Business and Information"

"This paper develops an algorithm for predicting the market direction more accurately when two stocks are strongly correlated to each other with a lag of K number of trading days. The forecasting horizon is the lag; therefore, this method is suitable for short term capital gains when the correlation is strong. It help recognize the close observation for the daily price ups and down of the price of the stock and the trend of the stock side by side to foresee the direction of the trend. To test the effectiveness of the method, the most correlated stocks were found and prediction of the direction of the price movements made for 3 different dates for training the model. For each date actual data were then used to verify the accuracy of the prediction. In the testing and verification stage the model predicted the direction of the movement of the stock prices accurately 67% of the time" [researchdirect.westernsydney.edu.au].

Research Methodology

Title of Project: "Analysis of the stock performance of Banks"

Objective of study:-

1) To get the useful insights by forecasting future stock prices through historical data.
2) To check the stock performance of the banks.
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4) To know about the past trends of banks

Research type: Quantitative Research

Data Source: Secondary Data

All the data that has been used in the project has been taken from the Kaggle and yahoo finance. The data taken is Secondary. For the reference of the techniques various research papers as well as sites has been used.

Scope of study:

- Core Study
- Stock Market
- Factors affecting the stock market
- Usage of techniques
- Analyzing the performance of Bank's Stock

Techniques Used:

- Candle-stick Analysis
- Bollinger Bands

- Moving- Average
- Relative- Strength Index
- Fibonacci Retracements
- Stochastic Oscillators

Limitations of the Study:

- **Data collection:** The most constraint during this study was data assortment as secondary data was hand-picked for study. Secondary data suggests that data that are already obtainable i.e. they consult with the information that already been collected and analyzed by somebody else.
- **Time Period:** "Time Period" is one of the major factor as it requires detailed analysis of the data and required techniques that require deep insights into the project.
- **Reliability:** Since data collected was secondary hence it creates the question whether the data collected is reliable data or not because it is very important parameter while deciding the conclusion of the data.
- **Accuracy:** To evaluate the accuracy, facts and its findings of the data cannot be said that they are accurate as the data is secondary and there will be chances of inaccuracy of the data
- **Data redundancy:** Although chances of data redundancy is quite low but this factor cannot be neglected if you are dealing with such a large amount of data.

Variables selected

Variables	Remarks
Opening price	It depicts the opening price of any stock
Closing price	It depicts the closing price of the stock
High price	It depicts the highest price of the stock on a particular day.
Low price	It depicts the lowest price of the stock on a particular day
Volume	Total Volume of stocks exchanged on a particular day.

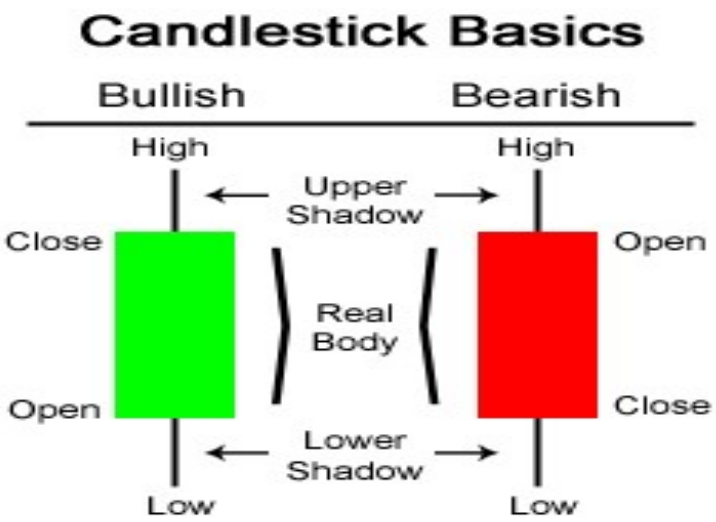
Techniques

CANDLESTICKS CHARTS

1) The most useful of all charts is the candlestick.
2) This chart has a rectangular real body. A green real body appears when the price moved up and red real body appears when the price moved down.
3) The rectangle's bottom and top depicts the closing and opening prices sessions.
4) Sticking out of the bottom and top are the shadows. These represent range of trading during the session, from highest to lowest price.

Most common candlesticks patterns are as follows:

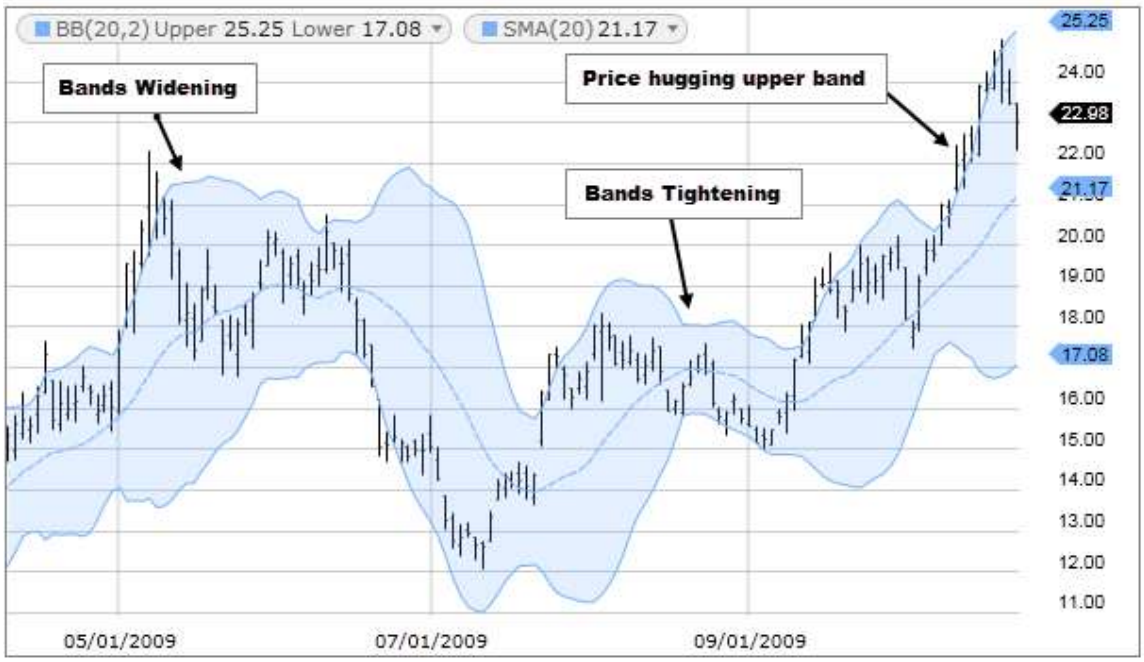
- Doji candles
- Engulfing candles
- Tweezer candles
- Inside candles
- Outside candles
- Dragonfly Doji
- Gravestone Doji
- Hammer
- Hanging Man



BOLLINGER BANDS

Bollinger Bands are a sort of price envelope developed by John Bollinger. (Price envelopes outline higher and cheaper price vary levels.) Bollinger Bands are envelopes planned at a regular deviation level higher than and below a straightforward moving average of the price. Because the gap of the bands is predicated on variance, they comply with volatility swings within the underlying price. Bollinger Bands use 2 parameters, Period and Standard Deviations, Std Dev. The default values are twenty for amount, and a pair of for traditional deviations, though you'll customize the combinations.

Bollinger bands facilitate confirm whether or not costs "are high or low on a relative basis. They are utilized in trys, each higher and lower bands and in conjunction with a moving average. Further, the pair of bands isn't meant to be used on its own. Use the pair to substantiate signals given with alternative indicators" [www2.wealth-lab.com].



Below illustrates the mechanism of this indicator workings:

- Whenever the bands stiffen throughout an amount of low volatility, "it raises the probability of a sharp value move in either direction. This might begin a trending move. Watch out for a false move in other way that reverses before the correct trend begins"[www2.wealth-lab.com].

- "When the bands separate by associate uncommon massive amount, volatility will increase and any existing trend could also be ending"[www2.wealth-lab.com].

- Prices have an inclination to bounce among the bands' envelope, touching one band then moving to the opposite band. You will use these swings to assist determine potential profit targets. For example, if a value bounces off the lower band and then crosses on top of the moving average, the higher band then becomes the profit target.

- "Price will exceed or hug a band envelope for prolonged periods throughout sturdy trends. On divergence with a momentum oscillator, you'll wish to try to additional analysis to work out if taking further profits is acceptable for you" [www2.wealth-lab.com].

- A sturdy trend continuation are often expected once "the worth moves out of the bands. However, if costs move straight off back within the band, then the suggested strength is negated" [www2.wealth-lab.com].

RSI (RELATIVE STRENGTH INDEX)

The Relative Strength Index - RSI may be an impetus display that strongly helps in measuring the magnitude of recent value changes to research overbought or oversold conditions. It is primarily used to aim to spot overbought or oversold conditions within the commerce of a stock.

The relative strength index (RSI) is calculated victimization the subsequent formula:

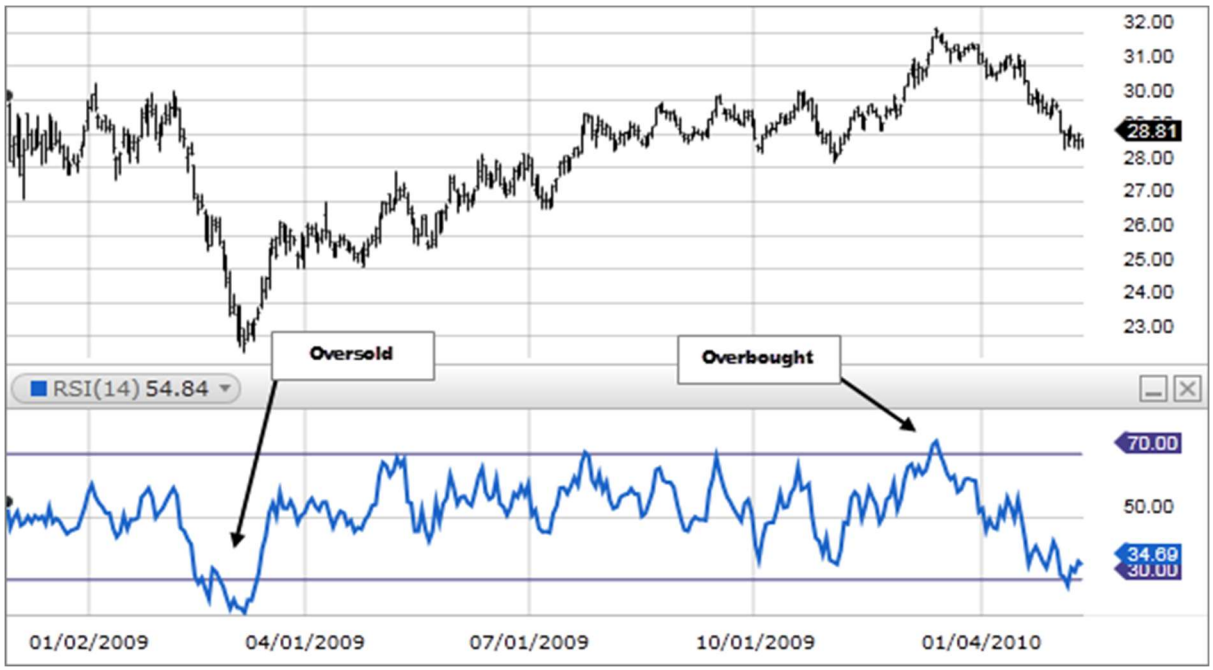
RSI = one hundred - 100 / (1 + RS)

Where RS = Average gain of up periods throughout the required timeframe / Average loss of down periods during the specified time frame.

RSI is used as a values of seventy or on top of direct that a security is turn-off into overbought or overvalued, so, is also ready for an inclination setback or curative pullback in value. An RSI reading of thirty or below is often taken as indicating an oversold or undervalued condition which will signal a trend amendment or corrective price reversal to the upside.

Methodology to calculate RSI:

- Firstly change is evaluated and further calculated by considering the closing price of the 2 stocks consecutively in order to see whether there would be gain or loss. It is calculated using the excel Formulae: E3-E2
- Now after calculation of change gain or loss is segregated on the basis of the positive and negative sign by using Excel Formulae as: =IF($H3>0,$H3,"") for Gain and =IF($H4<0,-$H4,"") for loss
- Now Average Gain and Average Loss is computed by using the formulae as: =SUM(I3:I16)/14
- Relative Strength will be computed as : Average Gain/ average Loss
- Relative Strength index will be computed as : 100-(100/(1+M17)



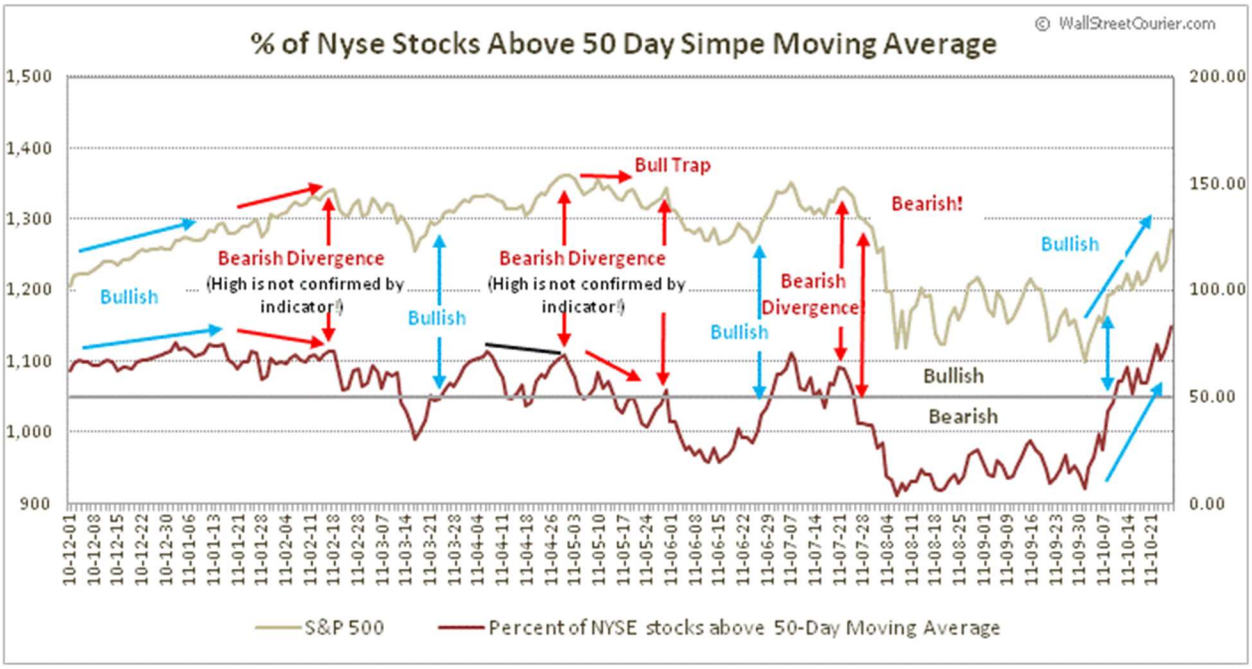
MOVING AVERAGE

This is a method that could be a widely used indicator during "the study of Technical Analysis that helps smooth value action by filtering out the "noise" from unsystematic worth variabilities" [www.investopedia.com] An indicator as a result of it's supported past prices.

A rising or upward trend for MA ("moving average") shows that the protection is elevated trend, whereas "a declining moving average indicates that it's in compressing" [www.investopedia.com].

This is evaluated by exploitation stand out formulae: =Average (E2:E11)

In Similar fashion, upward thrust is confirmed with an optimistic (bullish) crossover that happens once "a short moving average crosses higher than a longer-term moving average. Downward thrust is confirmed with a pessimistic (bearish) crossover, which occurs when a short-term moving average crosses below a longer-term moving average" [www.investopedia.com].



FIBONACCI RETRACEMENT

Fibonacci Retracements is one in all the foremost ordinarily wont tools to spot a rebound available values. It has helped investors build profits by distinctive the tip of a section of falling prices. It has conjointly helped them avoid losses by recognizing the end of bull runs. The Fibonacci retracement tool plots "share retracement lines based mostly upon the mathematical relationship inside the Fibonacci sequence. These retracement levels give support and resistance levels which will be used to focus on price objectives" [www.math.muni.cz].

"Fibonacci Retracements are displayed by 1st drawing a line between 2 extreme points. A series of six horizontal lines are drawn crossed the trend line at the Fibonacci levels of 0.0%, 23.6%, 38.2%,50%, 61.8%, and 100%" [e-fund.kr].

Below illustrates that how Fibonacci indicator works:

The share retracements establish attainable support or resistance areas, 23.6%, 38.2%, 50%, 61.8%,100%. "Applying these percentages to the distinction between the high and low value for the amount hand-picked creates a group of price objectives. Depending on the direction of the market, up or down, costs can usually retrace a significant slice of the previous trend before resuming the move in the first direction. These countertrend moves tend to represent sure parameters, that are often the Fibonacci Retracement levels" [www.math.muni.cz].

STOCHASTIC OSCILATOR

George C. Lane developed the random generator within the late 50s. This necessary technical indicator calculates the momentum of stock worth changes, and is outlined by the subsequent equation:
%K=(C–L)/(H–L)×100

where
C is this price
H is the very best high over the lookback amount
L is that the lowest low over the lookback amount

%K is planned with another quantity, %D. %D could be an easy moving average of %K over made public} smoothing amount. The recollect period is sometimes fourteen days and therefore the smoothing period is usually three days. %K and %D continuously vary between 0 and one hundred.

Implications of Stochastic Oscillator on trading:
If the random generator
• Rises higher than 80, signs purpose to an overbought stock; costs may well fall within the close to future
• Falls below 20, signs purpose to associate degree oversold stock; costs may okay bounce upwards
• Rises higher than %D, that's a shopping for signal (unless the values are bigger than 80)
• Falls not up to %D, that's a mercantilism signal
• Rises higher than ninety or ninety five and therefore then falls, you'll most likely need to sell before %K falls below 80. A divergence happens once the random generator (typically the %D line) and the stock worth move in opposite directions; recommends|this implies} the final trend is losing its strength.
• If the stock worth trends downwardly and makes lower lows, however the random generator doesn't fall more than its previous lows, that's an optimistic divergence
• if the stock worth trends upwards and builds higher highs, however the random generator doesn't Little Rhodyse more than its previous highs, that's a pessimistic divergence The divergence signals are amplified if %D is higher than eighty or below 20.

The random generator is usually paired with MACD; these 2 technical indicators work well together.


Overbought (Stochastic above 80)
Oversold (Stochastic below 20)
33
32
31
30
29
28
27
26
80
50
20
Chart by MetaStock
Copyright © 2006 Investopedia.com

OUTPUT

- **Bollinger Bands**
  HDFC BANK
  Calculation of SMA using excel formulae- =AVERAGE()

I4207 =AVERAGE(E4192:E4211)

	A	B	C	D	E	F	G	H	I	J	K
4205	20-02-17	269.9	271.55	268	269.65	267.233	9229363		SMA	Upper Bollinger band	Lower bollinger band
4206	21-02-17	270	271.5	268.65	270.7	268.274	7754157			2	2
4207	22-02-17	271.9	274.7	269.5	272.3	269.859	12617613		272.443	278.8451719	266.0398317
4208	23-02-17	271.7	273	269.6	270.45	268.026	13146194		272.273	279.0223464	265.5226548
4209	27-02-17	270.45	271.45	267.6	268.25	265.846	9645350		271.86	279.2830448	264.4369564
4210	28-02-17	268.9	271.25	268	269.2	266.787	7941592		271.475	278.4636717	264.4863313
4211	01-03-17	270	273.3	269.8	271.75	269.314	7656892		271.013	277.6811548	264.3438482
4212	02-03-17	273	274.7	266.5	267.3	264.904	14220808		270.613	276.4939095	264.7310935
4213	03-03-17	266.25	268.9	264.25	265.05	262.675	10120034		270.415	275.6252941	265.2047077
4214	06-03-17	266.6	270.35	266.35	269.85	267.431	9515073		270.225	274.8757563	265.5742437
4215	07-03-17	270.8	270.9	266.4	267.8	265.4	11599142		270.14	274.3842436	265.8957552
4216	08-03-17	267.8	270.3	266	269.9	267.481	9122987		270.425	275.6813799	265.1686201
4217	09-03-17	269	273.9	268.4	273.25	270.801	15594429		270.88	277.4026051	264.3573925
4218	10-03-17	274.5	275.55	269.5	272.05	269.612	9557026		271.14	277.7481443	264.5318515
4219	14-03-17	272.05	278.4	272.05	274.65	272.188	15734886		271.31	278.0177241	264.6022711
4220	15-03-17	272.65	280.5	272.65	277.35	274.864	20055974		271.46	278.1196977	264.8002975
4221	16-03-17	278	280.2	276.05	279.3	276.797	18005184		271.352	278.1925618	264.512434
4222	17-03-17	279.45	279.5	273.5	274.15	271.693	14265642		271.242	278.1908982	264.2940964
4223	20-03-17	274.75	274.75	271.8	273.9	271.445	9678185		271.452	278.7606087	264.1443871
4224	21-03-17	274.4	277.05	270.15	272.35	269.909	11898233		271.902	279.9765015	263.8284943
4225	22-03-17	270.3	271	266.8	267.5	265.103	9887203		272.595	281.6172481	263.5727483
4226	23-03-17	269	269.4	266.7	268.5	266.094	7998170		273.557	284.7676041	262.3473923

Calculation of Upper Bollinger Bands using Excel Formulae: =I4208+(STDEVPA(E4193:E4212)*J4206)

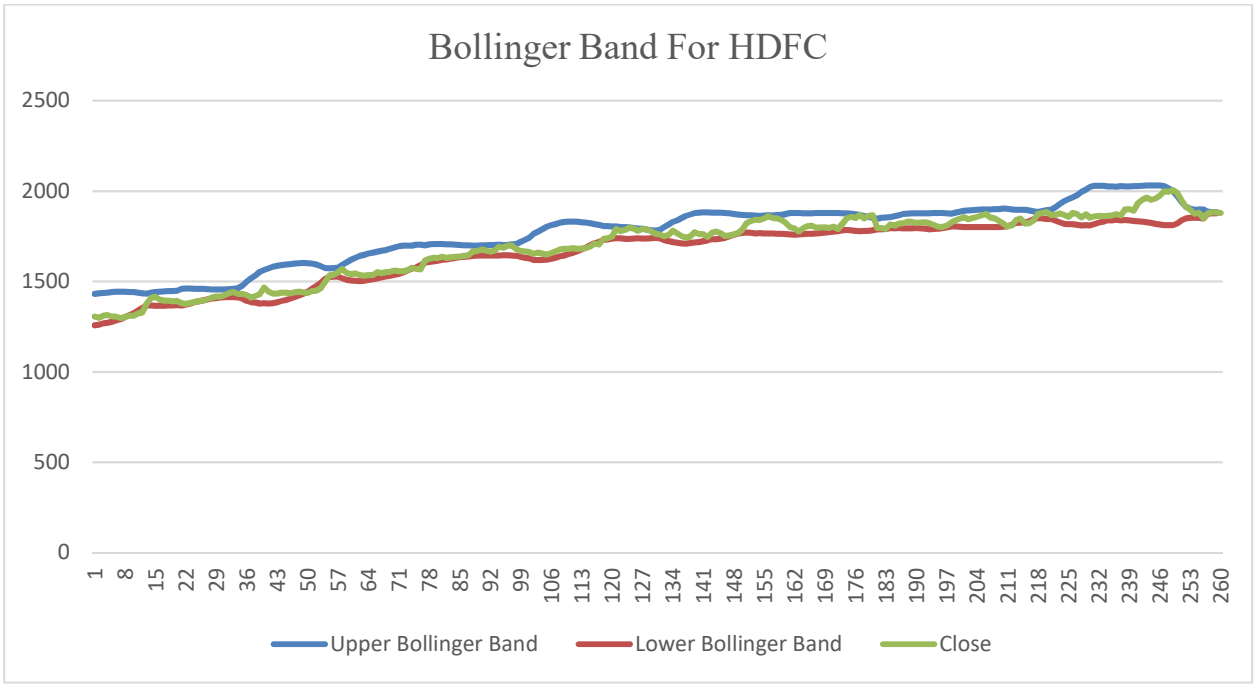
K4207 =I4207-STDEVPA(E4192:E4211)*K4206

	A	B	C	D	E	F	G	H	I	J	K	L
4191	Date	open	high	low	close							
4192	01-02-17	262	271.9	261.6	270.7	268.274	27253142					
4193	02-02-17	271.85	275	268.7	273.3	270.851	20139955					
4194	03-02-17	273	278.55	272	277.55	275.062	15366890					
4195	06-02-17	280	282.5	276	277.05	274.567	14725291					
4196	07-02-17	277.85	280	276.3	277.9	275.409	10981984					
4197	08-02-17	278.1	279.25	272.6	277.2	274.716	13622088					
4198	09-02-17	278.8	280.3	270.85	275.85	273.378	16080181					
4199	10-02-17	278.75	282.8	275	276.35	273.873	37580487					
4200	13-02-17	277.8	278.25	270.2	271.65	269.215	19853043					
4201	14-02-17	272	273	268.1	270.2	267.778	13306738					
4202	15-02-17	270.95	272.5	267.05	268.95	266.54	12201568					
4203	16-02-17	277	277	269.65	270.5	268.076	21794688					
4204	17-02-17	271.15	273.65	267.7	269.35	266.936	17830528					
4205	20-02-17	269.9	271.55	268	269.65	267.233	9229363		SMA	Upper Bollinger band	Lower bollinger band	
4206	21-02-17	270	271.5	268.65	270.7	268.274	7754157			2	2	
4207	22-02-17	271.9	274.7	269.5	272.3	269.859	12617613		272.443	278.845 .9	266.0398317	
4208	23-02-17	271.7	273	269.6	270.45	268.026	13146194		272.273	279.0223464	265.5226548	
4209	27-02-17	270.45	271.45	267.6	268.25	265.846	9645350		271.86	279.2830448	264.4369564	
4210	28-02-17	268.9	271.25	268	269.2	266.787	7941592		271.475	278.4636717	264.4863313	
4211	01-03-17	270	273.3	269.8	271.75	269.314	7656892		271.013	277.6811548	264.3438482	
4212	02-03-17	273	274.7	266.5	267.3	264.904	14220808		270.613	276.4939095	264.7310935	

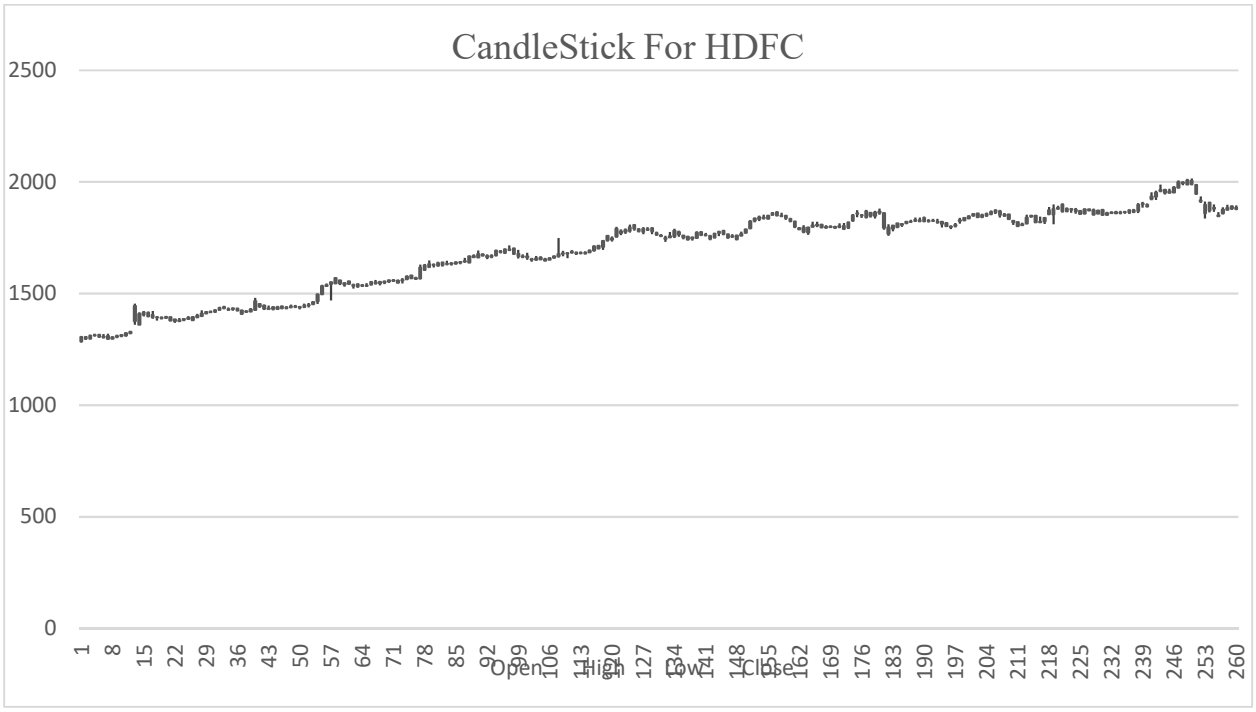
Calculation of Lower Bollinger Bands using excel formulae:
=I4207-STDEVPA(E4192:E4211)*K4206

K4207 =I4207-STDEVPA(E4192:E4211)*K4206

	A	B	C	D	E	F	G	H	I	J	K
									SMA	Upper Bollinger band	Lower bollinger band
4205	20-02-17	269.9	271.55	268	269.65	267.233	9229363				
4206	21-02-17	270	271.5	268.65	270.7	268.274	7754157			2	2
4207	22-02-17	271.9	274.7	269.5	272.3	269.859	12617613		272.443	278.845 .9	266.0398317
4208	23-02-17	271.7	273	269.6	270.45	268.026	13146194		272.273	279.0223464	265.5226548
4209	27-02-17	270.45	271.45	267.6	268.25	265.846	9645350		271.86	279.2830448	264.4369564
4210	28-02-17	268.9	271.25	268	269.2	266.787	7941592		271.475	278.4636717	264.4863313
4211	01-03-17	270	273.3	269.8	271.75	269.314	7656892		271.013	277.6811548	264.3438482
4212	02-03-17	273	274.7	266.5	267.3	264.904	14220808		270.613	276.4939095	264.7310935
4213	03-03-17	266.25	268.9	264.25	265.05	262.675	10120034		270.415	275.6252941	265.2047077
4214	06-03-17	266.6	270.35	266.35	269.85	267.431	9515073		270.225	274.8757563	265.5742437
4215	07-03-17	270.8	270.9	266.4	267.8	265.4	11599142		270.14	274.3842436	265.8957552
4216	08-03-17	267.8	270.3	266	269.9	267.481	9122987		270.425	275.6813799	265.1686201
4217	09-03-17	269	273.9	268.4	273.25	270.801	15594429		270.88	277.4026051	264.3573925
4218	10-03-17	274.5	275.55	269.5	272.05	269.612	9557026		271.14	277.7481443	264.5318515
4219	14-03-17	272.05	278.4	272.05	274.65	272.188	15734886		271.31	278.0177241	264.6022711
4220	15-03-17	272.65	280.5	272.65	277.35	274.864	20055974		271.46	278.1196977	264.8002975
4221	16-03-17	278	280.2	276.05	279.3	276.797	18005184		271.352	278.1925618	264.512434
4222	17-03-17	279.45	279.5	273.5	274.15	271.693	14265642		271.242	278.1908982	264.2940964
4223	20-03-17	274.75	274.75	271.8	273.9	271.445	9678185		271.452	278.7606087	264.1443871
4224	21-03-17	274.4	277.05	270.15	272.35	269.909	11898233		271.902	279.9765015	263.8284943
4225	22-03-17	270.3	271	266.8	267.5	265.103	9887203		272.595	281.6172481	263.5727483
4226	23-03-17	269	269.4	266.7	268.5	266.094	7998170		273.557	284.7676041	262.3473923



- **Candlesticks Chart**



- **Relative Strength**
  SBI BANK (excel formulae already mentioned above)

M17 =K17/L17

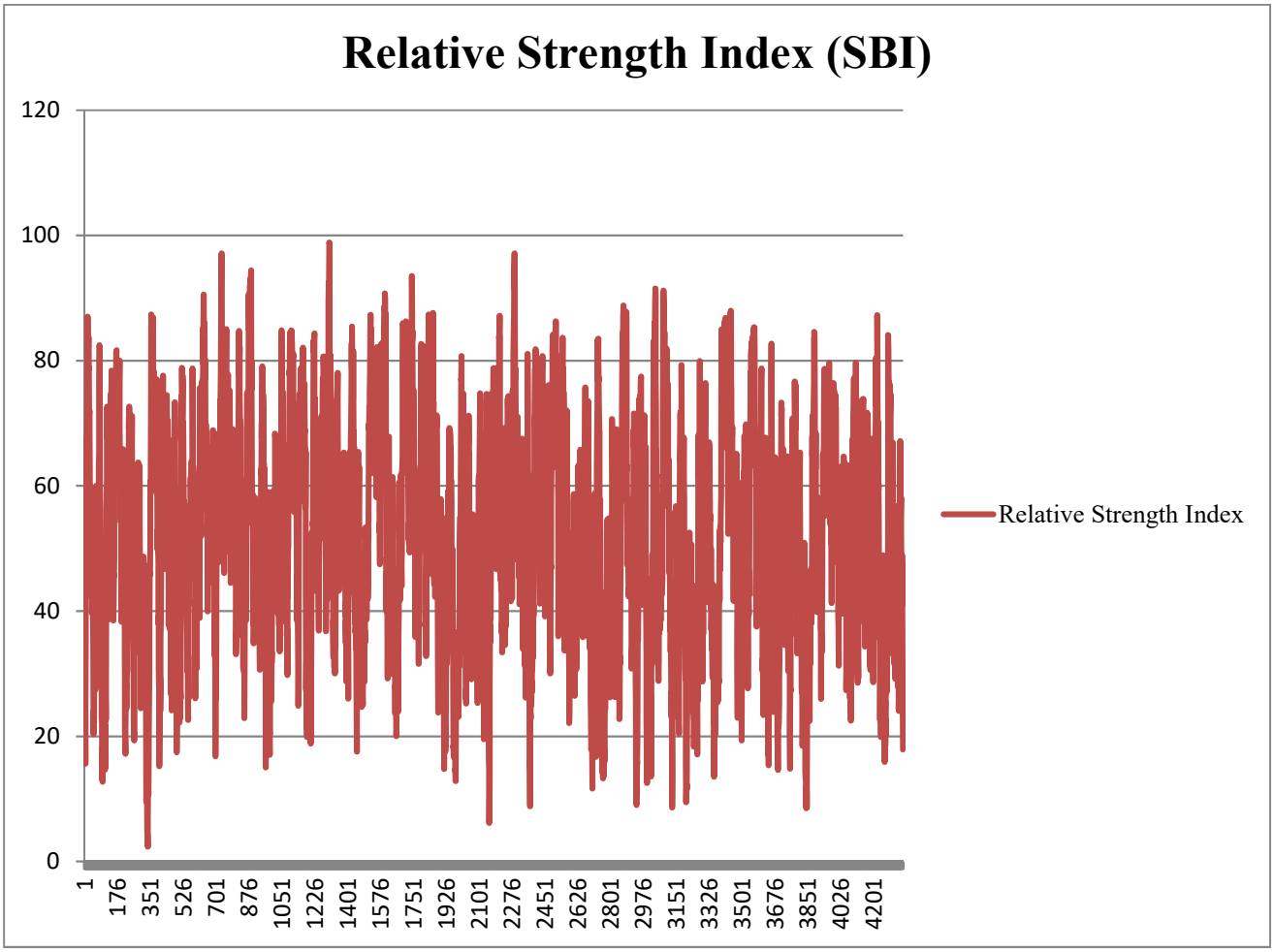
	A	H	I	J	K	L	M	N	O
1	Date	Change	Gain	Loss	Average Gain	Average Loss	Relative Strength	Relative Strength Index	
2	03-01-00								
3	04-01-00	1.4577	1.4577						
4	05-01-00	-1.0048		1.0048					
5	06-01-00	1.1841	1.1841						
6	07-01-00	1.1605	1.1605						
7	10-01-00	-0.3585		0.3585					
8	11-01-00	-2.0333		2.0333					
9	12-01-00	-0.3019		0.3019					
10	13-01-00	-0.0236		0.0236					
11	14-01-00	-0.5001		0.5001					
12	17-01-00	-0.3113		0.3113					
13	18-01-00	0.0518	0.0518						
14	19-01-00	0.7077	0.7077						
15	20-01-00	-0.5897		0.5897					
16	21-01-00	-0.0236		0.0236					
17	24-01-00	-0.8633		0.8633	0.325843	0.36762864	0.886337358	46.9872133	ProperValued
18	25-01-00	-0.3255		0.3255	0.2217215	0.42929293	0.516480671	34.0578473	ProperValued
19	28-01-00	2.2314	2.2314		0.2217215	0.3807715	0.582295419	36.80067652	ProperValued
20	31-01-00	-0.3585		0.3585	0.29652871	0.3807715	0.778757639	43.78098634	ProperValued
21	01-02-00	0.1698	0.1698		0.21363586	0.40637879	0.525706224	34.45658253	ProperValued
22	02-02-00	0.0943	0.0943		0.22576443	0.38077164	0.592912925	37.22192945	ProperValued
23	03-02-00	1.0662	1.0662		0.23250021	0.23553593	0.98711146	49.6756966	ProperValued
24	04-02-00	-0.2736		0.2736	0.30865743	0.21397157	1.442516062	59.05861109	ProperValued

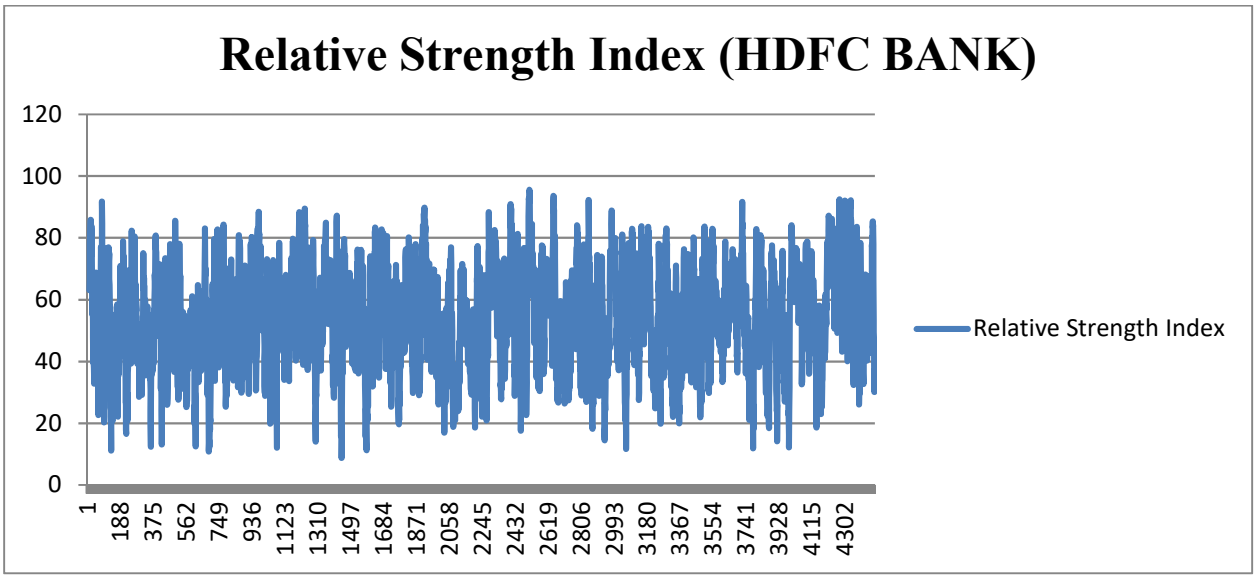
SBI Data

N92 =100-(100/(1+M92))

	A	H	I	J	K	L	M	N	O
1	Date	Change	Gain	Loss	Average Gain	Average Loss	Relative Strength	Relative Strength Index	
92	17-05-00	0.1792	0.1792		0.16005721	0.24396436	0.656068026	39.61600707	ProperValued
93	18-05-00	-0.5519		0.5519	0.07581443	0.24396436	0.310760266	23.70839842	Undervalued
94	19-05-00	0.0943	0.0943		0.07581443	0.22677879	0.334310056	25.05490044	Undervalued
95	22-05-00	-0.2358		0.2358	0.08255021	0.22509307	0.36673814	26.83309473	Undervalued
96	23-05-00	-0.2265		0.2265	0.08255021	0.16982157	0.486099696	32.70976351	ProperValued
97	24-05-00	0.0189	0.0189		0.07682157	0.18600029	0.413018567	29.22952157	Undervalued
98	25-05-00	0.3491	0.3491		0.03436457	0.18600029	0.184755477	15.59439734	Undervalued
99	26-05-00	0.3302	0.3302		0.05930014	0.17454314	0.339744901	25.35892475	Undervalued
100	29-05-00	0.4435	0.4435		0.08288586	0.15432164	0.537098074	34.94234252	ProperValued
101	30-05-00	0.5755	0.5755		0.1145645	0.14590021	0.785225029	43.98465271	ProperValued
102	31-05-00	0.4907	0.4907		0.15230014	0.14590021	1.043865107	51.07309204	ProperValued
103	01-06-00	-0.4246		0.4246	0.18735014	0.09097157	2.05943615	67.31423861	ProperValued
104	02-06-00	0.2594	0.2594		0.18735014	0.10512871	1.782102484	64.05596107	ProperValued
105	05-06-00	0.3539	0.3539		0.19577164	0.10512871	1.862209047	65.06195098	ProperValued
106	06-06-00	0.3019	0.3019		0.22105014	0.10277164	2.150886536	68.26290034	ProperValued
107	07-06-00	-0.0142		0.0142	0.22981457	0.10277164	2.236167147	69.09924752	ProperValued
108	08-06-00	1.0709	1.0709		0.22981457	0.0643645	3.570517466	78.12063935	Overvalued
109	09-06-00	0.2642	0.2642		0.29957164	0.0643645	4.654299231	82.31434243	Overvalued
110	12-06-00	-0.4529		0.4529	0.31844314	0.04752171	6.70100285	87.01467822	Overvalued
111	13-06-00	-0.0424		0.0424	0.31844314	0.063693	4.999656836	83.33238005	Overvalued
112	14-06-00	0.2783	0.2783		0.317093	0.06672164	4.752475905	82.61618099	Overvalued
113	15-06-00	0.2312	0.2312		0.312036	0.06672164	4.676683406	82.38408013	Overvalued
114	16-06-00	0.9859	0.9859		0.30496464	0.06672164	4.570700447	82.04893605	Overvalued

SBI Data



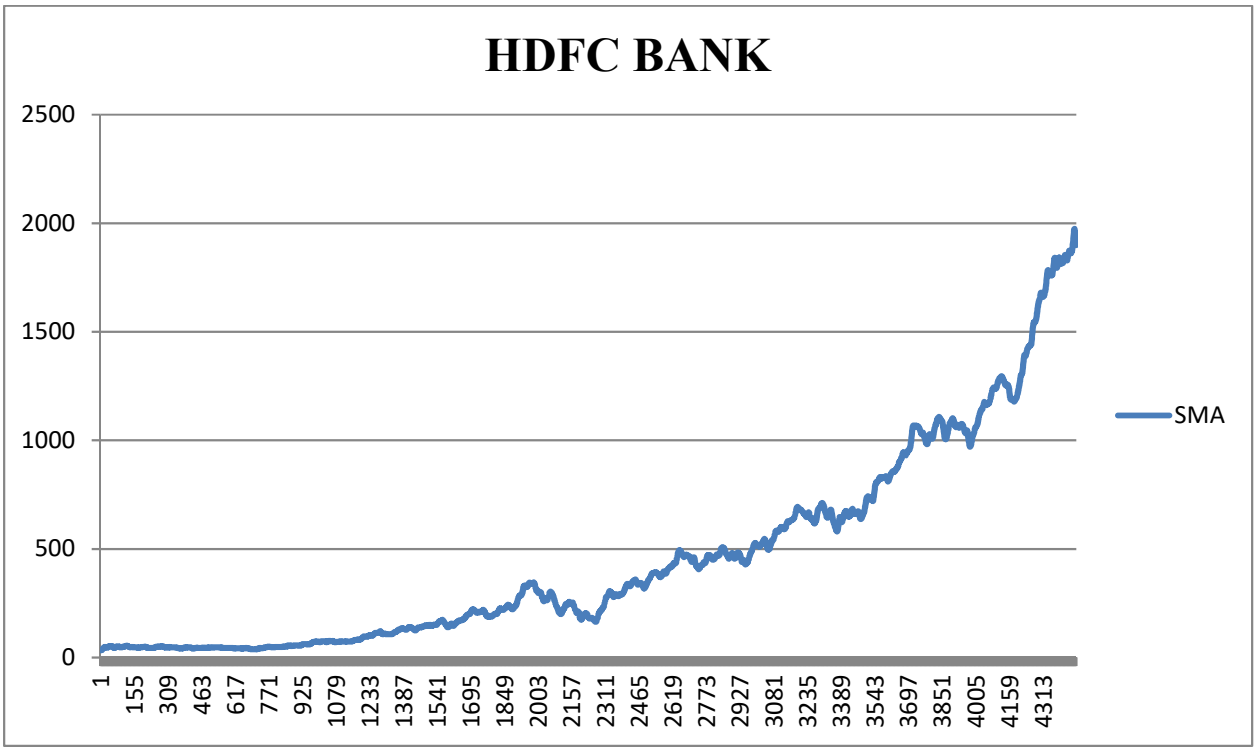


- **Moving average**

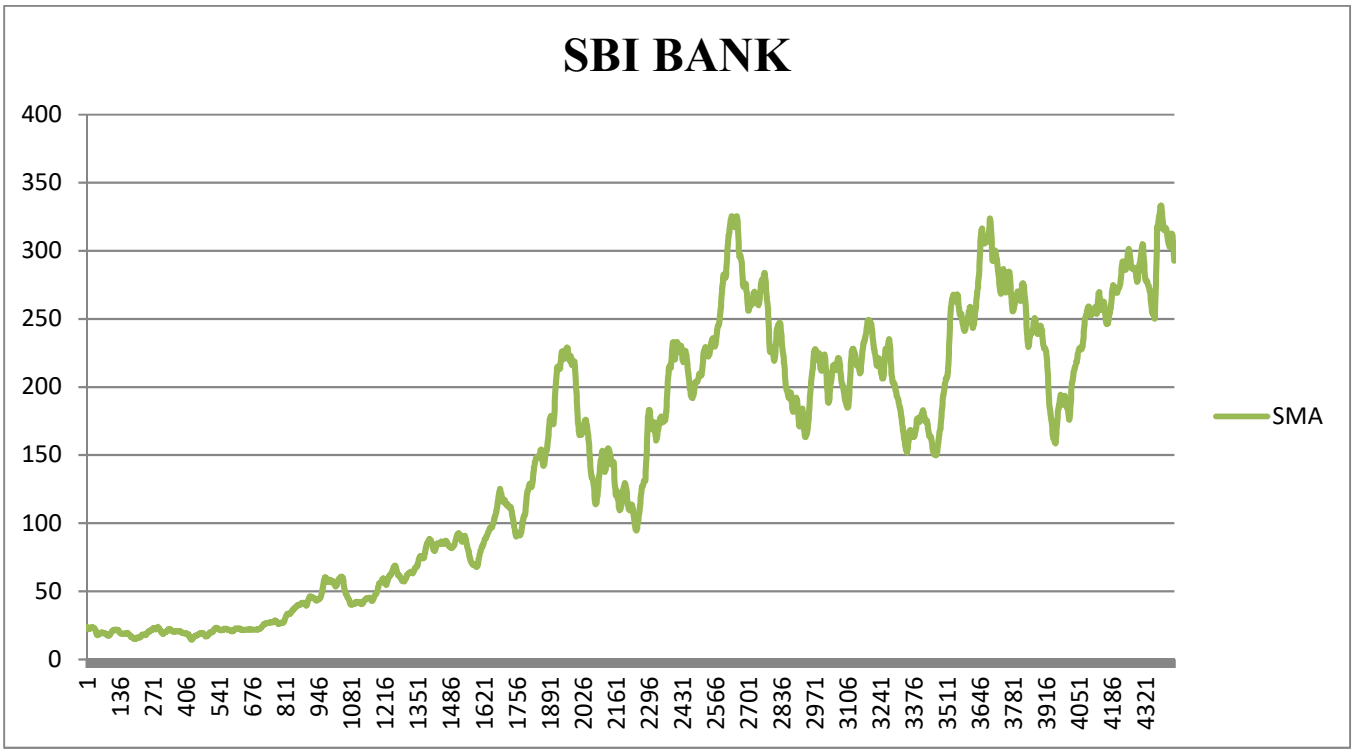
	A	B	C	D	E	F	G	H
1	Date	open	high	low	close	adj_close	volume	10 day SMA
12	17-01-00	23.0597	23.6824	21.918	22.2577	1.05615	46484262	23.8842896
13	18-01-00	22.352	22.7388	22.0548	22.3095	1.05861	28686319	23.8111697
14	19-01-00	22.7294	23.3521	22.6445	23.0172	1.09219	26623143	23.5974597
15	20-01-00	22.9276	23.0974	22.2907	22.4275	1.06421	12278097	23.5549998
16	21-01-00	22.5266	22.6209	22.2199	22.4039	1.06309	12491796	23.3351598
17	24-01-00	22.3284	22.6775	21.4274	21.5406	1.02212	19667144	22.9969098
18	25-01-00	21.3236	21.5028	21.0028	21.2151	1.00668	23597921	22.6081798
19	28-01-00	21.9557	23.4559	21.9557	23.4465	1.11256	52762279	22.3902297
20	31-01-00	23.2106	24.2249	22.8804	23.088	1.09555	51181392	22.4256099
21	01-02-00	23.1163	23.6541	22.904	23.2578	1.1036	23279486	22.4274999
22	02-02-00	24.2485	24.4089	23.2106	23.3521	1.10808	24676879	22.4963798
23	03-02-00	23.588	24.9939	23.4559	24.4183	1.15867	77717350	22.6058198
24	04-02-00	24.5315	24.9797	24.0126	24.1447	1.14569	33982238	22.8166999
25	07-02-00	24.4089	24.4089	22.9842	23.3427	1.10763	21819083	22.9294498
26	08-02-00	23.305	23.4465	22.72	22.8615	1.0848	25418400	23.0209697
27	09-02-00	23.9654	23.9654	22.9417	23.154	1.09868	14956246	23.0667297
28	10-02-00	22.8521	23.6777	22.8521	23.4748	1.1139	19541275	23.2280696
29	11-02-00	23.6824	24.3145	23.2672	23.5975	1.11972	31623753	23.4540397
30	14-02-00	23.7767	25.4892	23.7154	25.1543	1.1936	67707768	23.4691396
31	15-02-00	25.6543	25.6638	23.305	23.956	1.13673	50319323	23.6757698
32	16-02-00	24.2485	24.2485	23.3521	23.588	1.11927	21683665	23.7455898
33	17-02-00	23.3993	23.9466	23.305	23.588	1.11927	18448442	23.7691797
34	18-02-00	23.7531	23.8522	22.5501	22.7483	1.07943	16000844	23.6861495

BSE INDEX | SBI | HDFC

Graphical Representation of Moving average
For HDFC BANK



For SBI BANK

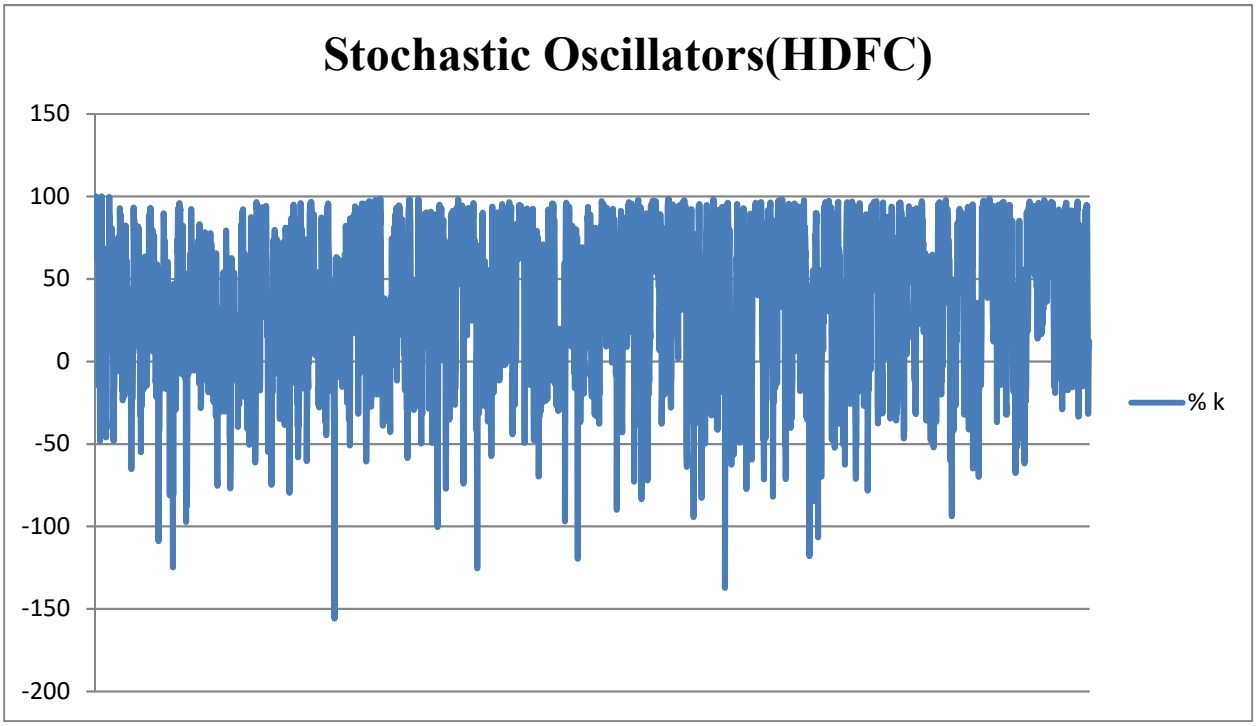


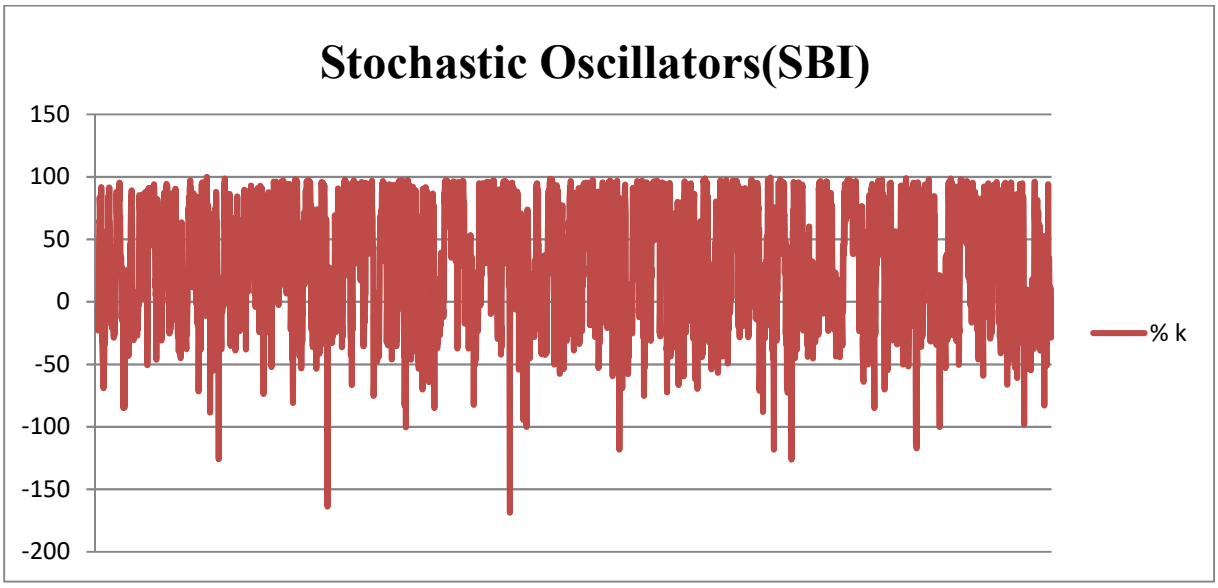
- **Stochastic Oscillators**

For HDFC BANK

	A	B	C	D	E	F	G	H	I	J	K	L
1	Date	open	high	low	close	adj_close	volume	Highest High	Lowest Low	% k	%D	
15	20-01-00	36.96	36.96	35.2	35.72	20.9209	1345490	36.959999	33.580002	63.3136		ProperValued
16	21-01-00	35.2	38.4	34.42	37.63	22.0396	2361645	38.400002	33.580002	84.0249		Overbought
17	24-01-00	39.76	40.64	38.6	40.11	23.4921	2246830	40.639999	33.580002	92.4929	79.94381819	Overbought
18	25-01-00	39.8	43.32	39.8	43.32	25.3722	1451455	43.32	33.580002	100	92.17260617	Overbought
19	27-01-00	44.8	46.79	44.25	45.94	26.9067	2817910	46.790001	33.580002	93.5655	95.35280268	Overbought
20	28-01-00	46	46.6	44.8	45.58	26.6958	2395825	46.790001	33.580002	90.8403	94.80191482	Overbought
21	31-01-00	46.02	49.23	46.02	47.55	27.8497	3186900	49.23	33.580002	89.2652	91.22363747	Overbought
22	01-02-00	47.2	48.8	47	48.19	28.2245	1953895	49.23	33.59	93.3504	91.15194153	Overbought
23	02-02-00	52.04	52.05	47.8	48.8	28.5818	1719160	52.049999	33.599998	82.3848	88.33345667	Overbought
24	03-02-00	48.8	50	44.9	45.19	26.4674	1423435	52.049999	33.599998	62.8184	79.51787741	ProperValued
25	04-02-00	45.99	46.4	43.5	45.79	26.8188	1328520	52.049999	35.740002	61.6186	68.94063303	ProperValued
26	07-02-00	47	49.46	46	49.34	28.8981	1945175	52.049999	35.740002	83.3844	69.27383469	Overbought
27	08-02-00	50	50.76	48.02	50.15	29.3725	1526040	52.049999	35.799999	88.3077	77.77026155	Overbought
28	09-02-00	51	52.2	49.22	50.5	29.5774	1586165	52.200001	36.959999	88.8451	86.84575995	Overbought
29	10-02-00	50	52.4	49.65	50.35	29.4896	1050430	52.400002	38.400002	85.3571	87.50332144	Overbought
30	11-02-00	51.02	51.8	46.33	46.42	27.1878	1324115	52.400002	40.639999	49.1496	74.45063079	ProperValued
31	14-02-00	47	47	44.03	46.69	27.346	1262720	52.400002	43.32	37.1145	57.20709045	ProperValued
32	15-02-00	46.8	47	45.02	45.52	26.6607	970435	52.400002	46.400002	-14.667	23.86581903	Oversold
33	16-02-00	48.98	49.17	46	49.17	28.7985	353000	52.400002	46.400002	46.1666	22.87147275	ProperValued
34	17-02-00	51.54	51.54	49.63	50.08	29.3315	1170800	52.400002	46.400002	61.3333	30.94441111	ProperValued
35	18-02-00	50.2	50.6	47.8	48.52	28.4178	593885	52.400002	46.400002	35.3333	47.61107778	ProperValued
36	21-02-00	48.65	49.6	47.02	47.23	27.6622	552360	52.400002	46.400002	13.8333	36.83331111	Oversold
37	22-02-00	47.21	48	43.46	43.51	25.4835	874030	52.400002	46.400002	-48.167	0.333288889	Oversold

HDFC_Stochastic | Sheet1 | SBI_Stochastic




Stochastic Oscillators(SBI)
150
100
50
0
-50
-100
-150
-200
% k

CONCLUSION

- From candlesticks techniques we have accomplish that chart has a rectangular real body. A green real body looks when the price moved up and red real body appears when the price moved down.

- From Bollinger Bands Technique we are able to conclude that it predicts whether or not costs “are high or low on a relative basis. They are utilized in pairs, each higher and lower bands and in conjunction with a moving average” [www2.wealth-lab.com].

- From Relative strength Technique we are able to conclude that whether or not the stock is unsold situation which will leaning for once and modification value blow to the positive.

- From Moving Average Technique we are able to conclude that a rising moving average indicates that the protection is during an uptrend, whereas a declining moving average indicates that it's in a downtrend.

- From Stochastic Oscillators we are able to conclude that it's wont to calculate the momentum of stock value changes.

- From Fibonacci Retrenchments we are able to conclude that it plots share “retracement lines based mostly upon the mathematical relationship among the Fibonacci sequence” [www.math.muni.cz].

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