FUNDAMENTAL
AND
TECHNICAL ANALYSIS

ECON F412 & FIN F313: SECURITY ANALYSIS & PORTFOLIO MANAGEMENT
GROUP: 5

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

HYDERABAD CAMPUS

GROUP MEMBERS

Name	ID	Contribution
Balabhadra Krishna Chaitanya	2019A4PS1500H	Yes
Gaurav Anoop	2019A4PS1503H	Yes
Venkata Praneeth Jandhyala	2019A4PS0773H	Yes
Sumanth K	2019A4PS0756H	Yes
Shubham Agarwal	2019A4PS0593H	Yes

ACKNOWLEDGEMENT

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Introduction

For a rational investor there are mainly two techniques which he can use to pick the subset of stock from the large set.They are Fundamental analysis and Technical analysis.

Fundamental analysis (FA) is a way of determining the fundamental value of a securities by looking at linked economic and financial elements. Fundamental analysts look at everything that might influence the value of a security, from macroeconomic issues like the state of the economy and industry circumstances to microeconomic elements like the company's management performance.The ultimate aim is to arrive at a figure that can be compared to the present price of an asset to determine whether it is undervalued or overpriced.

Technical analysis is a trading discipline that analyses statistical trends acquired from trading activity, such as price movement and volume, to evaluate investments and uncover trading opportunities. Technical analysis, as opposed to fundamental analysis, focuses on the examination of price and volume. Fundamental analysis aims to estimate a security's worth based on business performance such as sales and earnings.

Methodology :

- For the purpose of this assignment we selected five companies from the IT Sector namely TATA Consultancy Services (TCS),Infobeans Technologies,TATA Elxsi, Larsen & Toubro Infotech Limited,Ramco Systems.
- For Fundamental analysis we have collected data(balance sheet,income statement,relative valuation ratios) from various sources such as Bloomberg,Money control and annual reports.
- For Technical analysis we collected stock price data from yahoo finance and performed the analysis using yfinance library in Google collaboratory using Python3.

Fundamental analysis Techniques Used:

- **52-week Low/high** : The 52-week high/low is a technical indicator that represents the highest and lowest price at which a securities has traded over the course of a year.
  The 52-week high/low is calculated using the security's daily closing price.
  Traders can use the 52-week high as a resistance level and the 52-week low as a support level to help them make trading choices.

- **DCF Valuation** : Discounted cash flow (DCF) is a valuation approach that uses predicted future cash flows to determine the value of an investment. DCF analysis aims to determine the current value of an investment based on future forecasts of how much money it will earn.

    - ❖ In DCF we employed two variations one is DCF valuation using terminal growth rate assuming minimum growth rate of 1.5% and maximum growth rate of 3.5%.
    - ❖ Second DCF approach is to use EV/EBITDA multiple to find the terminal value of the company . EV/EBITDA multiple we considered high and low values of EV/EBITDA for the five we have chosen.

- **Relative Valuation**:A relative valuation model is a business valuation strategy that compares a company's value to that of its competitors or industry peers in order to determine its financial worth. Absolute value models attempt to calculate a business's intrinsic value based on its expected future free cash flows discounted to present value, with no reference to another firm or industry average. With no reference to another firm or industry average, relative value models attempt to identify a company's intrinsic worth based on its expected future free cash flows discounted to present value.
    - ❖ PE Ratio
    - ❖ EV/EBITDA
    - ❖ EV/sales

Technical Analysis Indicators Used:

- **Simple Moving Average(SMA) :** The average of a range of prices divided by the number of periods within that range is calculated using simple moving averages.It is a technical indicator that can be used to determine if a bull or bear trend will continue or reverse.
- **Exponential Moving Average(EMA):** In EMA unlike exponential recent price activity will get more weight than the older one.
- **Relative Strength Index(RSI) :** It's a lagging momentum indicator that takes into consideration the security's average gains and losses over time. The analysis was conducted using a 14-day RSI.
  Formula: RSI = 100 - [100 / (1+ {Average Gains/Average Losses})]
  The value of RSI ranges from 0 to 100 where values below 30 indicate that the stock is oversold and values above 70 indicate that the stock is overbought.
  Since it is a momentum indicator, it can lag sometimes since it takes averages of gains and losses.

- **Bollinger Bands :** It is one of the most widely used techniques where three lines are drawn, one below the security price line and another above it. To build a 'envelope,' its precise period moving average is labeled as midline. These lines depict a volatility band or range in which a security's price is moving up or down. Because standard deviation is a measure of volatility, volatility is shown on the basis of standard deviation for a given security, which is denoted by upper and lower line/band.

Industry Averages Used For Valuation (Source: Bloomberg)

	WACC		EV/EBITDA		P/E		PEG		EV/sales
Infobeans	15.80%		2.448		36.06		1.09		8.16
TCS	9.68%		16.692		35.33		2.49		6.51
Tata elxsi	13.82%		16.508		94.7		3.41		19.34
Ramco	14.76%		19.502		-25.21		2.2		1.69
L&T	12.46%		18.316		38.88		2.07		5.94
Industry Averages	13.30%		14.6932		35.952		2.265		8.328

OVERVIEW OF IT SECTOR IN INDIA

The Indian IT industry's revenue is predicted to reach US$ 227 billion in FY22, up from US$ 196 billion in FY21, according to the National Association of Software and Service Companies (Nasscom).IT spending in India is likely to rise to US$ 101.8 billion in 2022, up from an estimated US$ 81.89 billion in 2021, according to Gartner forecasts.
By 2025, the Indian software product sector is anticipated to be worth $100 billion. Indian enterprises are concentrating their efforts on overseas investments in order to grow their global presence and improve their global delivery centers.
In FY20, the Indian data annotation market was valued at US$ 250 million, with the US market accounting for 60% of the total. Due to fast growth, the market is estimated to reach US$ 7 billion by 2030.

Infobeans Technologies Limited

InfoBeans Technologies Limited is a global IT software services provider company that operates in the areas of Digital Transformation, Business Intelligence, UX, Package implementation, ServiceNow, and Automation Engineering. It has its headquarter in Indore, Madhya Pradesh, India. The company has its delivery centers in Indore and Pune.


It was incorporated in 2000 as InfoBeans Software Solutions Private Limited and then subsequently renamed InfoBeans Systems India Private Limited. On 28 February 2015, it was converted into a public limited company with the name InfoBeans Technologies Limited. Shares in the company were listed on the National Stock

Exchange of India in May 2017 with an offer price of Rs 69.60 per share and a market capitalization of INR 168.11 crores as of FY 2018-19.

Infobean Technologies			Min	Difference	Max
DCF Perpetuity growth rate			85.179	8.974	94.153
DCF Terminal EBITDA			59.509	124.152	183.661
PE Ratio			735.577	82.823	818.4
EV/EBITDA			583.702	78.437	662.139
EV/SALES			406.447	8.289	414.736
52 Week Low/High			162	647	809

Valuation of Infobean
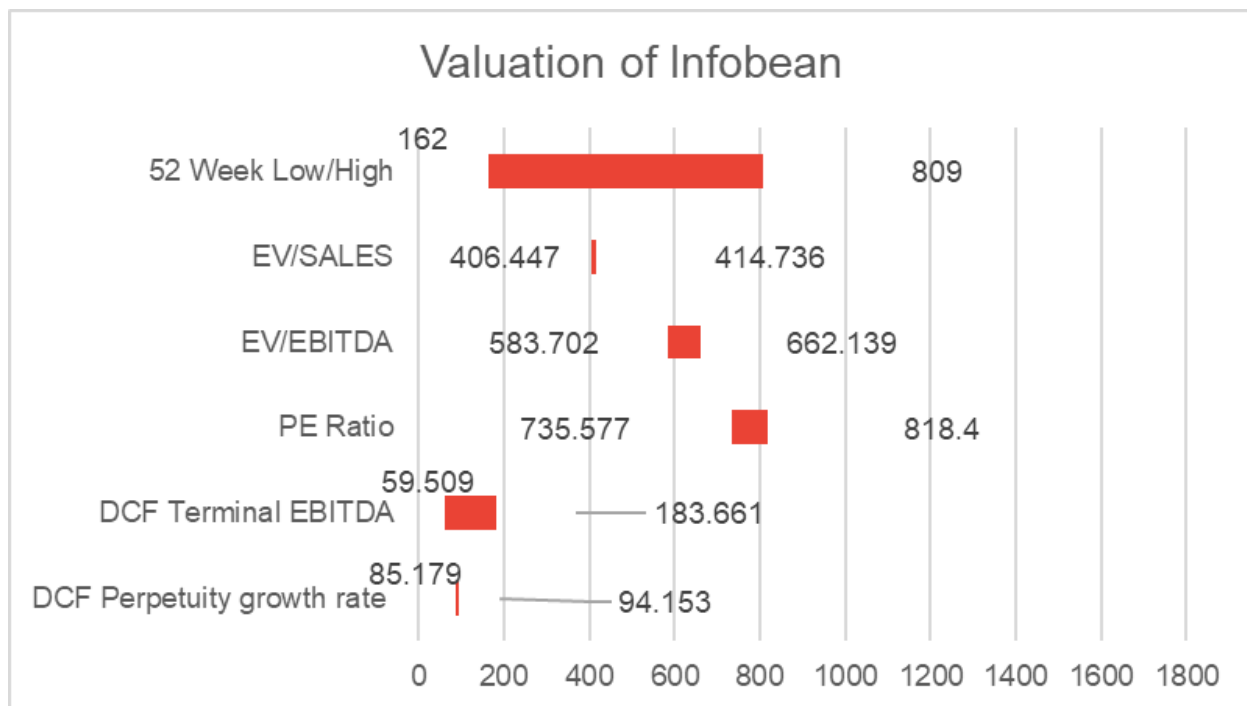
Current price:707.85 as on 22/04/2022

Using DCF Perpetuity Growth rate method, we can see that the minimum projected value is 85.179 and the maximum value is 95.153

Using the DCF Terminal EBITDA method, the minimum and maximum projected values are 59.509 and 183.661 respectively.

Using the PE Ratio method, the maximum and minimum projected values are 735.577 and 818.4 respectively.

Using the EV/EBITDA method, the maximum and minimum projected values are 583.702 and 662.139 respectively.

Using EV/Sales method, the maximum and minimum projected values are 406.447 and 414.736

Using 52 Week Low/High the maximum and minimum projected values are 162 and 809 respectively.

It can be observed that the difference between maximum and minimum is highest for 52 week Low/High and lowest for EV/Sales method.

Using the EV/EBITDA and PE Ratio methods, we get the closest value to the current price.
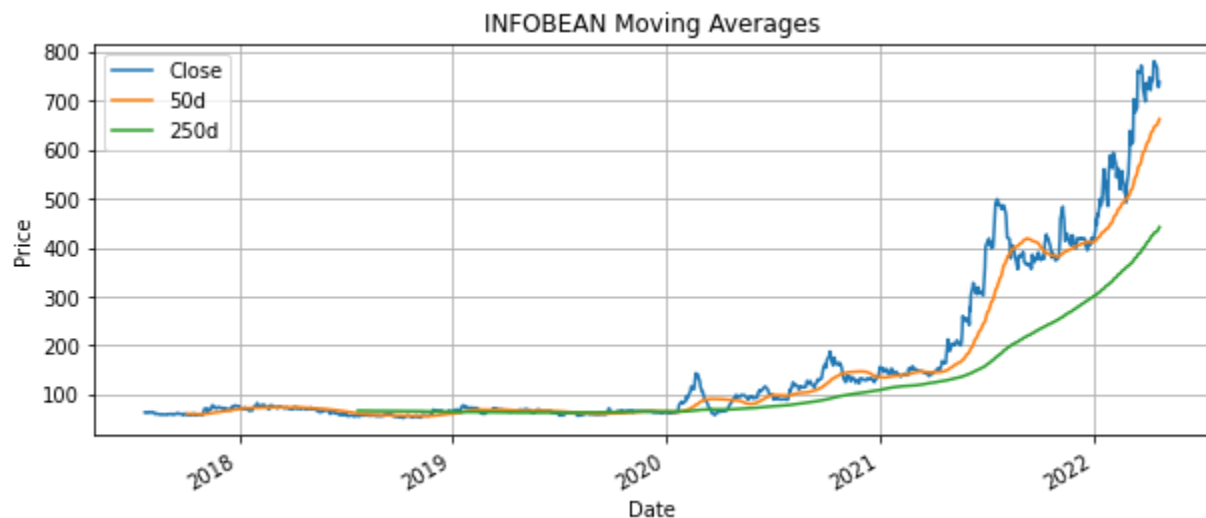

The curve is flat in the region from 2017 to 2020 depicting that the investing strategy must be to hold. From 2020 onwards the 50 day curve crosses the 250 day curve indicating the investing strategy is to buy. We can see that the 250 day moving average is smoother than the 50 day average.

INFOBEAN Exponential Moving Averages
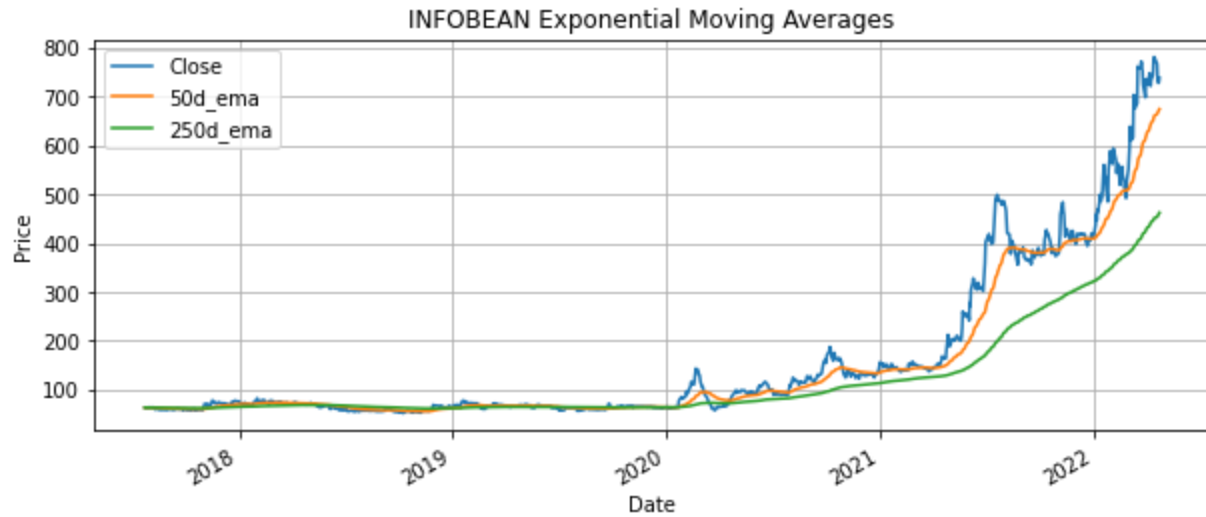
EMA gives more weightage to the recent data points and is more sensitive to price change than the moving average curve. Here the 50 day curve and 250 day curve are not intersecting indicating that the graph does not give any signal.

INFOBEAN RSI
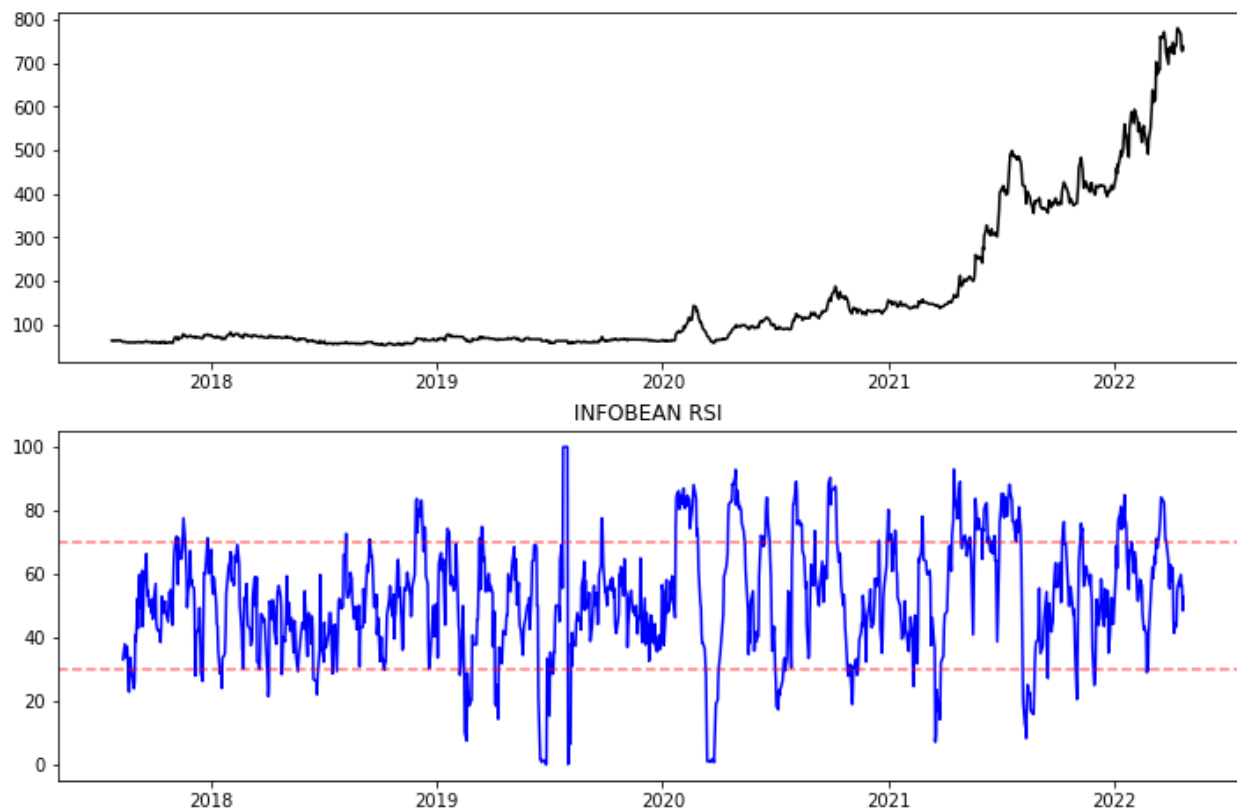
RSI graph is indicating sell signal when the curve crosses 70 and indicates sell when the curve dips below 30.

INFOBEAN Bollinger Bands
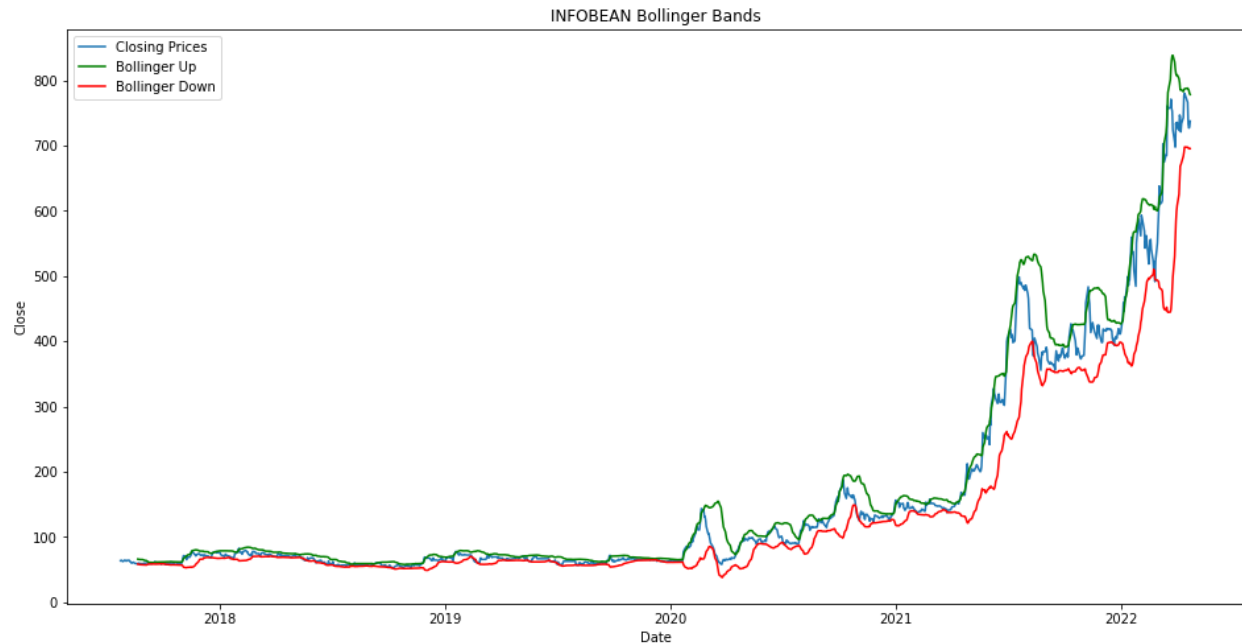
In this case the blue band which depicts closing prices is almost in between the two bollinger bands. So for this case the bollinger curve doesn't turn out to be useful.

TATA CONSULTANCY SERVICES

TCS (Traditional Consultancy Services) is a Mumbai-based Indian multinational information technology (IT) services and consulting firm. It is a subsidiary of the Tata Group, with 149 locations in 46 countries.

TCS is India's second-largest corporation by market capitalization and one of the most valuable IT services brands in the world.

TCS was ranked 64th overall in Forbes' World's Most Innovative Companies ranking in 2015, making it the highest-ranking IT services company as well as the top Indian company. [12] It is placed eleventh on the Fortune India 500 list as of 2018. TCS became the first Indian IT company to hit $100 billion in market capitalization in April 2018 , and the second Indian company to do so ever (after Reliance Industries in 2007).

In 2016–2017, parent company Tata Sons owned 72.05% of TCS and more than 70% of Tata Sons' dividends were generated by TCS.In March 2018, Tata Sons sold stocks of TCS worth $1.25 billion in a bulk deal. As of 15 September 2021, TCS has recorded a market capitalization of US$200 billion, making it the first Indian IT firm to do so.

		TCS			
			Min	Difference	Max
DCF Perpetuity growth rate			1928.124	133.602	2061.726
DCF Terminal EBITDA			2194.123	1977.215	4171.338
PE Ratio			1398.882	24.628	1423.51
EV/EBITDA			1569.228	513.581	2082.809
EV/SALES			2577.607	719.832	3297.439
52 Week Low/High			3004	1039	4043

Valuation of TCS
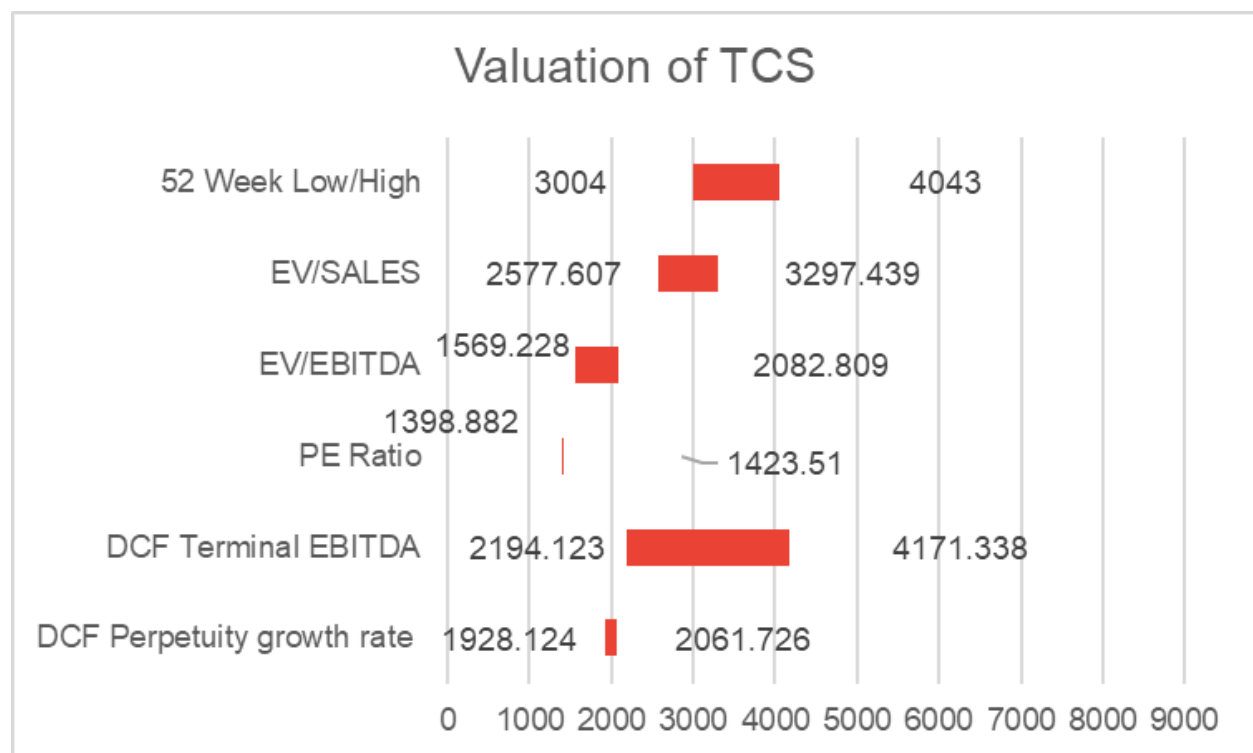
Current Price: 3544.00 As on 22/04/2022

Using DCF Perpetuity Growth rate method, we can see that the minimum projected value is 1928.124 and the maximum value is 2601.726

Using the DCF Terminal EBITDA method, the minimum and maximum projected values are 2194.123 and 4171.338 respectively.

Using the PE Ratio method, the maximum and minimum projected values are 1398.882 and 1423.51 respectively.

Using the EV/EBITDA method, the maximum and minimum projected values are 1569.228 and 2082.809 respectively.

Using EV/Sales method, the maximum and minimum projected values are 2577.607 and 3297.439

Using 52 Week Low/High the maximum and minimum projected values are 3004 and 4043 respectively.

It can be observed that the difference between maximum and minimum is highest for DCF Terminal EBITDA method and lowest for PE Ratio method.

Using the 52 Week Low/High method, we get the closest value to the current price.
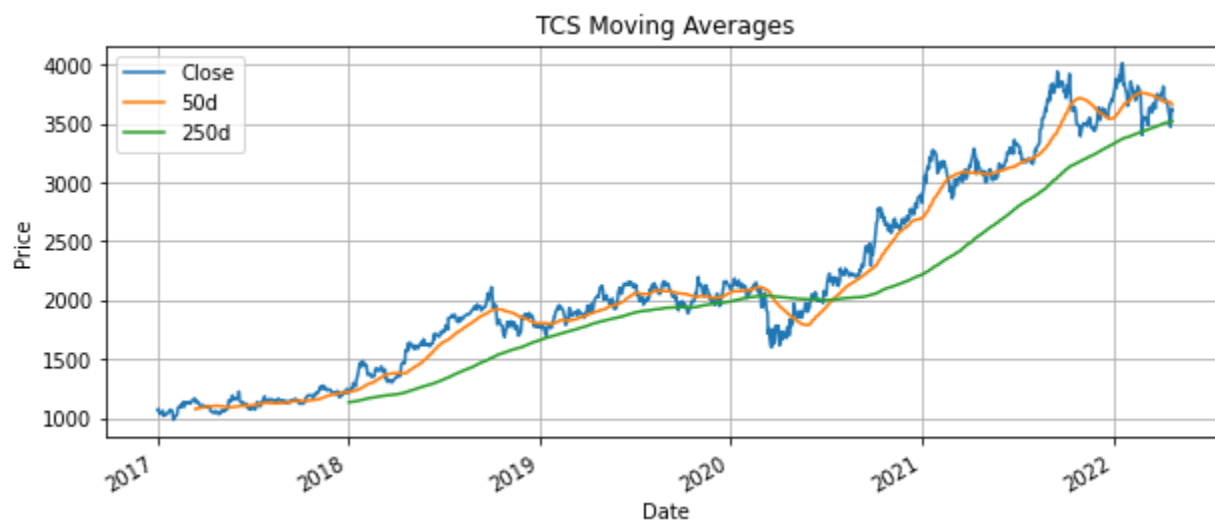
The 50 day curve dips below the 250 day curve in Feb 2020,indicating a sell signal.
The 50 day curve crosses the 250 day curve in June 2020, indicating a buy signal.

TCS Exponential Moving Averages
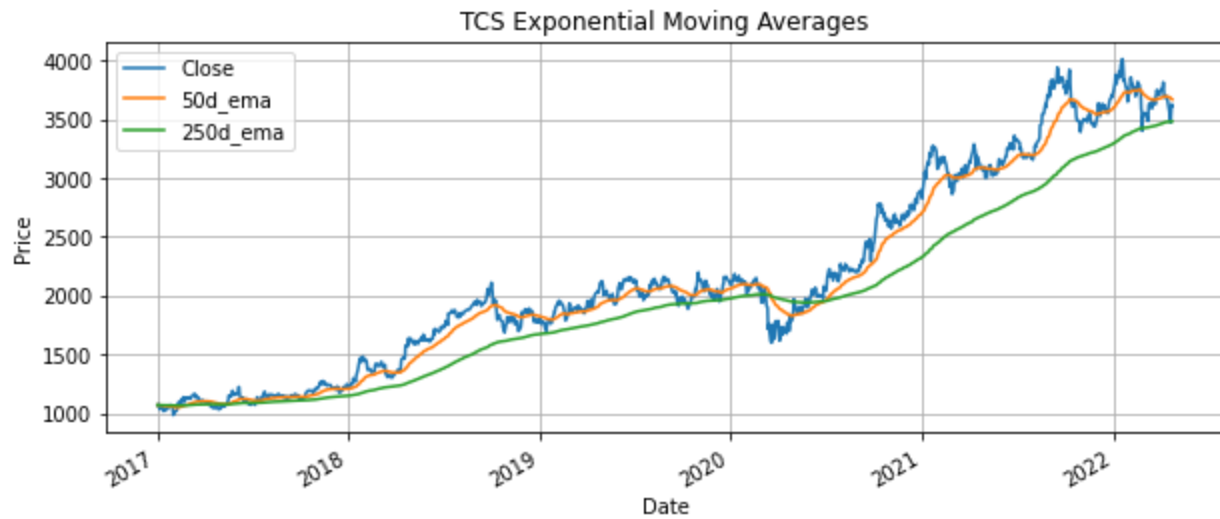
The EMA graph as well gives the same signal as that of the simple moving average graph indicating a sell signal in Feb 2020 and again a buy signal in June 2020.

TCS RSI
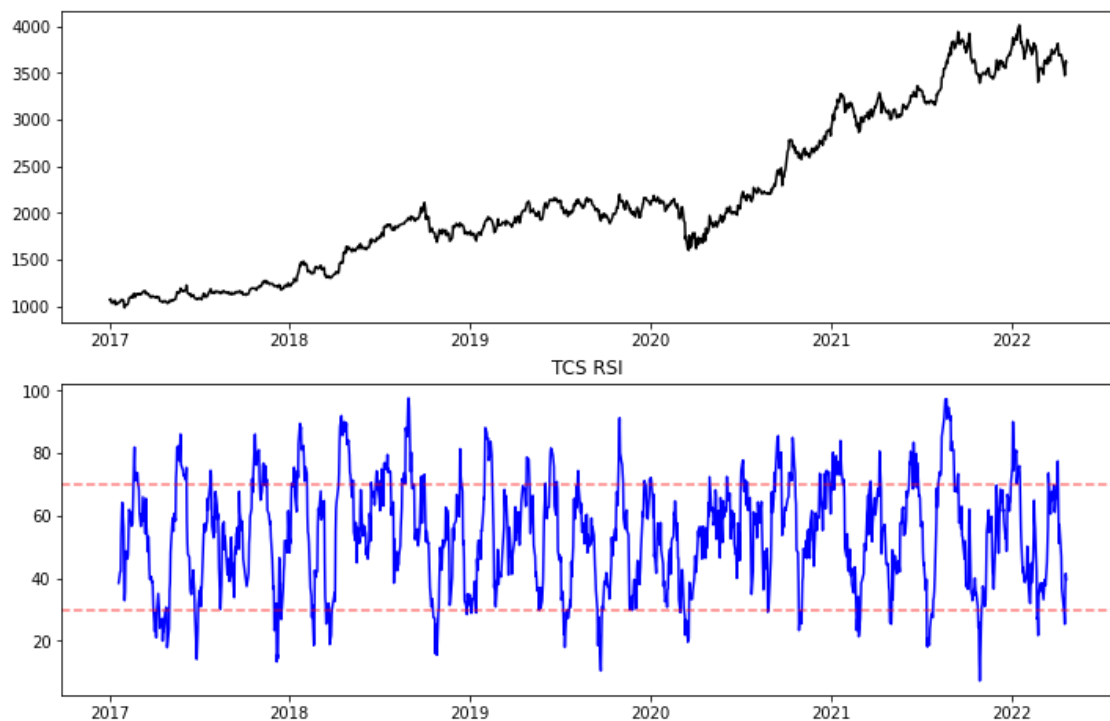
There are many brief instances where the RSi curve gives buy/sell signals but the major ones are an oversold (buy) signal in 2017-18 and an overbought (sell) signal in 2021-22.
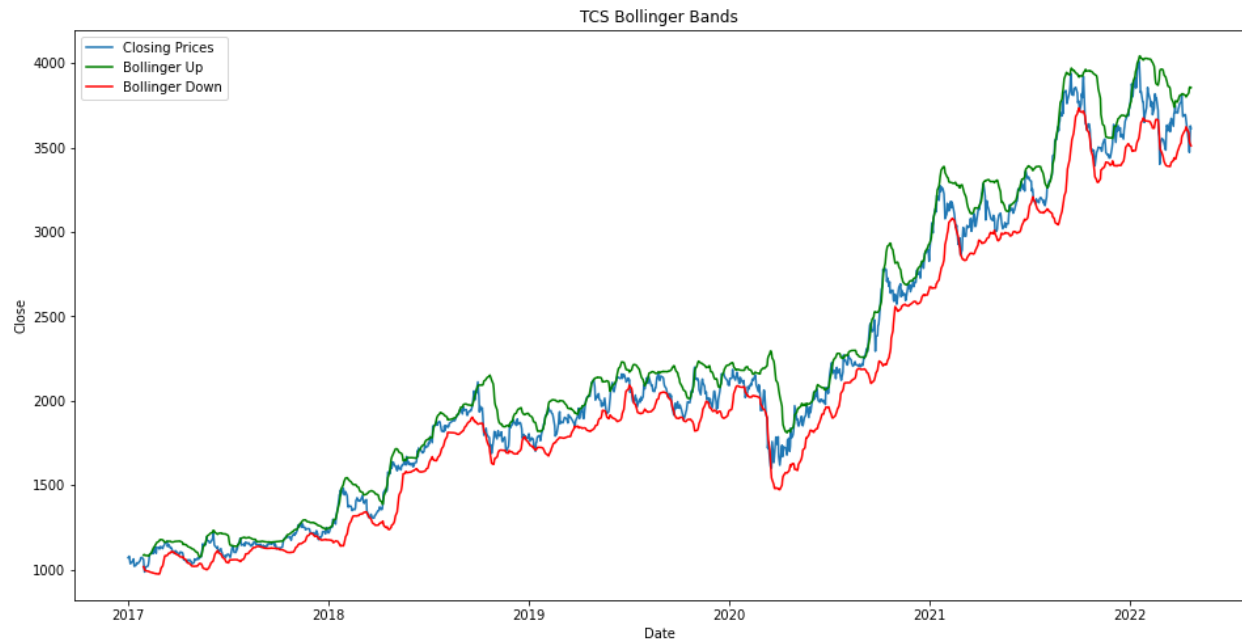
The SMA curve stays in between the bollinger bands indicating a hold signal.

RAMCO SYSTEMS

Established in 1989 Ramco Systems is a part of the Chennai based Ramco Group.
Ramco is a global provider of Enterprise Solutions and Services in key areas such as
Manufacturing Aviation Asset Management Trading & Logistics Healthcare
eGovernance Banking & Financial Services Corporate Performance Management and
Human Resources Management. It is also a Siebel Alliance Partner and provides CRM
implementation services to global customers.

 Ramco also teamed with EarlySalary, an Indian consumer financing and wellness platform, to
provide financial wellness services to Ramco's consumers.

		Ramco Systems			
			Min	Difference	Max
DCF Perpetuity growth rate			99.819	91.789	191.608
DCF Terminal EBITDA			643.582	185.766	829.348
PE Ratio			324.2006	107.2234	431.424
EV/EBITDA			229.41	374.114	603.524
EV/SALES			178.053	673.289	851.342
52 Week Low/High			262	425.25	687.25

Valuation of Ramco Systems
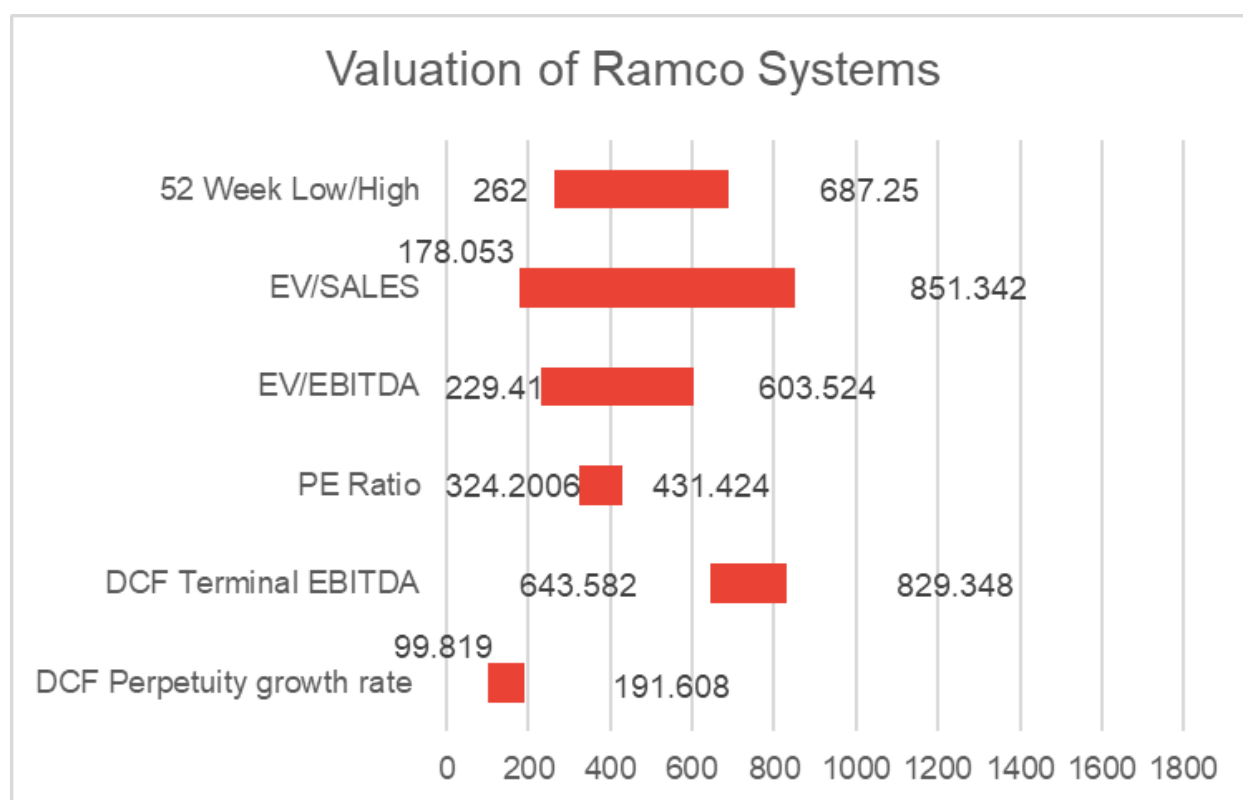
Current price:320.70 As on 22/04/2022

Using DCF Perpetuity Growth rate method, we can see that the minimum projected value is 99.819 and the maximum value is 191.608

Using the DCF Terminal EBITDA method, the minimum and maximum projected values are 643.582 and 829.348 respectively.

Using the PE Ratio method, the maximum and minimum projected values are 324.2006 and 431.424 respectively.

Using the EV/EBITDA method, the maximum and minimum projected values are 229.41 and 603.524 respectively.

Using the EV/Sales method, the maximum and minimum projected values are 178.043 and 851.342.

Using 52 Week Low/High the maximum and minimum projected values are 262 and 687.25 respectively.

It can be observed that the difference between maximum and minimum is highest for EV/Sales method and lowest for DCF Perpetuity growth rate method.

Using the PE Ratio method, we get the closest value to the current price.
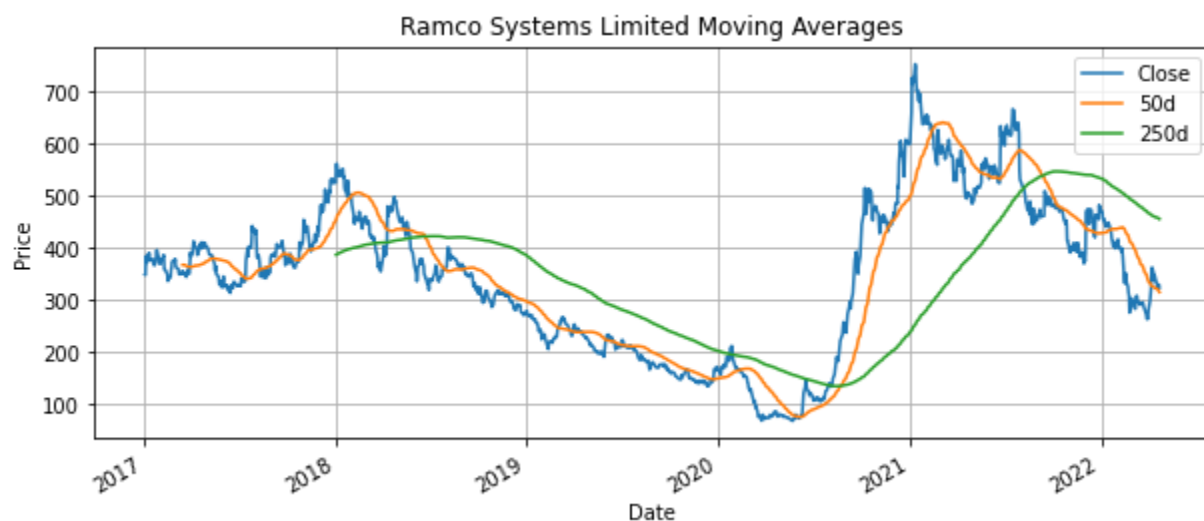
The 50 day curve dips and goes below the 250 day curve in June 2018 indicating a sell signal and again crosses the 250day curve in July 2020 indicating a buy signal.

Ramco Systems Limited Exponential Moving Averages
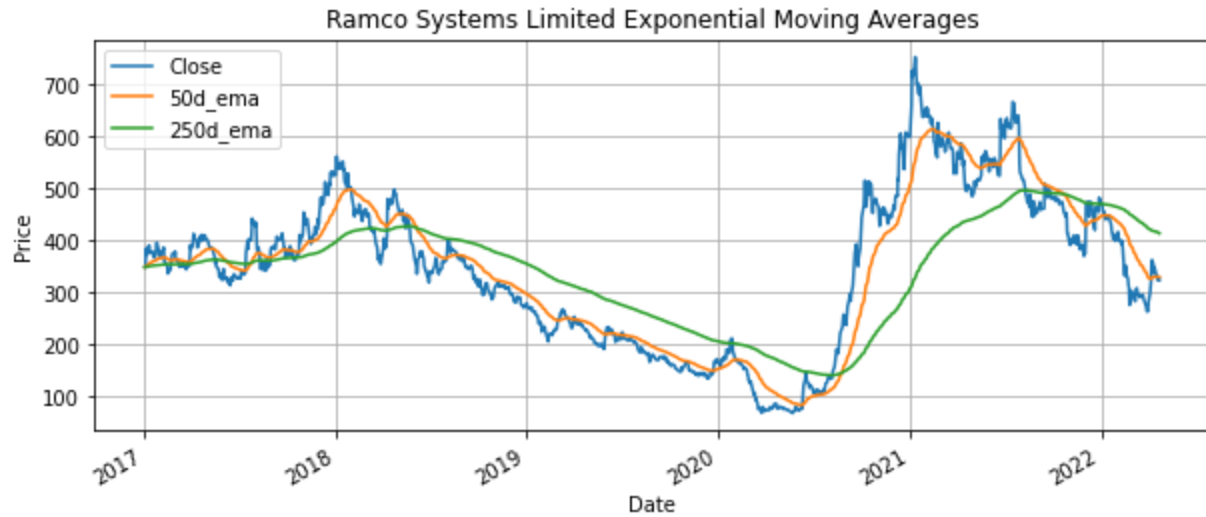
The EMA curve gives more signals than the SMA curve as the EMA curve is more sensitive to price changes. The 50 day EMA dips below the 250 day EMA in 2018 June indicating sell signal; crosses above the 250 day EMA in Aug 2020 indicating buy signal and again dips below in 2021 indicating a sell signal.

Ramco Systems Limited RSI
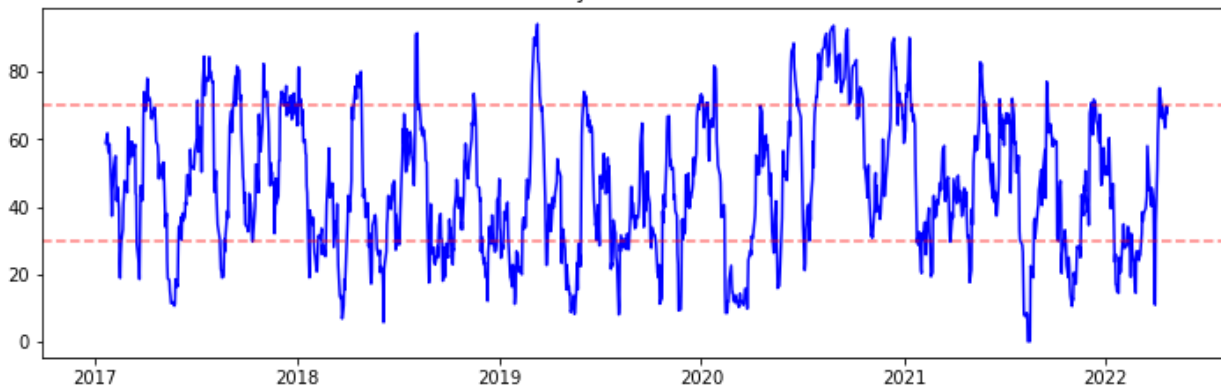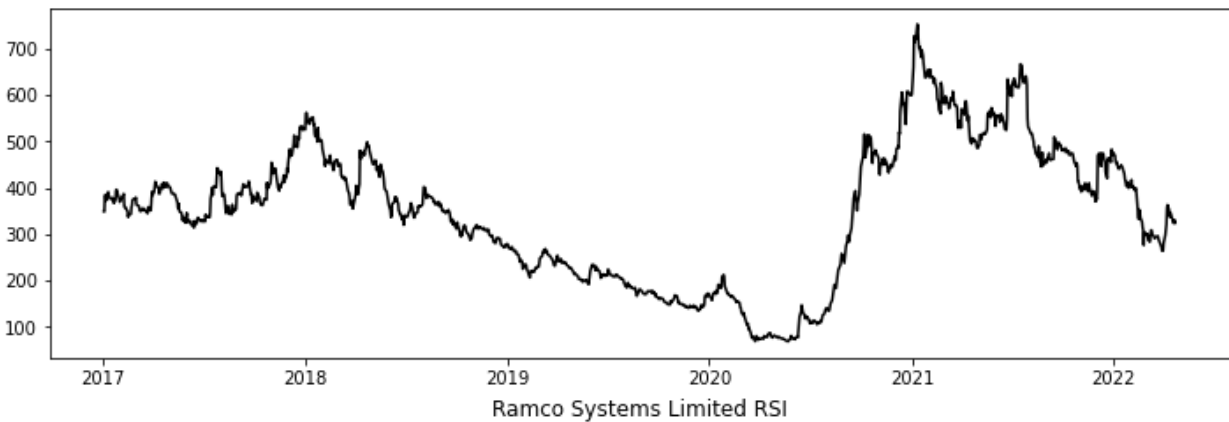
The major signals are the overbought signal in 2020 and oversold signal in 2019.

Ramco Systems Limited Bollinger Bands
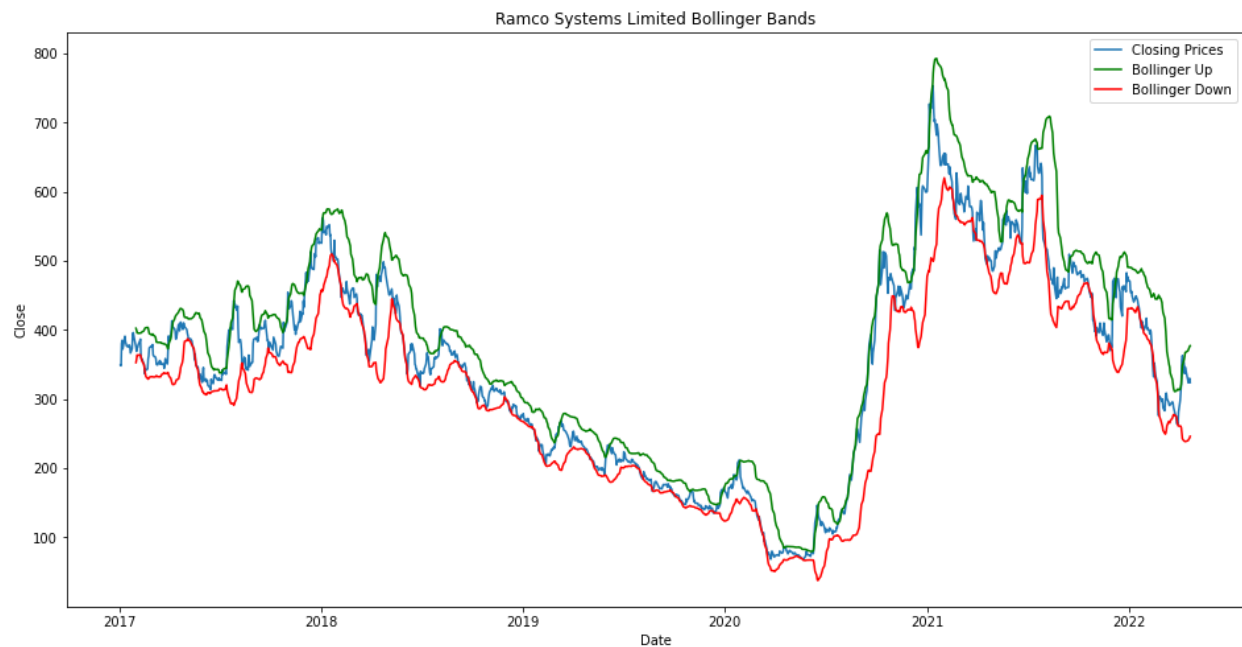
From 2020 June to 2021 the closing prices band is touching the bollinger up band indicating a strong buy signal.

TATA ELXSI

Tata Elxsi offers a full range of services, including research and strategy, electronics and mechanical design, software development, validation, and deployment, and is backed by a global network of design studios, global development centers, and offices. integrating strong subject understanding with over 30 years of technology and product development experience, that enable brands to differentiate and win.

Tata Elxsi uses design thinking and digital technologies including IoT (Internet of Things), Cloud, Mobility, Virtual Reality, and Artificial Intelligence to help customers reinvent their products and services.

Tata Elxsi share price was Rs 8,009.40 as on 25 Apr, 2022, 03:59 PM IST. **Tata Elxsi share** price was down by 4.17% based on previous share price of Rs 7,903.85.

TATA ELXSI			Min	Difference	Max
DCF Perpetuity growth rate			6423.639	2408.86462	8832.504
DCF Terminal EBITDA			1389.283	625.274129	2014.557
PE Ratio			4497.024	3861.19848	8358.222
EV/EBITDA			1081.874	354.07657	1435.951
EV/SALES			2193.86	5709.0946	7902.955
52 Week Low/High			2991	6429	9420
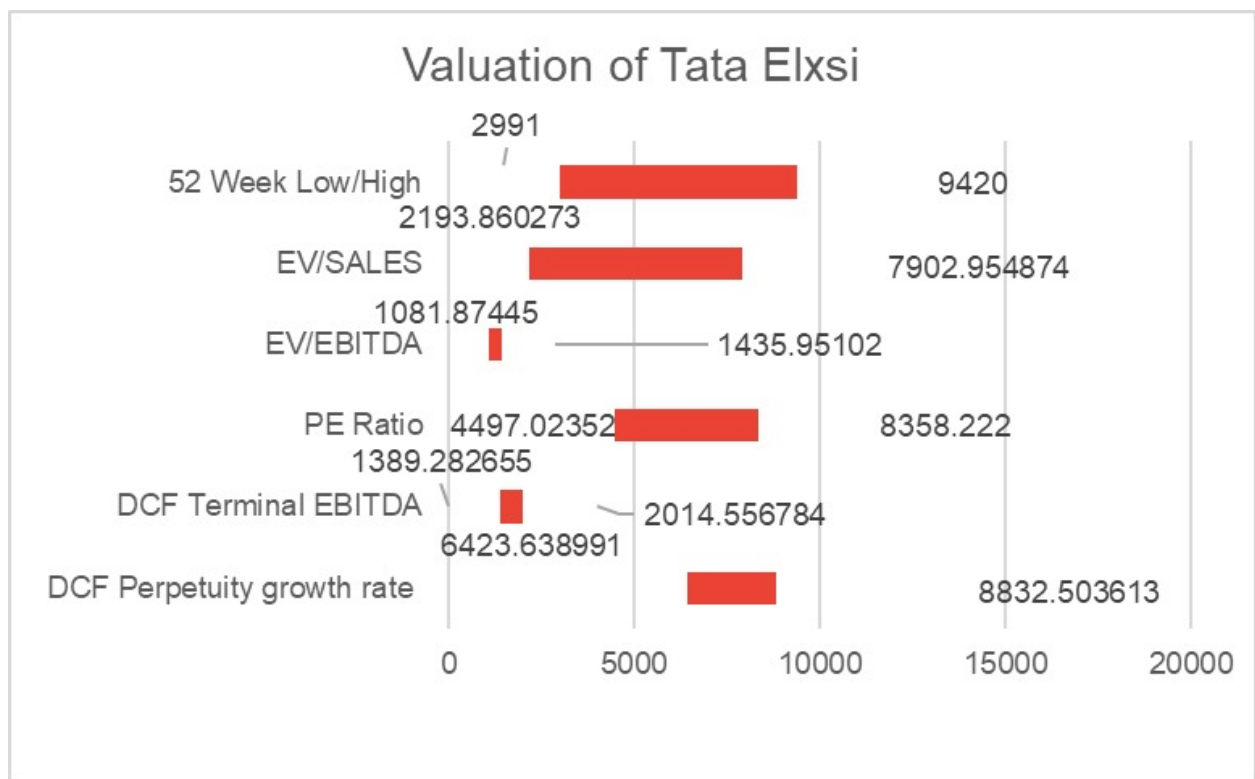
Current price:8009.40 As on 22/04/2022

Using DCF Perpetuity Growth rate method, we can see that the minimum projected value is 6423.639 and the maximum value is 8832.504

Using the DCF Terminal EBITDA method, the minimum and maximum projected values are 1389.283 and 2014.557 respectively.

Using the PE Ratio method, the maximum and minimum projected values are 4497.024 and 8358.222 respectively.

Using the EV/EBITDA method, the maximum and minimum projected values are 1081.874 and 1435.951 respectively.

Using EV/Sales method, the maximum and minimum projected values are 2193.86 and 7902.955

Using 52 Week Low/High the maximum and minimum projected values are 2991 and 9420 respectively.

It can be observed that the difference between maximum and minimum is highest for 52 week Low/High and lowest for EV/EBITDA method.
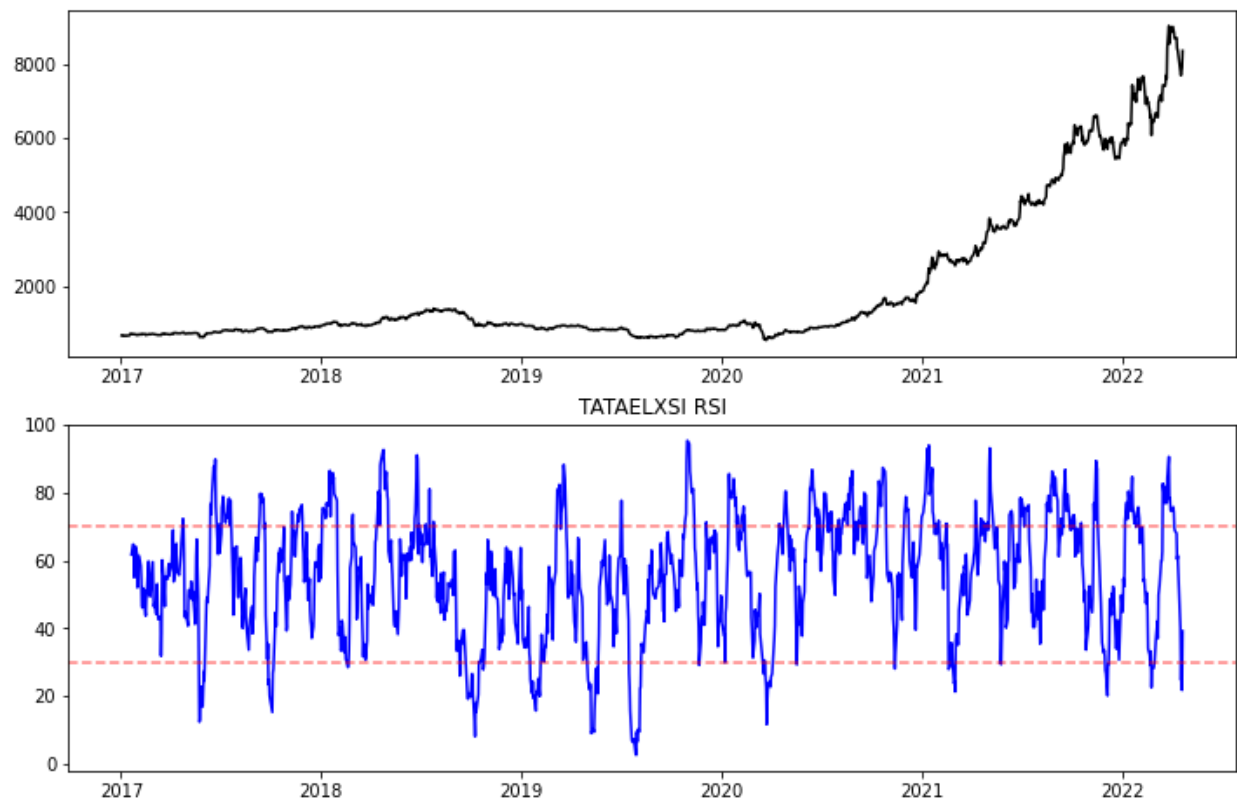
Using the DCF Perpetuity Growth rate method, we get the closest value to the current price.
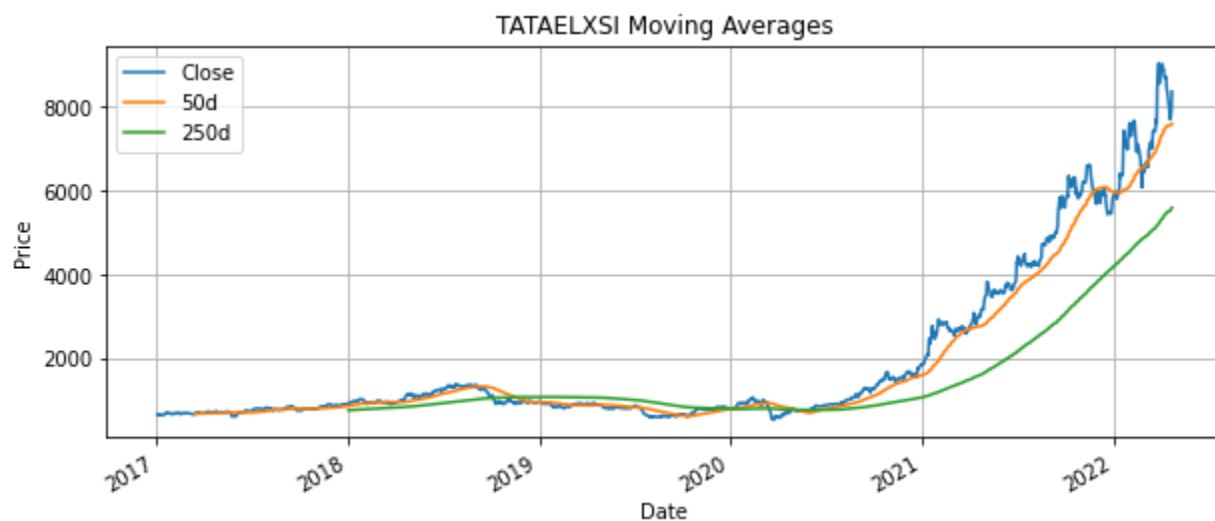
The 50 day curve dips below the 250 day curve in 2019 indicating a sell signal and then crosses and moves above the 250 day curve in 2021 indicating a buy signal.
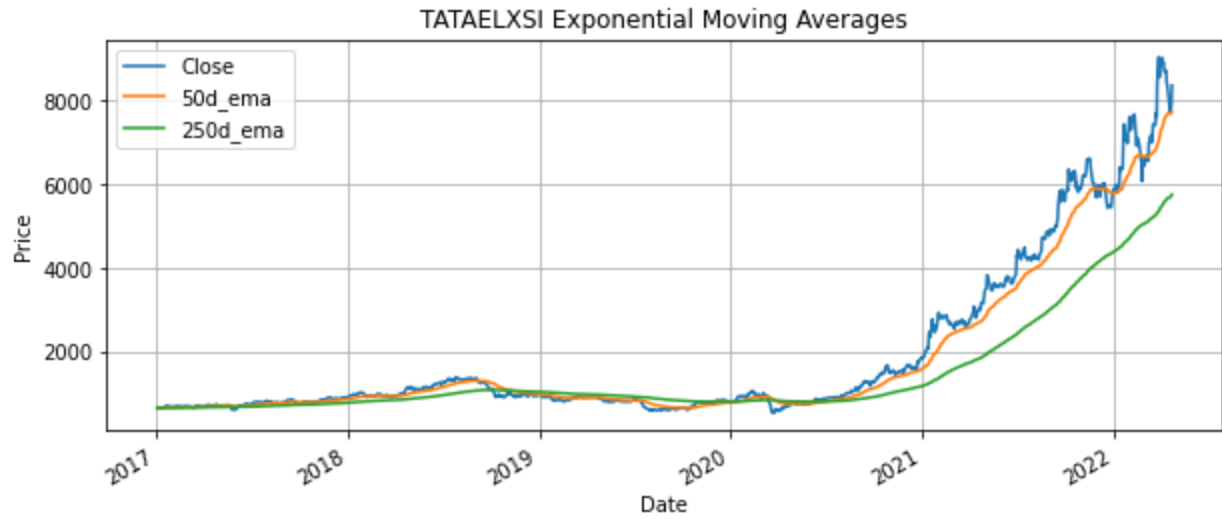
The 50 day EMA crosses the 250 day EMA in 2020 indicating a strong buy signal.

From 2020 to 2021 there are major overbought regions indicating sell signal.
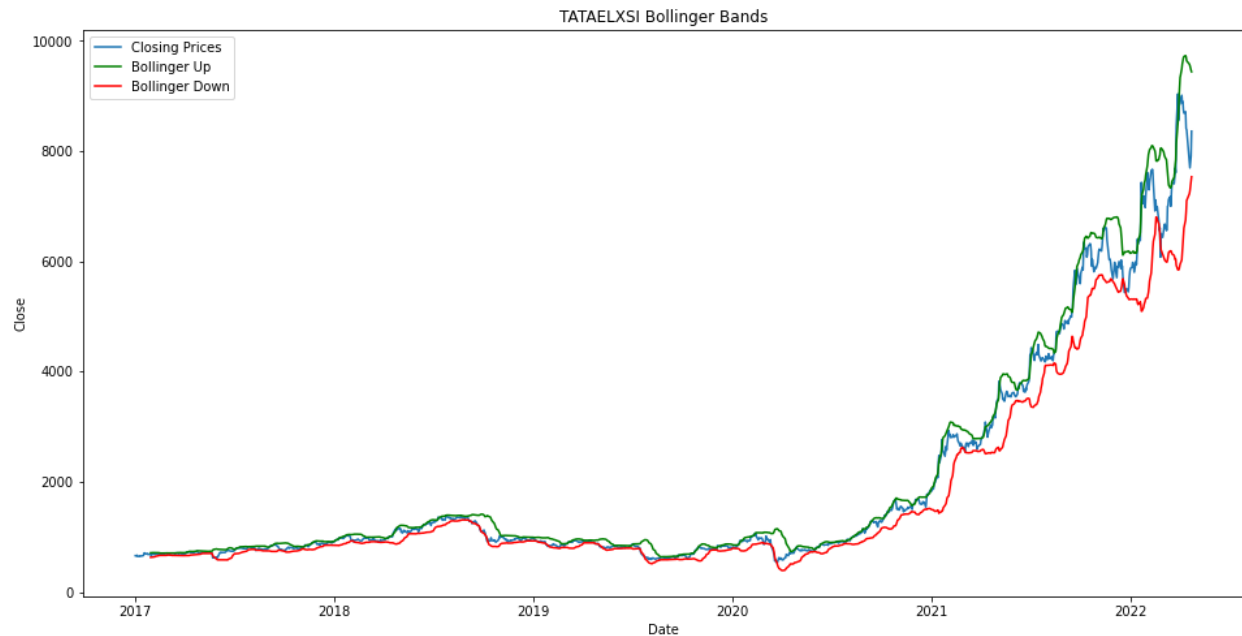
The SMA curve crosses the Bollinger Up Band in 2020 and stays coinciding with it from 2020 to 2022 indicating a strong buy signal.

L&T INFOTECH

Larsen & Toubro Infotech Limited (LTI) is a Mumbai-based global information technology services and consulting firm. LTI was recognised as the sixth-largest Indian IT services company in terms of export revenues by NASSCOM in 2017. According to the Everest Group's PEAK Matrix for IT service providers, it was among the top 15 IT service providers globally in 2017. LTI is a wholly owned subsidiary of Larsen & Toubro, which was founded in December 1996 as L&T Information Technology Ltd. (L&T).


During the years 2001–2002, the business's name was changed from L&T Information Technology Limited to Larsen & Toubro Infotech Limited, and the company received the SEI

Level 5 assessment in the same year. To reflect the changing business environment, L&T Infotech omitted the word "infotech" from its name.

			Larsen Tubro Infotech		
			Min	Difference	Max
DCF Perpetuity growth rate			1003.169	299.631	1302.8
DCF Terminal EBITDA			1257.161	365.91	1623.071
PE Ratio			4710.431	530.369	5240.8
EV/EBITDA			976.93	645.011	1621.941
EV/SALES			2541.639	3329.471	5871.11
52 Week Low/High			3525	4063	7588

Valuation of LNT
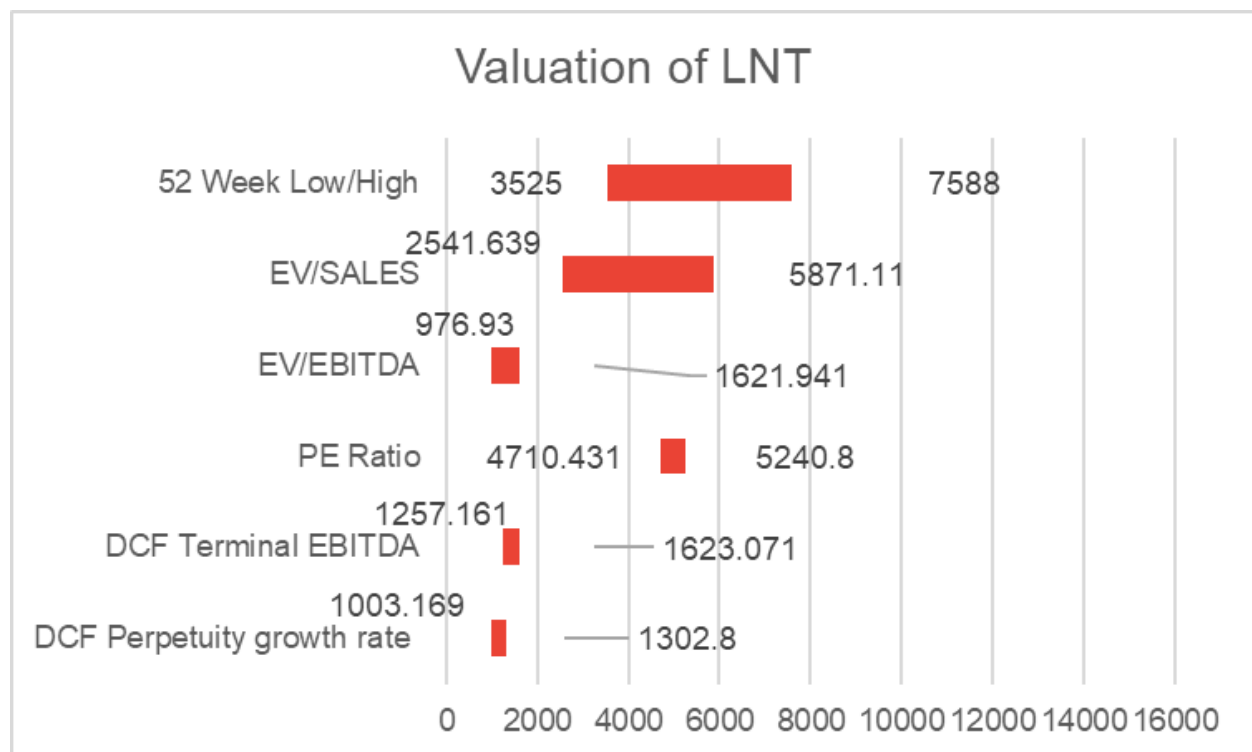
Current price:4856.05 As on 22/04/2022

Using DCF Perpetuity Growth rate method, we can see that the minimum projected value is 1003.169 and the maximum value is 1302.8

Using the DCF Terminal EBITDA method, the minimum and maximum projected values are 1257.161 and 1623.071 respectively.

Using the PE Ratio method, the maximum and minimum projected values are 4710.431 and 5240.8 respectively.

Using the EV/EBITDA method, the maximum and minimum projected values are 976.93 and 1621.941 respectively.

Using EV/Sales method, the maximum and minimum projected values are 2541.639 and 5871.115

Using 52 Week Low/High the maximum and minimum projected values are 2991 and 9420 respectively.

It can be observed that the difference between maximum and minimum is highest for 52 week Low/High and lowest for DCF Perpetuity growth rate method.

Using the 52 Week Low/High method, we get the closest value to the current price.
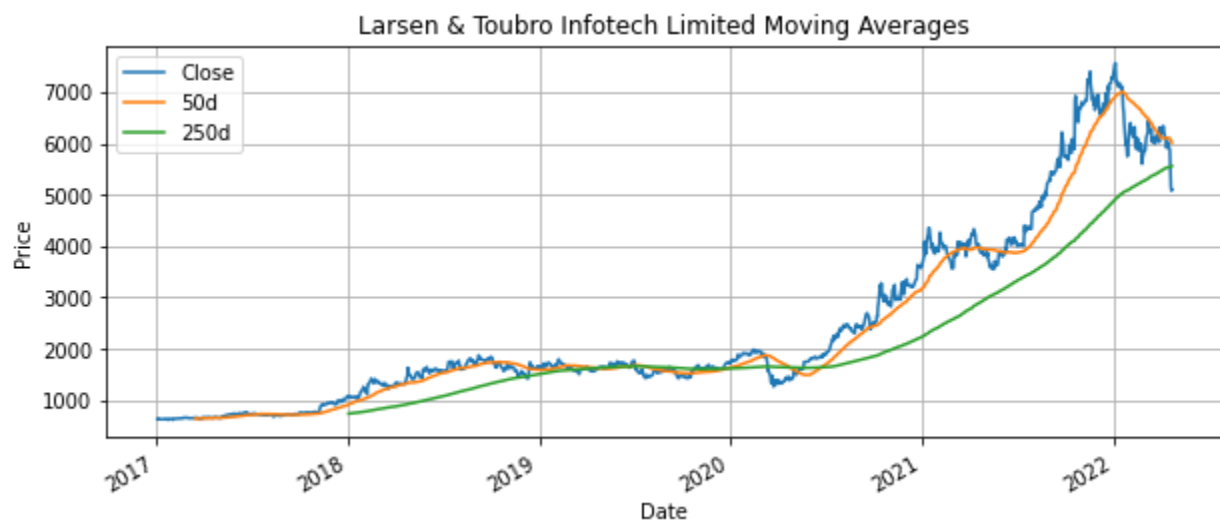
The major indication here is in mid 2020 when the 50 day SMA crosses the 250 day SMA indicating a buy signal.

Larsen & Toubro Infotech Limited Exponential Moving Averages
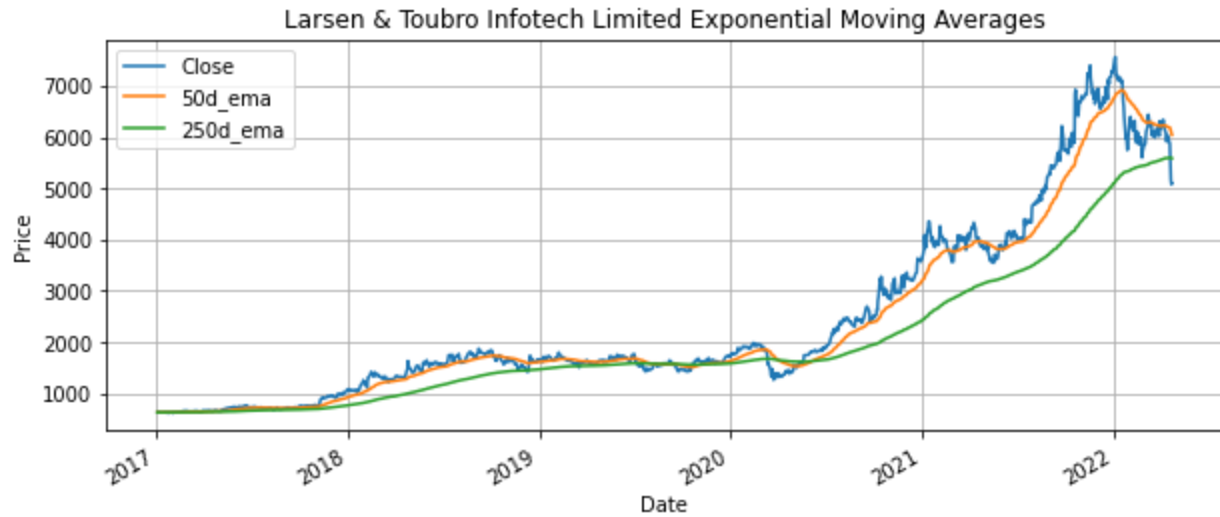
The 50 day EMA crosses the 250 day EMA and the gap broadens in 2020 April indicating a strong buy signal.

Larsen & Toubro Infotech Limited RSI
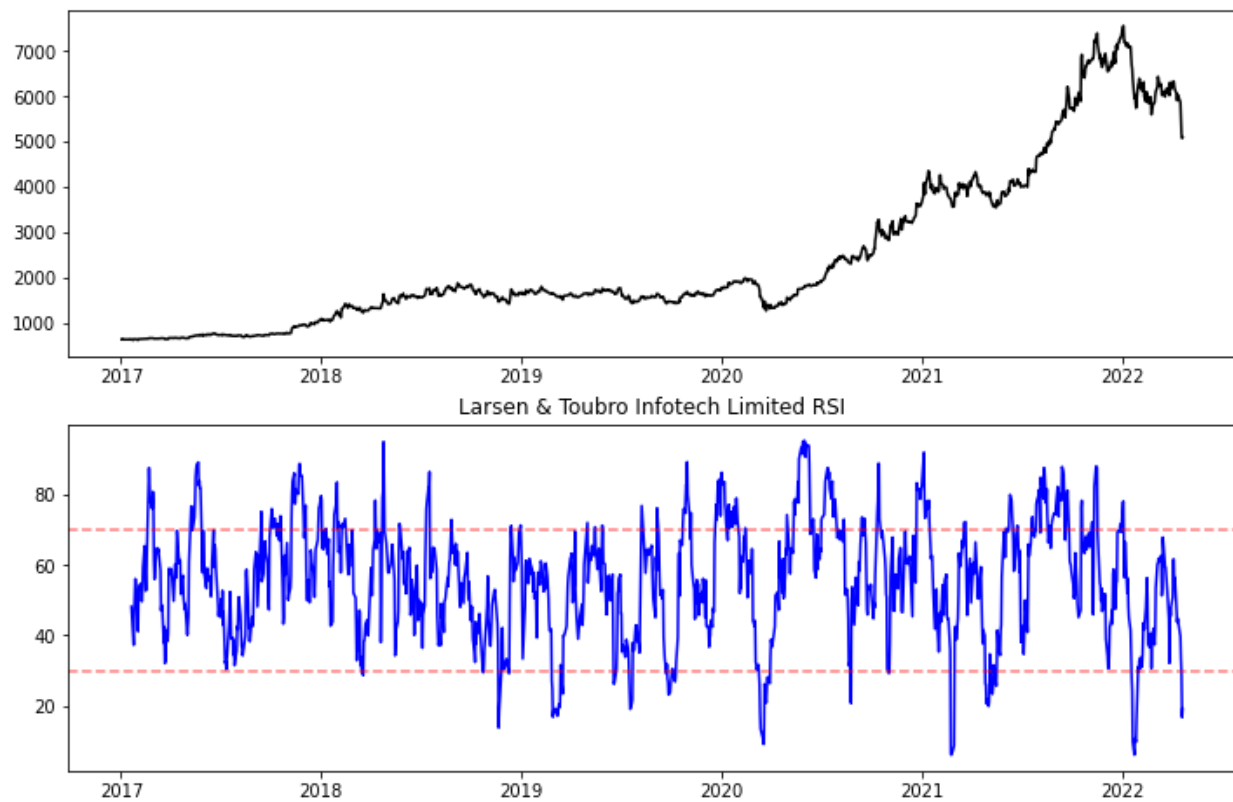
The major signals given by the RSI graph are overbought signal in 2017-18 and in 2020-21. There is no major oversold region for this company.

Larsen & Toubro Infotech Limited Bollinger Bands
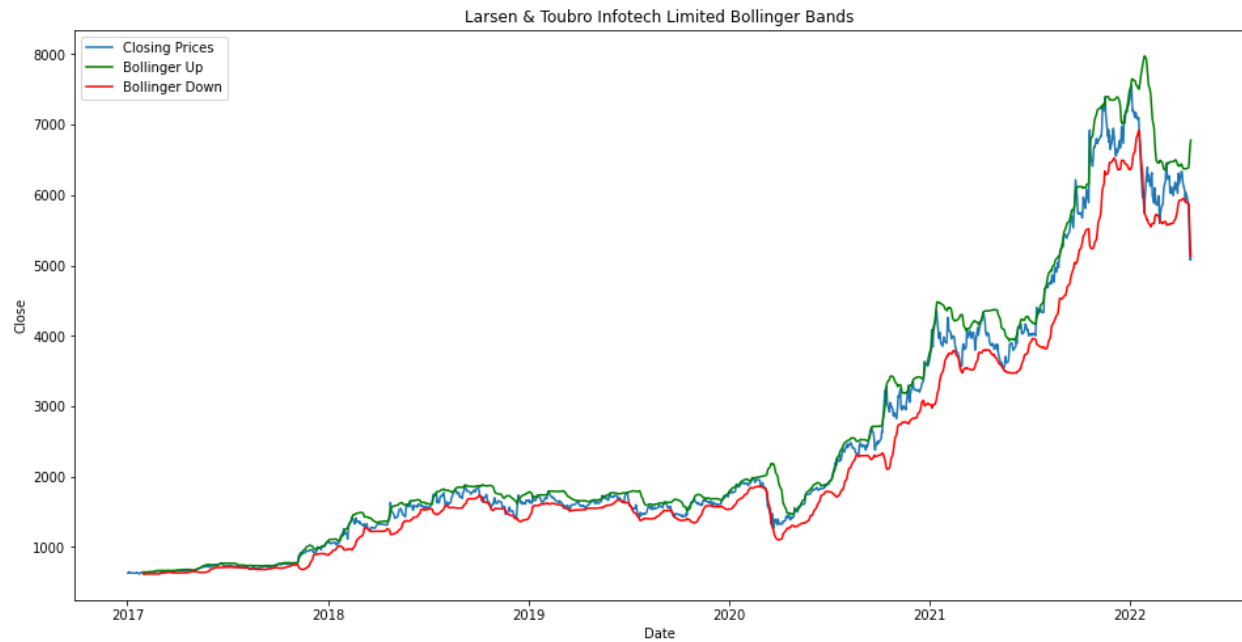
From mid 2020 to starting of 2022 the SMA line is coinciding with the bollinger up band indicating a strong buy signal. Here the bollinger graph is depicting a clear signal.

References

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https://www.moneycontrol.com/
https://epwrfits.in/
https://www.tcs.com/investor-relations
https://www.bloomberg.com/asia
https://www.nseindia.com/
https://www.screener.in/

Technical Analysis
https://colab.research.google.com/drive/1FEu4mcXzst-beqsoWJAKN3fymZJbaGng?usp=sharing