



# A STUDY ON APPLICATION OF ARTIFICIAL INTELLIGENCE IN STOCK MARKET PREDICTION

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## ABSTRACT

*Artificial Intelligence is a trending topic nowadays. It is believed that artificial intelligence will be the solution to all the existing societal problems and will help reduce human effort and also help improve the way humans interpret the world around them. In technical terms, artificial intelligence can be defined as a field of computer science that emphasizes on the creation of intelligent machines that think, work, and react like human beings. As of today artificial intelligence is being implemented in various fields such as medicine, engineering, agriculture, autonomous driving and flying etc. Finance is also an upcoming field where artificial intelligence is being implemented.*

*Stock market can be defined as an aggregation of various buyers and sellers of stock. A stock or a share can be defined as an ownership of a particular company, and an attempt to determine the future value of a particular stock of a company is known as stock market prediction. Many claim that stock markets are dynamic and chaotic in nature and there exist various methods or techniques that the investors use in order to invest in the stock markets. But due to this chaotic nature of the stock markets it sometimes becomes a bit tedious and difficult to use the existing statistical and analytical methods to forecast the stock prices.*

*This research paper basically focuses on how artificial intelligence is being used and how it can be beneficial to use artificial intelligence based analytical methods, software's and techniques for stock market predictions. This paper will also focus on some of the pre-existing artificial intelligence tools and software's that are being deployed by various companies for the purpose of stock market predictions and what is the impact of Artificial Intelligence on the future of trading. In conclusion it can be said that introducing Artificial Intelligence into stock markets will be beneficial for both traders and investors alike. It does come with its fair share of cons, but in the long run it will be advantageous.*

**Keywords:** Artificial intelligence, High Frequency Trading, performance, Sentiment Analysis, Stock Market.

## 1. INTRODUCTION

### 1.1 BACKGROUND

Artificial intelligence is a concept which has a lot of buzz surrounding it nowadays. Artificial intelligence is not a brand new concept; it has been around for quite a long time. The earliest work in the field of artificial intelligence was done in the mid 20<sup>th</sup> century; the name that can be clearly associated with this concept is that of Alan Turing, but during that time it was an undefined field and did not attract so much attention. The term AI was first officially coined in 1955 by John McCarthy (Dartmouth Conference), his definition for the term Artificial intelligence is regarded as the original and purest of the lot, he proposed "Every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problem now reserved for humans and improve themselves." (John McCarthy, 1955). Meaning Artificial intelligence is a machine with the ability to solve problems that are usually done by us humans with our intelligence. As of 1955 there were only a limited number of areas where AI was applicable, but as time progressed many more fields were added. And as of now AI already has a huge impact on our lives, having spread to almost every field and helping improve that field. Artificial intelligence is helping banks make loan decisions, helping doctors diagnose patients, autonomous driving, and it is even present in our mobile devices helping auto complete texts, recommending videos on platforms such as Netflix and YouTube, and in voice assistants such as Siri.

It has been a long standing fact that stock market investments fetch more profits as compared to any other type of investments. But the amount of profit an investor makes boils down to the selection of stock. Selecting a stock to invest in depends on the future performance of that stock, prediction or forecasting the future performance of a particular stock is called stock market prediction or stock market forecasting. A large amount of capital is traded through stock markets, and hence stock market prediction becomes an important area in the field of finance. There exists a lot of traditional ways of performing the task of stock market forecasting. With AI beginning to find its way into the field of finance, integrating it into the canvas of stock trading will only help optimize the whole trading process by significantly reducing the element of human error and promote more investments. There exists a few machine learning and AI methods that are being implemented by various companies in stock trading. We will have a look at some of those methods and how AI is changing the whole landscape of stock trading for good.

### 1.2 METHODS OF PREDICTION

Predicting the stock market is an interesting task, there exist many ways with the help of which such predictions can be made. These methods use various approaches such as company analysis, using statistics, studying charts etc. All these various methods can be combined under various heads which have been discussed below:-

#### 1.2.1 FUNDAMENTAL ANALYSIS

The main aim of fundamental analysis is to evaluate the underlying value of a company. It is basically a method to calculate the intrinsic value of an asset and analyze the factors that could influence its future value. This type of analysis is based on external events, external influences, industrial trends, and also the financial statements of a company. Fundamental analysis can be broadly categorized into two types namely; top-down analysis and bottom-up approach.

Top-down approach or analysis starts with a broader view of the economy and narrows it down to the industry and ultimately to the specific company, on the other hand bottom-up analysis begins with the particular stock and expands to all the other factors such as industry and economy that impact the price. As it is evident from the types of fundamental analysis that there exists analysis of three factors namely economy, industry, and finally company.

At an individual level all these three factors are extensively analyzed in order to reach an investment decision. On the economic front factors such as monetary policy, industrial production, GDP, Inflation and various other macro-economic factors are analyzed. Industry analysis can be performed with the help of Michael Porter's Five Force model or SCP Analysis. Company analysis is performed with the help of balance sheet analysis, P&L analysis, and Cash flow analysis.

### 1.2.2 TECHNICAL ANALYSIS

Share prices are really volatile, one day they are up and one day they are down, they keep fluctuating and are barely stable. But over time some particular patterns and trends emerge. In this particular method the analyst studies the trend of the share prices. In other words, it is a method of security evaluation by analyzing the statistics that are generated by various market activities such as price and volume of shares. Technical analysis uses charts and tool in order to predict the future activity. The whole concept of technical analysis revolves around three basic assumptions which are as follow:-

- (1) Market prices reflect all the information regarding a stock
- (2) Patterns always tend to repeat itself.
- (3) Stock prices follow a trend.

Technical analysis can be performed with the help of charts, momentum indicators, and moving averages (figure 2). Many technical analysts use the concept of Fibonacci numbers (the golden mean), Elliot wave principle, Dow Theory etc. The term technical analysis is a wide term consisting of a wide range of techniques all of which are based on analyzing past information in order to determine the future performance.

### 1.3 EFFICIENT MARKET HYPOTHESIS

“The efficient Market Hypothesis essentially says that all known information about investment securities, such as stocks, is already factored into the prices of those securities. Therefore assuming this is true no amount of analysis can give an investor an edge over other investors, collectively called the market.”(Eugene Fama, 1970) The main idea behind the hypothesis is that the prices of traded assets such as stock already reflect all the publically available information and if you are investing on the basis of publically available information you will not be able to outperform the market. Stock returns are hard to forecast as old information is already incorporated in stock prices and new information is by definition unexpected or random. Efficient market hypothesis repudiates both technical and fundamental analysis; it also goes against this whole concept of using AI for stock market forecasting.

There exist three different forms of EMH namely strong, semi-strong, and weak. **Strong form** states that the prices are indicative of the information both private and public, and it implies that it is difficult to outperform the market even with insider information. According to **Semi-strong form** the prices are indicative of all the public information and expectations about the future, according to this the prices adjust very quickly to new public information and old public information cannot be used to make superior returns. **Weak form** states that past prices, returns, volume and other market statistics provide no information that can be used to predict the future prices, it basically rejects technical analysis.

### 1.4 ARTIFICIAL INTELLIGENCE IN STOCK MARKET PREDICTION

Since the past few years artificial intelligence has made advanced that has disrupted the financial sector. It has transformed the way we interact with money, it is helping the financial industry to better optimize and streamline the process ranging from credit decisions to trading and financial risk management. Artificial Intelligence has given the world of finance a new way to meet the demands and need of customers, who with these changing times are demanding smarter, convenient, efficient and safer ways to spend save and invest their money.

Artificial intelligence can be termed as the future of stock trading. Using robot-traders, machine learning, analyzing millions of data points all with greater accuracy and efficiency. Implementing artificial intelligence into stock trading will not only helps traders, investors take better and efficient decisions and will also help increase the investor base.

#### 1.4.1 BIG DATA & STOCK MARKET

Big data is a term that describes large volume of data the data may be structured and unstructured. The data is so large that it becomes difficult to analyze and process the data with the help of traditional methods. Gartner's definition, circa 2001 “Big data is data that contains greater variety arriving in increasing volumes and with ever high-velocity”, which is still a go to definition and covers the 3V's which are synonymous with big data. These large data sets or large amount of data can be collected from various sources such as social media etc.

Decision making is based on how much information is available to the individual, more the information available the better and informed will be the decision taken by the individual. Artificial intelligence also works on the same concept, the more data you feed into the machine the better will be the decision taken by the machine. Stock market is rarely stable, it keeps fluctuating and this happens in real time, therefore it would be safe to say that stock market is filled with real time data and information, in other words there exist large amount of data sets associated with stock markets. These data sets not only contain real time data but also contain data sourced from social media like facebook twitter etc and can be either an image, a word document etc. These data sets if collected on a regular basis could easily be peta-bytes even exabytes or zettabytes. These data sets will keep expanding with time and the traditional databases are not capable of coping with such huge amounts of data.

Big data provides us with the opportunity to analyze this large amounts of data that is generated from breaking news down to a social media post. All this data is important because of the volatile nature of the stock markets and its ability to fluctuate

## 1.4.2 MACHINE LEARNING & STOCK MARKET INVESTING

Whenever you indulge in the act of online window shopping, or may have recently purchased something online you keep receiving product recommendation either through emails or somehow the application magically recommends the exact product that matches your taste. It is all thanks' to machine learning. Machine learning is everywhere, from "Ok Google" to complex medical diagnosis and procedures. Machine learning can be defined as the ability of computers to learn new things autonomously with the help of data, past experiences and observations. More the data a computer processes, better will be the decisions and conclusions made.

Stock market forecasting is not what it used to be a decade ago, there are a large number of factors that lead to the fluctuation of stock markets and all these factors are required to be taken into consideration while predicting the stock market. In other words stock markets are unpredictable and possess a chaotic structure which makes it sometimes really difficult to predict a particular pattern or trend. If all this available data is fed into an algorithm it will be able to find a pattern amongst this chaos and predict the how it will affect the future.

### 1.4.2.1 ALGO TRADING

An algorithm is defined as a clear set of instruction designed to carry out designed to carry out a particular task or process. If we want a machine to perform a particular task or process for us we need to explain that task clearly by setting instruction for it to execute. In ALGO TRADING we can write an algorithm and instruct the machine of the computer to buy or sell a particular stock when the desired conditions are met. These algorithms have the capability to analyze every quote and trade, identify liquidity opportunities and use all this information to make intelligent trading decisions. A computer that is programmed with a trading algorithm can trade at a speed and frequency which impossible for a human trader. Another concept that is quite similar to Algo-trading is a term called automated trading; these terms are very often used interchangeably

Algo-Trading makes the market more liquid and makes the whole trading system more systematic by removing the impact of human emotion in the process of trading. Apart from this using algo-trading reduces the risk of manual errors while placing the trades, the trades will be executed at best possible prices, trades are timed instantly and correctly, and reduces transaction cost due to a lack of human intervention. Algo-Trading has been in use for more than a decade, and it accounts for majority of trades that happen across stock exchanges globally and has helped many hedge funds gain success most notable being Renaissance technologies. But as it is with every new emerging technology, there still exist a great deal of confusion and misnomers related to this concept and it is yet to be fully accepted.

HFT (High frequency trading) is a subset of automated trading used by large investment banks and hedge funds. Basic concept behind HFT is using powerful computers to execute a larger number of orders at extremely high speeds. These HFT platforms allow a trader to scan multiple markets and execute large number of orders. Some critics feel that high frequency trading provides larger firms an advantage over smaller investors.

## 1.4.3 SENTIMENT ANALYSIS

Sentiment analysis can be defined as method to understand public attitude towards a particular topic or a product. Nowadays social media has become a platform which attracts majority of the world's internet traffic. It is



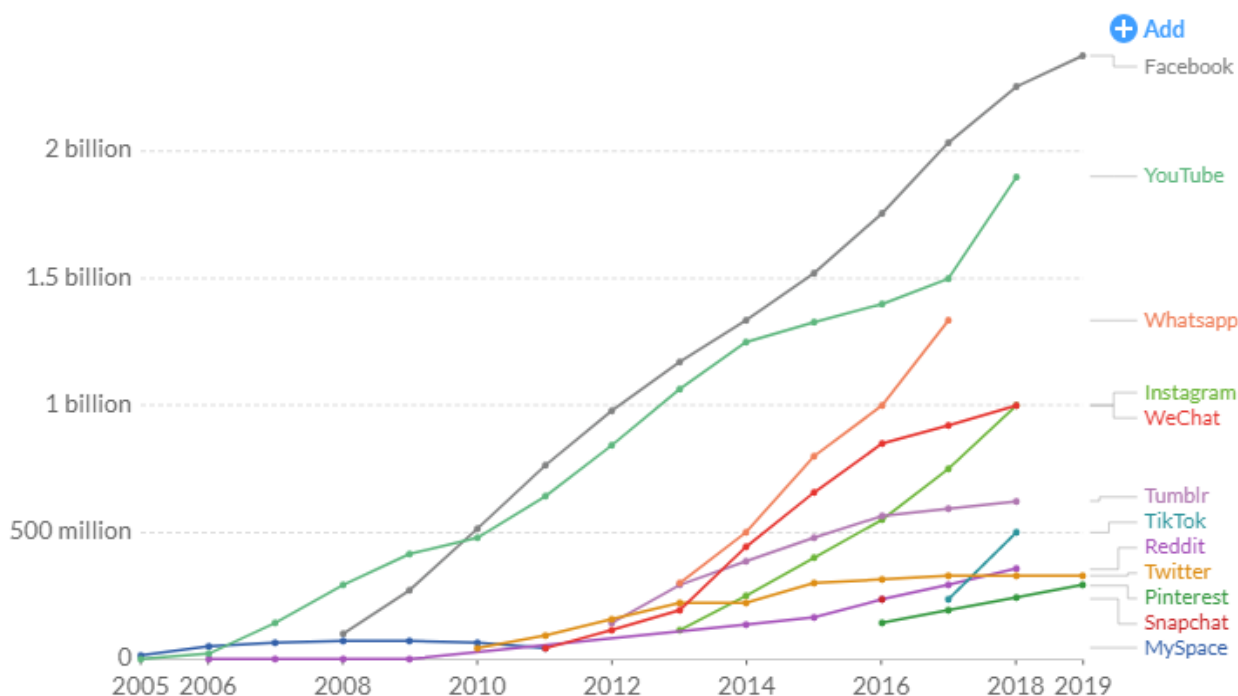
evident from fig (4) that the number of social media users across various social media platform is increasing steadily. As of 2019 statistics show that there are 3.5 Billion social media users worldwide (Emarsys, 2019.Oberlo, 2020), if we break these users down according to generation 90.40% of these are millennials (Emarketer,2019) be it a new product launch, review of a product or opinion about a topic or a product everything is available on social media.

Fig 1 Number of People Using Social Media Platforms

### Number of people using social media platforms, 2005 to 2019

Estimates correspond to monthly active users (MAUs). Facebook, for example, measures MAUs as users that have logged in during the past 30 days. See source for more details.

Our World  
in Data



These public opinions, reviews, product launches and how people react to these events has a major impact on the stock market. Analyzing these post, messages, or in other words attitude of people can really help in predict the stock market or even better predict the future of a particular stock. But analyzing these thousands and even millions of post is really a difficult and tedious task.

Using an algorithm, a computer can be programmed to analyze thousands of messages and determine which type of message will have a positive impact and which message will have a negative impact on the stock markets. The algorithm should be programmed in a way that gives the machine an ability to study texts, post and reviews, basically giving it the capability to interpret and analyze text. The machine is trained to look for patterns which are common with particular types of messages. The machine should also be capable of identifying the difference between data that is required and the data which is not required.

### 1.5 ARTIFICIAL INTELLIGENCE SOFTWARE'S

There has been a significant increase in the users of finance apps, and there has also been an increase in the number of software companies that have come up with AI based software's for trading. Some of the companies using AI in trading include-

- (1) **Trading Technologies-** They have an AI platform that identifies complex trading pattern on a large scale. They use machine learning technology with big-data processing power.
- (2) **Greenkey Technologies-** The use speech recognition coupled with natural language processing technologies to save traders time by allowing them to sift through notes, market insights, and trending companies in real time.
- (3) **Kavout-** Uses AI to recommend daily top stocks, and does this with the help of pattern recognition technology and a price forecasting engine. It also models portfolios that enhanced with the help of AI algorithms.

- (4) **Auquan**- This particular platform democratizes trading by allowing data scientists from all backgrounds to produce algorithmic trading strategies. As a result the clients can reap benefits of data scientist.
- (5) **Equibot**- IBM-affiliated technology combines AI with an active exchange traded fund. This collects data from various sources such as news articles, social media postings, financial statements etc and systematizes the investment process.
- (6) **TechRadar**- Provides two service, chat room services and a trading alert system. The algo used is called a lossless algorithm and this is believed to minimize trading risk by tracking the markets and tracking support and resistance strength.
- (7) **Trade Ideas**- A standalone market scanner that provides the investor with real-time trading opportunities. They have created a trading system called “Holly” an AI bot.

Some of the other major players in this area include-

- (1) 8topuz
- (2) hiHedge
- (3) Neotic
- (4) Trading Depth

**I Know First** created an AI predictive system for the Indian stock market. The firm uses an advanced self-learning algorithm to analyze, mode, and predict the stock market. The output of the algorithm is a predicted trend as a number, which is used by the traders to identify when to enter and when to exit the market. Some mother examples in India include **AiProfits, Robotrader** (JB Capital Technologies) just to name a few.

## 2. LITERATURE REVIEW

Kinjal Patel, 2018, in her paper has stated that Artificial Intelligence has slowly made its way into every sector and it has helped improve these sectors. Artificial intelligence has been implemented by various financial institutions in various innovative ways to avail the benefits such as saving time, reducing cost and adding values. This paper highlights how artificial intelligence is used in finance, such as fraud detection, improving and increasing the security, client side user authentication etc. Now there also exists certain disadvantages such as it being time consuming and a little expensive. K Hiba Sadia, et.al., 2019 through their paper reviewed the use of random forest, SVM (Support Vector machines) on the datasets and the outcomes it generates. It states that the techniques of random forest and support vector machine are not exploited fully. The authors of this paper presented a more accurate and a more feasible method to predict the stock market movement with higher accuracy. After conducting the research and analyzing the various data points and historical data the authors were able to conclude that random forest is the most suitable and a great asset for both brokers and investors.

Anshul Mittal, et.al., 2012 with the help of this paper have tried to establish a correlation between “Public Sentiment” and “Market Sentiment” with the help of data collected from twitter. They collected a large amount of data (tweets) and they tried to capture the public moods with the help of simple natural language processing techniques. The dataset used for this research only includes tweets of English speaking population; hence the population size is small. But they were able to obtain a correlation that people mood does effect there investment decision. Rajan Bhawe, et.al., 2020, began this paper by highlighting the fact that a company raises fund primarily through stock markets and predicting stock markets is a difficult and interesting task. There are many factors that play a role in affecting stock prices. With the help of this paper they have tried to develop a system which will predict stock prices by relating it with the previous performance of the stock, they have used the data provided by yahoo finance.

Aditya Bhardwaj, et.al., 2015, in their paper focused on the Indian stock market in particular. They performed sentiment analysis on the data fetched from SENSEX and NIFTY live servers at different time intervals. Apart from this they have also provided a brief about sentiment analysis and how it can be used to predict the stock markets. Singh Krishna Kumar, 2018 has sheds some light on the concept of green computing, which is a new buzzword is in today's time and is considered to be the solution to a lot of societal problems. The Indian stock market has been

selected for the researcher and the researcher tries to use the Indian stock market for simulation of green financial model. This paper also provides some idea the big data analytics model in financial markets and the green database model. The software that was used for the simulation was ORACLE database, 4 different algorithms for the databases were created.

Vanipriya, ch, 2016, through this paper tries to provide an image and a idea of a decision making system of stock investment, and the same will be achieved through the implementation of a system that processes information such as news articles and historic stock prices and analyses them to predict future stock prices. The author tries to study the impact of news articles on stock prices; a prediction model has been designed based on the relationship between stock prices and news articles. The overall idea behind this is to provide a predictive power to the investor in this era of the internet.

Smita Agrawal, et.al., 2018, highlighted the importance of artificial neural networks and their role in stock market predictions due to their ability to deal with uncertain and insufficient data which fluctuates in very short time intervals. The main aim of this research is to forecast stock prices of companies with the help of efficient neural network models. There exist numerous methods such as genetic algorithms, but the reason for selecting artificial neural networks is ability and capacity to deal with nonlinear, complex and unpredictable behavior of stock market. Indrani Mukherjee, et.al., 2011, the main idea behind their work is to analyze as to why there is a lack of participation in the Indian stock market and also to provide solutions to the same. Apart from this also studies the investment behavior of general people of India and their participation, also provides the solution to the problem of lack of participation. The stock market in India is amongst the largest, 4<sup>th</sup> largest in Asia and 8<sup>th</sup> largest in world, and as of 2010 with a market capitalization of US\$ 1.63 trillion. But still the participation of the general public in the Indian stock markets is declining; Indians mostly prefer to put their funds or savings in fixed income bearing securities.

S Kumar Chandar, et.al., 2016, through their research have tried to provide predictive models which are adaptive, flexible, and scalable, and which utilizes the full potential of neural network models. These models are used for foreign exchange rate prediction, stock market price prediction, and gold price prediction. The proposed models in this paper aim to improve the forecasting of the business applications in ever-changing economy. All these models use previous data to analyze and predict the performance which will help business to perform better.

V Kranthi Sai Reddy, 2018, stock trading is amongst the most important areas in finance, and forecasting the stock market is one of the most difficult tasks due to ability of the stock markets to be so unpredictable. This paper focuses on predicting the stock market using machine learning. Python has been used as the programming language to perform the task of stock market prediction; the machine learning technique used is called SVM (Support Vector Machine). The data used for this has been collected from various global financial markets, and the model created was able to generate higher models.

### 3. RESEARCH METHODOLOGY

The aim of this paper is to highlight the application of Artificial Intelligence in stock market prediction. It highlights how using Artificial intelligence in the field of stock market prediction can be beneficial and also how various Artificial Intelligence technologies will be beneficial. The present study is a qualitative in nature and is a case study with the aim to provide the reader with a basic knowledge and idea about the topic. It uses secondary data that has been collected from various sources like journals, books and internet based websites.

#### Research Objectives

- (1) To study the application of Artificial Intelligence in Stock Market Prediction.
- (2) To understand how application of Artificial intelligence has benefitted investors.
- (3) To explore some of the Artificial Intelligence tools/software's that have been implemented.

## 4. ANALYSIS & INTERPRETATION

Artificial Intelligence has disrupted the financial sector. Finance sector was one of the early adopters of Artificial Intelligence in comparison to other industries. Artificial Intelligence has a myriad of applications in the finance sector. Implementing artificial intelligence in stock markets comes with its fair share of advantages and disadvantages;

### ADVANTAGES

- Allows for real time analysis and monitoring of stock markets
- Major benefit of Artificial Intelligence in the field of trading will be that it has the ability to consider patterns which are not humanly possible.
- This pattern recognition can be done at a comparatively faster pace to a human advisor.
- Investment decisions that are made by Artificial intelligence will be accurate, unbiased and calculated unlike those made by human advisors.
- Artificial Intelligence can help plan for potential problems.
- Artificial Intelligence is also helpful in the back end of financial trading such as IT related issue, financial data processing and labor reduction related to auditing and compliance.

### DISADVANTAGES

- One major drawback of Artificial Intelligence adoption is skills shortage, i.e. availability of the technical staff with training and expertise required to deploy the technology
- Cost is another drawback. Artificial Intelligence is not cheap, the cost of procuring and large scale implementation comes with a price.
- Privacy becomes a major concern while implementing Artificial intelligence technologies.
- More the automation more the job losses, more the redeployment of work forces.

#### 4.1 HOW ARTIFICIAL INTELLIGENCE IS CHANGING INVESTING HABITS.

A lot of brokerage firms are investing heavily in technologies such as big data, machine learning, artificial intelligence, chat bots, social media etc. Gone are the days when an investor used to stay glued top his television sets, and going through a large number of recommendations provided by brokerage firms in order to gain an idea as to how to invest and in what to invest. Nowadays chat bots are answering investor queries and investment is mostly done through mobile applications.

These brokerages are investing into the latest disruptive technologies in order to attract tech-savvy millennial, with high a higher disposable income and are always on the lookout for a quick buck. Firms like Edelweiss Securities, HDFC Securities and Karvyetc with the help of chat bots have introduced a concept of “conversational investing”, these bots allow you to invest in mutual funds, check your portfolio, view mutual fund and stock recommendation etc. With time new technologies such as voice assistant (ARYA- HDFC securities) will be more prominent and allow you to invest in stocks with the help of voice commands.

Trading firms have not only limited themselves to chat bots, they are also using technologies such as machine learning and big data analytics to implement predictive analytics in order to understand consumer preferences and acquire new customers. For example; if an investor is constantly checking the price of a particular stock, he/she would receive a prompt whenever there is sharp movement in the price. Firms send complete information/ detailed analysis of a stock with historical data points, comparison with other stocks on various parameters etc. in order to allow the investor to make a smart choice. Data analytics are used to identify interest of the investor by analyzing various data points. Data analytics can also be used to identify various dormant customers and increase communication with them. Edelweiss securities launched TX3 platform which provides speedy trading and analytical solutions, allowing customers to analyze market data and place their trades all at one place. Firms like Zerodha and Upstox are changing the way trading is done, there main focus is on millennial investors who are comfortable with digital platforms. Zerodha uses cloud based solution to provide instant stock updates to the investors. Upstox uses a trading platform which is supported even by a 2G connection, hence catering to a larger audience.



## 4.2 SEBI, NSE AND ARTIFICIAL INTELLIGENCE

Securities and Exchange Board of India has decided to tap the potential of Artificial Intelligence and big data in order to curb manipulations (PTI, The Hindu). SEBI plans to create a “data lake” project in order to harness the capabilities of technologies such as Artificial Intelligence, Machine Learning, and Big Data etc. After some research and keeping a close eye on social media posts, SEBI was able to conclude that social media posts have been used to manipulate the securities market. “Catching malpractices using standard tools and software’s that only analyze structured data of price and volume is a difficult task” (Ajay Tyagi, Chairman SEBI). SEBI intends to use this technology in order to analyze unstructured data such as social media post. SEBI chief was also quoted as saying that the technologies such as Artificial Intelligence, machine learning, carry the potential to bring about a paradigm shift in the securities market landscape. Artificial Intelligence and machine learning tools are already used in various fields like trading fund management, supervision, surveillance etc.

National stock exchange plans to use machine learning, artificial intelligence and blockchain technologies to improve delivery services, operational efficiencies and reduce costs. In the past various sensitive information about various companies was leaked through whatsapp even before their official announcement. NSE aims to incorporate these technologies in order to improve their surveillance systems to prevent such activities from happening. This move is also done keeping in mind the future where AI seems to be taking over the world of securities market slowly.

## 4.3 IMPACT OF ARTIFICIAL INTELLIGENCE ON THE FUTURE OF TRADING

In a survey conducted by the Swiss stock exchange when the traders were asked about the impact that Artificial Intelligence will have on trading, about two-thirds of the traders believe that it will provide with more trading opportunities. As shown in figure 5 Two out of three believed that it will reduce the overall cost of trading, but there still exist some who believe that Artificial Intelligence will create a more volatile market condition. Innovation in the space of Artificial intelligence will allow the industry to become more effective and will be able to withstand future risks and challenges (Tony Shaw, Securities and exchanges at SIX). Various stock exchanges are looking at ways to incorporate this into their ecosystem in order to provide the customers benefits throughout including trading and post-trading. Many traders believed that Artificial Intelligence will help reducing the trading hours and will have a number of operational benefits, but some (6%) felt that reduction in trading hours will lead to increase in the trading cost (figure 6)

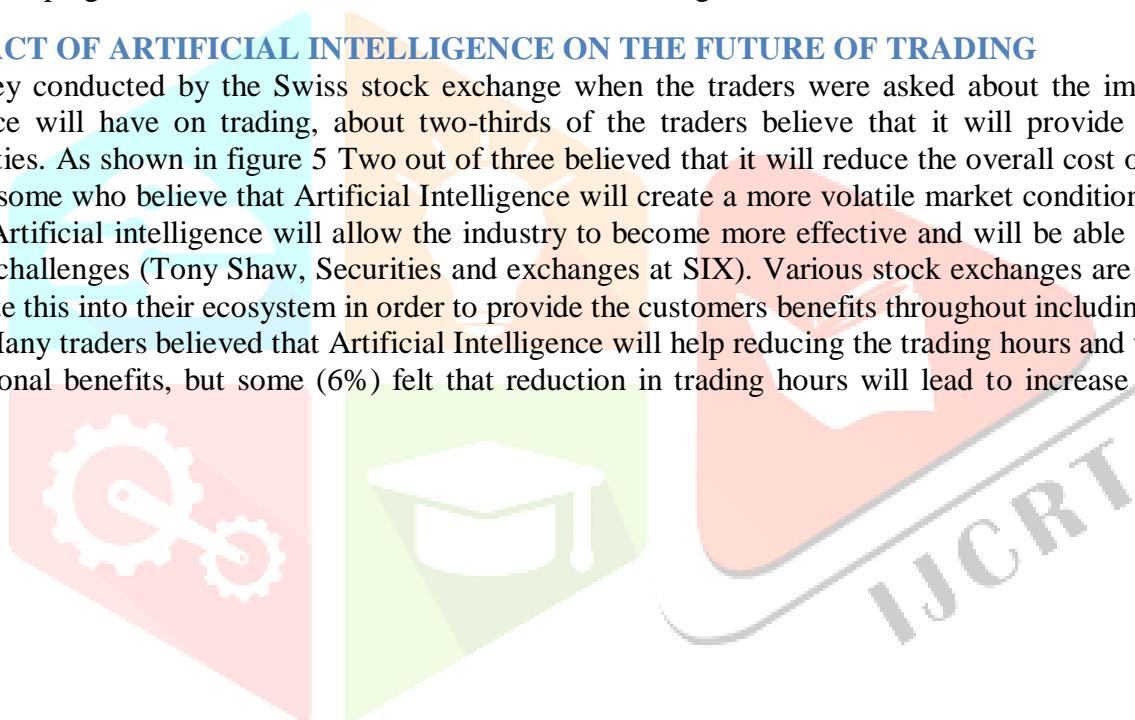


Fig 2; Artificial Intelligence will create more trading opportunities for equity's traditional business

### Artificial Intelligence will create more trading opportunities for equity's traditional business

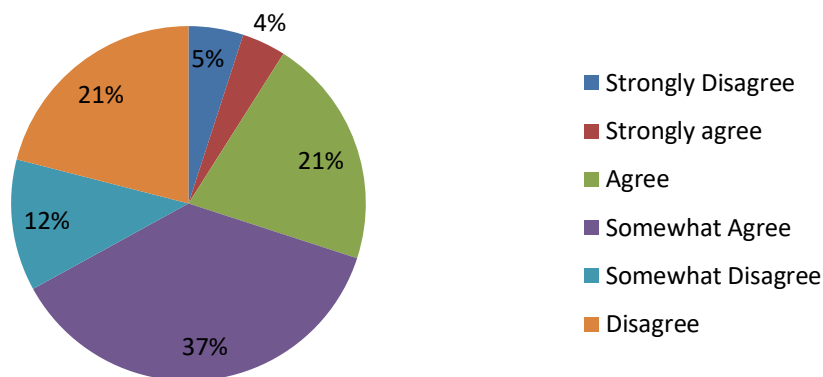
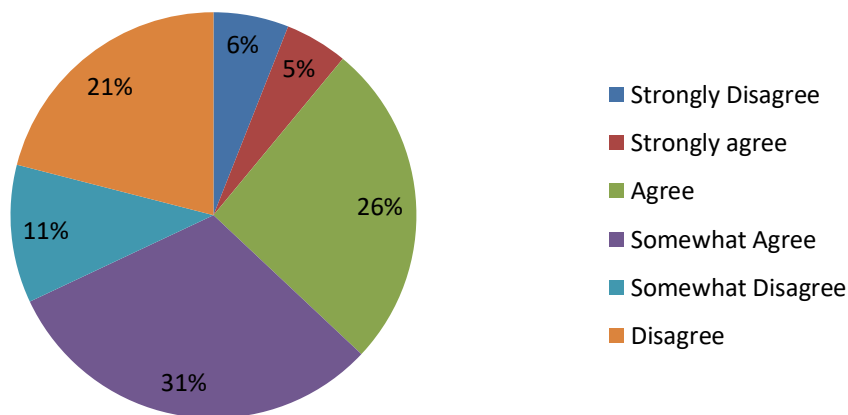


Fig 3; Artificial Intelligence will reduce the cost of trading

### Artificial Intelligence will reduce the cost of trading



Source- Mondovisione.com

In order to be competitive in the stock market one must regularly read the news and constantly monitor the stock market. This is another area where technologies like Artificial Intelligence, Big Data, and Machine Learning are really advantageous. These can be programmed and implemented in a way to provide advice to the investors after analyzing all the relevant data. Some can be programmed to recognize patterns and analyze those patterns in order to perform real-time risk assessment in order to ensure compliance. Artificial Intelligence also helps with the back end of financial trading; companies are using Artificial Intelligence to resolve IT-related issues. For financial data processing, and also to reduce the labor associated with compliance auditing and other regulations. Artificial Intelligence can also provide for automatic documentation when certain tasks, transaction and activities happen, this can really come handy in industries that are heavily regulated and industries such as banking, trading and finance fall under that category.

According to a KPMG report 'Transformative Change', around 60% of fund managers believe that Artificial Intelligence and Machine Learning will have an impact on their way of conducting business. But this figure is not only limited to 60%, according to KPMG some managers don't take into account some of the existing uses of Artificial Intelligence and Machine Learning. According to the same report many firms have started investing in these technologies and many believe that it will enhance the way they work and also be beneficial in the long run.

## 5. CONCLUSION

Technologies such as Algorithmic Trading or automated trading are being used by many companies and many retail investors for quite a long time. But this is not the only artificial intelligence that can be used for predicting the stock markets. The way Artificial Intelligence has disrupted various sectors, it won't take that long before Artificial Intelligence is completely takes over stock trading (Financial Singularity). Implementing Artificial Intelligence into stock trading sure comes with its positives due to the capability of machines to take make more quicker and better decisions as compared to human traders. This will also be helpful to attract more new investors towards stock trading. The stage that we are in, Artificial intelligence comes with its fair share of drawbacks such as privacy, system crashes etc. Hence, before completely implementing artificial intelligence, an ecosystem with a false proof technology needs to be created in order to assure the investors that there money and the data. But as it has been mentioned Artificial Intelligence is not a new technology, it has been around and various companies have implemented it to certain extent. The results are encouraging and it only proves that using artificial Intelligence for predicting stock markets is the future.

## 6. FUTURE SCOPE AND RECOMMENDATION

Artificial Intelligence as a technology is always evolving and it's growing at a really fast pace. Once implemented it will constantly learn and evolve in order to take better decisions. Artificial Intelligence has the capability of completely transforming the industry; many financial market participants have invested in AI technology in order to improve functioning and communication. At an individual level all these various Artificial Intelligence technologies such as chat bots, machine learning etc. have room for improvement. These improvements can be made in order to enhance their performance and improve their decision making. The technologies can be integrated and implemented together for better and accurate decision making. For all the advantages that Artificial Intelligence has in its arsenal, cost-effectiveness is not one of its strong-suits. The main focus at this point is to make it cost effective in order to be implemented at a wider scale.

To enhance this study a survey can be conducted in order to understand the awareness level of the investors and will the perspective of the investor or an individual change if Artificial Intelligence will completely replace the human element. A study can be carried out in order to understand how integrating these technologies or any two technologies together can help both investors and companies. In order appeal to a larger public cost-effectiveness and privacy should be the primary motives, hence research can be done to identify ways and means in which this Artificial Intelligence ecosystem can be better implemented and made cost-effective.

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