**INTRODUCTION**

STOCK MARKET is one of the oldest methods where a normal person would trade stocks, make investments and earn some money out of companies that sell a part of themselves on this platform. This system proves to be a potential investment schemes if done wisely. However, the prices and the liquidity of this platform are highly unpredictable and this is where we bring technology to help us out. Machine learning is one such tool that helps us achieve what we want. The following 3 paragraphs will briefly explain the key components of this paper:

Stock market as we know is a very important trading platform which affects everyone at an individual and national level. The basic principle is quite simple; Companies will list their shares in the companies as small commodities called Stocks. They do so in order to raise money for the firm. A company lists its stock at a price called the IPO or initial public offering. This is the offer price at which the company sells the stock and raises money. After which these stock are the property of the owner and he may sell them at any price to a buyer at an Exchange such as BSE or Bombay Stock Exchange. Traders and buyers continue selling these shares at their own price but the company only gets to keep the money made during the IPO. The continue hoping of hares from one party to another in order to make more profits, results in an increase of price of the particular share after every profitable transaction. However, if the company issues more stocks at a lower IPO, then the market price for exchange goes down and traders suffer a loss. This exact phenomenon is the reason for the fear people have in investing in stock markets and the reason for the fall and rise of stock prices in a nutshell.

Now if we try to graph the stock exchange price over the time period (say 6 months), is it really hard to predict the next outcome on the graph? A human brain is very capable of extending the graph a few coordinates by just simple looking at it for a few minutes. And if we crowd compute i.e. make a group of random people try to extend the graph by a fixed amount of time (say a week), we will get a very reasonable and approximate answer to a real life graph. Because many brains will try to interpret the pattern and make a guess and this activity has proven to be a lot more successful in practice than it seems in theory. Having said that, predicting the true value of the stock is best estimated by the method of crowd computing. But as it very much evitable that crowd computing is a very slow activity therefore we try to use a computer here to simulate such example with a more scientific and mathematical approach.

In statistics, there is a way where we look at the values and attributes of a problem in a graph and identify the dependents and independent variables and try to establish or identify an existing relationship amongst them. This technique is known as linear regression in statistics and is very commonly used due to its very simple and effective approach. In machine learning we have adapted the same algorithm where we use the features to train the classifier which then predicts the value of the label with certain accuracy which can be checked while training and testing of the classifier. For a classifier to be accurate you must select the right features and have enough data to train your classifier. The accuracy of your classifier is directly proportional to the amount of data provided to the classifier and the attributes selected.

So with the basic knowledge of stock market, graphs and data analysis coupled with machine learning; we are now prepared to device the program.

Financial markets exhibit dramatic movements, and stock prices may appear too volatile to be justified by changes in fundamentals. Such observable facts have been under scrutiny over the years and are still being studied vigorously (LeRoy and Porter, 1981; Shiller, 1981; Zhong et al., 2003). Volatility as a phenomenon as well as a concept remains central to modern financial markets and academic research. The link between volatility and risk has been to some extent elusive, but stock market volatility is not necessarily a bad thing. In fact, fundamentally justified volatility can form the basis for efficient price discovery. In this context volatility dependence that implies predictability is welcomed by traders and medium-term investors. The importance of volatility is widespread in the area of financial economics. Equilibrium prices, obtained from asset pricing models, are affected by changes in volatility, investment management lies upon the mean-variance theory, while derivatives valuation hinges upon reliable volatility forecasts.

Portfolio managers, risk arbitrageurs, and corporate treasurers closely watch volatility trends, as changes in prices could have a major impact on their investment and risk management decisions. Volatility may be defined as the degree to which asset prices tend to fluctuate. Volatility is the variability or randomness of asset prices. Volatility is often described as the rate and magnitude of changes in prices and in finance often referred to as risk. The Nobel laureate Merton Miller writes “by volatility public seems to mean days when large market movements, particularly down moves, occur. These precipitous market wide price drops cannot always be traced to a specific news event. Nor should this lack of smoking gun be seen as in any way anomalous in market for assets like common stock whose value depends on subjective judgment about cash flow and resale prices in highly uncertain future. 153 The public takes a more deterministic view of stock prices; if the market crashes, there must be a specific reason.” There are two schools of thought that have divergent views on the reasons of volatility.

The economists in their fundamentalist approach argue that these market movements can be explained entirely by the information that is provided to the market. They have tried to put forward theories to explain this phenomenon and more still have tried to use these theories to predict future changes in prices. They go on to say that since the efficient market hypothesis holds, the information changes affect the prices. Market volatility keeps changing as new information flows into the market. Others have argued that the volatility has nothing to do with economic or external factors. It is the investor reactions, due to psychological or social beliefs, which exert a greater influence on the markets.

The Popular Models Theory1 proposes that people act inappropriately to information that they receive. Thus, freely available information is not necessarily already incorporated into a stock market price as the efficient market hypothesis would have proved. The issue of changes in volatility of stock returns in emerging markets has received considerable attention in recent years. The reason for this enormous interest is that volatility is used as a measure of risk. The market participants also need this measure for several reasons. It is needed as an input in portfolio management. It is indispensable in the pricing of options. Furthermore, in the process of predicting asset return series and forecasting confidence intervals, the use of volatility measure is crucial. The current chapter provides an overarching review of the equity market volatility, covering areas that have caught the attention of researchers and practitioners alike. It aims to enlighten financiers and anyone interested in equity markets about the theories underlying stock market volatility, the historical trends and debates in the field, as well as the empirical findings at the forefront of academic research.