**Literature Review**

Stock market prediction is the act of trying to determine the future value of a company stock or other financial instrument traded on an exchange[1]. The prediction methodologies are either fundamental analysis or technical analysis methods.

Fundamental analysis is a method of measuring a security's value by examining related economic and financial factors. Factors ranging from the state of the economy and industry conditions to microeconomic factors like the effectiveness of the company's management.[2]

Technical analysts focus on patterns of price movements, trading signals and various other analytical charting tools to evaluate a security's strength and weakness. This analysis is carried out on historical trading data which includes stocks, futures, commodities, fixed income, currencies, and other securities.[3] Futures[4] are derivative financial contracts that mandate the parties to transact an asset at a predetermined future date and price.

In this project we will be working with time based data, which will involve working on time based data (years, days, hours, minutes) to derive hidden insights to make informed decision making. Time series model are used when we have serially correlated data. Since this is my first project where I will be working with time series data, understanding all the basic concepts of this field is important.

Starting with stationary series. The mean of the series should be a constant. The variance of the series should not be a function of time too. This property is known as homoscedasticity. Variance is the average of the squared differences from the Mean.[5] Homoscedasticity , is a situation when the error term is the same across all values of the independent variables.[6] Covariance of the i th term and the (i+m)th term should not be a function of time. Covariance provides a measure of the strength of the correlation between two or more sets of random variates.[7]

Past works relating to prediction of stock prices are referenced to an article by Aishwarya Singh on Analytics Vidhya. She started out by calculating RSME value, then moved ahead by implementing linear regression which performed poorly. k-nearest neighbor as well did not perform well. Auto Regressive (AR) Intergrated(I) Moving Average(MA), this performed better than the past two algorihms. Facebook's time series forecasting library Prophet also gives an analysis from which it is evident that, stock market is dependent on what is currently going on in the market. Lastly, as my many people LSTM was used. Long Short Term Memory, worked best as compared to the ones used, but it is not said to be the best approach.[8]

I will continue my work by implementing Genetic Algorithms(GA), Time Delay Neural Network(TDNN), Convolutional Neural Network, and produce a model which best predicts the stock price.

**References :**

[1] Stock Market Prediction, <https://en.wikipedia.org/wiki/Stock_market_prediction>

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[3] Technical Analysis, <https://www.investopedia.com/terms/t/technicalanalysis.asp>

[4] Futures, <https://www.investopedia.com/terms/f/futures.asp>

[5] Variance, <https://www.mathsisfun.com/data/standard-deviation.html>

[6] Homoscedasticity, <https://www.statisticssolutions.com/homoscedasticity/>

[7] Covariance, <http://mathworld.wolfram.com/Covariance.html>

[8] Aishwarya Sigh, Analytics Vidhya, <https://www.analyticsvidhya.com/blog/2018/10/predicting-stock-price-machine-learningnd-deep-learning-techniques-python/>