Feasibility Study of Stock Market Prediction for Sentiment Analysis using Artificial Intelligence

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Abstract— **Artificial intelligence plays an important role in the financial industry. AI and ML techniques are being used to solve real-world problems with high effectiveness, maximum accuracy, and less time. Nowadays, investment in the stock market is a lucrative option in which the power of ML is used to predict the moment of stock using sentiment analysis. Stock market prediction is a challenging task because it influences by various factors such as sentiment of investors, the concert of stock, economical factors, and social media sentiments. This paper gives an overview of flavors of sentiment and stock price prediction along with developments and applications of AI in financial Sector. Some methods are used for stock market prediction like Linear Regression, k-Nearest Neighbors and "Long Short Term Memory (LSTM) ARIMA model Recurrent Neural Network (RNN).**

Keywords— **ANN, Data Mining, Ghana Stock Exchange, SVM , NLP, sentiments, stock market prediction.**

I. INTRODUCTION

As the prospering development of Internet, IT, and also in finance, financial data haggling combine with various information processing technology i.e. machine learning, which has obtained important achievements. If we talk about stock market people, they always wanted to know the rule behind stock market fluctuation to earn more profit by investing money in stock market. All over the world expert investment predictors applying different methods to analysis the data by using web mining and also trying to find out the rule behind trading in stock market so that the investor earn more profit. This paper shows how prediction of stock market works and various factors which are affecting the stock market by using ML.

1.1. DEVELOPMENT AND APPLICATION IN FINANCIAL FIELD

A. The Development of AI

AI is extensively used in each and every aspects of financial Industry the main aim of development of AI is to reduce the cost, risk, and to improve the quality of services and important profit.

In 1960s, the algorithms in ML, Bayesian Statistics, have been used in financial sector. [1].

In the prior stage of collaboration between AI and financial Sector, it determined on dipping the work pressure of financial practitioner by computing the power of computer.

In 1980s, the Expert System used in the financial filed for the forecasting of trend in the stock market and provide tailor made financial plan. Expert System consist of six components, which are knowledge base, inference engine, explanation system, knowledge acquisition or Knowledgebase Editor and user interface, as figure 1 shown. [2]. Expert System is used to achieve decision making process. [3] establish Expert System consist of domain knowledge and operational knowledge, to give credit ranking for companies listed in Taiwan stock market. [9]

B. Application of AI

The application of AI and ML in finance industry can be further classified into four groups.

a. Front End-it is customer-oriented applications, and customer- oriented service robot.

b. Back End -Management level applications analyze capital optimization, risk and impact on market.

c. Financial stock market transactions and

12

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Investment portfolio management.

d. AI and ML are used in financial institute for "Reg -Tech" or regulators for "Sup Tech".
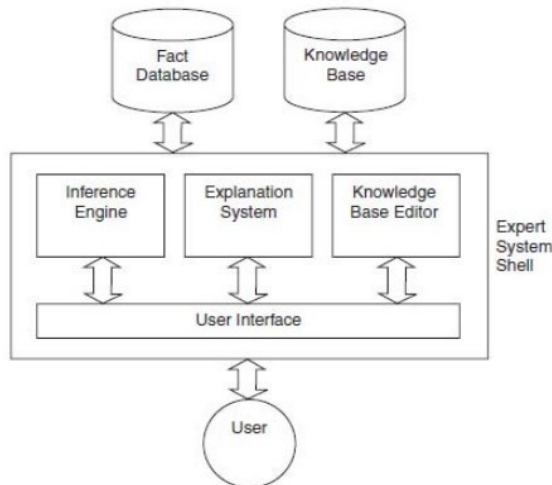

Fig.1 Expert System Architecture [3]

II. DATA MINING

Data mining is broadly used in financial and manufacturing industry [4]. With the advantage of growth of data-mining and computer technology, organization of data warehouse develops promptly [5]. Particularly in the stock investment of financial markets, speculation experts from different countries use dissimilar stock analysis methods for data mining from giant stock data, in order to find out the possible stock trading rules at the back the stock market, and recognize predicting changes in the stock market, the future is to achieve the goal of maximum profit [6-7]. usual data mining methods include alliance rule learning, group analysis, categorization analysis, series analysis, variation detection, forecast analysis, mould similarity mining and degeneration analysis. [8-9].

III. LITERATURE SURVEY

In this section we will discuss about machine learning and its review.

Machine Learning: It is the study of computer algorithms that improve repeatedly through experience .where a robot is given capability to learn without being explicitly programmed. In order to deal with the uneven, formless and uncontrollable, time series dataset, dissimilar learning based on algorithms such as SVM, ANN, Decision Tree are used in stock market predictions. In this paper, we use the ANN due to its extraordinary learning capability for solving prediction problems [10].

A. Related Works

The study in paper shows that the investment decision is not completely reasonable. As an outcome, this study try to understand how the investor is prejudiced as making an investment verdict .There are too many sentiment analytical tools exist in the literature, they can be further classified into two groups such as ML and word count analysis method. [12]

ML is commonly used techniques which are classified algorithms such as ANN. If we talk about its drawback it involve more time for manually labeling the dataset. Instead of this technique, we should implement the web mining using Text data for sentiment analysis, and the two most considered sources are Google search and Twitter.

a. Google search analysis

The study examines that Google searches might not calculate future irregular returns. As an alternative, the increased in google search prediction then it also increase in trading volume and volatility. Thus, as an outcome, it can be predictable that Google searches are more allied with future than current trading activity.

Machine learning has remarkable applications in the stock price prediction. Linear regression and ARIMA is one such model that is used for predicting futuristic time-related predictions will help you predict continuous values, LSTM is also one such technique that has been used for stock price predictions and makes use of neural networks for predicting continuous values. LSTMs are very powerful. With the help of example of Recurrent Neural Network (RNN) to predict Google stock price step by step. It is split into 7 parts as below.

1. Problem statement
2. Data processing
3. Model building
4. Model compiling
5. Model fitting
6. Model prediction
7. Result visualization

The study shows that Google searches from India were further interrelated to the gold market than other countries. Google search related to gold price dip and amplified volatility. This shows elevated prediction in both ways.

Fig. 1.1. Google stock Predication

b. Twitter in stock prediction

A trust management structure for the stock market based on tweets from Twitter. The study designed to investigative the degree of association twitter sentiments.

A sentiment analysis structure for stock market movement prediction is based on three things:

1) The absolute number of tweet sentiments.
2) Tweet sentiments weighted by favorites.
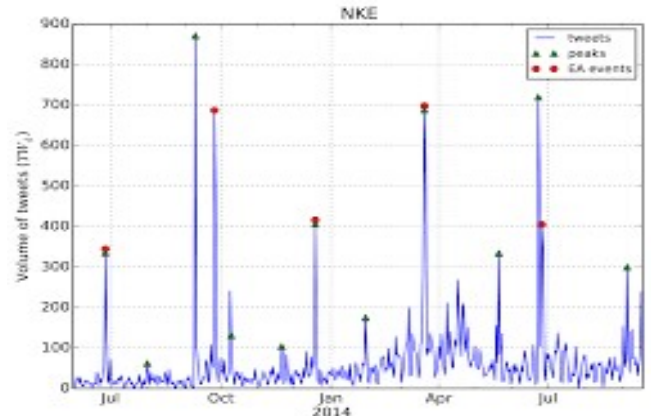3) Tweet sentiments inclined by retweets were presented.

Fig.1.2. Twitter stock Sentiment on Stock

IV. MATERIALS AND METHODS

In this paper, the study shows, stock prediction analysis model based on public sentiment state that prediction is mostly influence by different sentiment analysis like Google, twitters. It is cultural beliefs and practices, differences in policies and regulatory frameworks among different nations, differences in levels of stock market, among others. Thus, sentiment analysis might be easier with countries or region which share cultural similarity or closeness than from a global level. It is in this light we decided to investigate the impacts of investor's sentiments about the Ghanaian Stock Market.
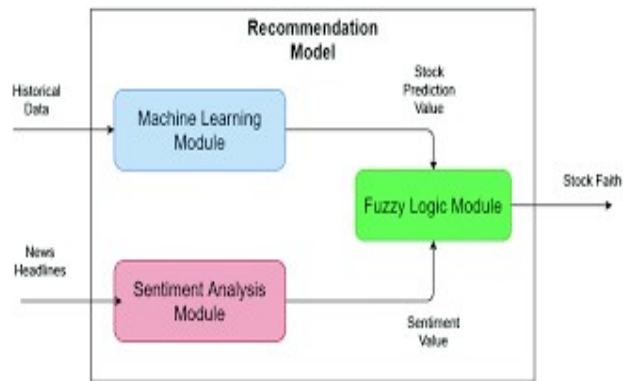

Fig.1.3. Data pipeline

14

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V. CONCLUSION

Artificial Intelligence plays an important role in the development of science and technology it is broadly used in each aspect of finance but there are corresponding challenges in applying artificial intelligence. Therefore, the financial system should understand artificial intelligence and make its system more perfect. In order to design a complete artificial intelligence, it is necessary to set principle rule which aims to guide the complete procedure of artificial intelligence in development, designing, management and control. Research in stock market has been increased rapidly .the stock market prediction correctness can be more improve to give more accurate outcome by using sentiments, ANN, machine learning.

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