An Algorithm to Find out Risk Free Share to Invest in Stock Market

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Abstract*: The stock market is interesting and beneficial for investors. The Stockholder did the analysis of share before buy and also used different types of algorithm to predict on the specific share. But the small investors are investing stock market without doing an analysis. Traders and Stockholder are waiting for this opportunity. They are passing the fake information to the small investor who does not have any knowledge about the share. As a result, Small investors buy those items to make short term profit at over price. When a large number of small investors are buying the share at over price, Traders and Stockholder sold their item. Therefore, the Small investors could not able to make any profit. In this paper, we are proposing an algorithm. It finds and extracts those share which has dramatic negative change on the market based on time frame. We analysed and found that those shares will give a positive change in between next 3 months to 6 months. So, It may give the profit to those investors who can wait at least 3 months. It can be decreased after buy and investors need not to panic, wait at most 6 months.*

Keywords: *Stock Market Analysis, Financial Data Analysis, Risk Analysis, Data Mining, Prediction Algorithm, Dhaka, Stock Exchange.*

I. INTRODUCTION

Predicting the stock market is an interesting topic in research because of its importance and popularity among the people and companies' financial benefits. There are many reasons that can influence the market value in a particular day like economic conditions [1], political events, investor's emotions [2] for a specific company etc. That is why the stock markets are expected to rapidly change and it can cause random fluctuations in the stock price.

Generally stock market series are progressive [3]. The stock price goes up and down randomly and because of the versatile nature of stock behavior. There is always a high risk of investment in share markets. People always want to buy a share which is expected to increase in the future and at the same time, they want to avoid buying a share whose price is expected to fall in the future. Therefore the prediction should be more accurate to get maximum gain and minimize loss in the stock market.

Normally small investors or irregular traders do not have enough knowledge about buying and selling shares in the stock markets. Traders should know some terms which will make them better understand about stock markets. Day trading means to buy a share and sell the share within the same day. Day trading can be a dangerous policy for the traders who are new at it. The opening price is the price at which any listed stock's first price upon the opening of an exchange on the particular trading day. A stock's opening price is an important thing to keep in mind especially for those who are interested in measuring short-term results as day traders. The final price of a share is traded on a specific day. The closing price shows the most updated value of share until trading start again on the next trading day. Trading volume is the total number of shares traded in a share market during a specifically given period of time.

The stock market news has played an important role all over the world. People are conscious about the news. It is officially declared by market authority. But it can change the human sentiment which can change the market trading pattern [2]. The world news can also change market trading pattern because of human sentiment. If stock market official news can correlate with world news by using ontology, it can be the effective solution to reduce loss or increase profit.

There are many methods and techniques to assist investors to predict the stock market behavior and how to take risks and know the perfect time to buy a share in cheapest price and sell it at the highest price. Data mining techniques are widely used to investigate the market behaviour. The performance is much higher, compared to traditional statistical methods to predict various fields like economy, politics and engineering [4]. As a result, machine learning algorithms have been used for predicting on stock market's behavior [5].

In this paper, We have proposed an algorithm based on our financial data analysis of Dhaka Stock Exchange. We found that some of the share decreases 30% to 100% due to over price. It increases minimum 10% to maximum 50% within a short time period. As a result, The scenario is risk free. Based on this scenario, we have developed the algorithm. It extracts the risk free share. It may give minimum 10% to maximum 50% profit for each share. The limit of the short time period is minimum 3 months to maximum 6 months. It may decrease after buy. If Investors wait maximum 6 months, it will give them a good profit.

The rest of the paper is organised as follows: The section 2 discusses about literature review. The section 3 discusses about the proposed methodology which has three sub sections. The section 4 discusses about Analysis. The section 5 discusses about Result. Section 6 discuses about Limitation and Future work. Finally, we conclude our paper on section 7.

II. LITERATURE REVIEW

The stock market is the very exclusive investment sector all over the world. It is too much risk for its volatile nature. There are a large number of researchers contributed to forecast on the stock market price and average movement. They used various techniques on ANNs(Artificial Neural Networks) to predict the stock market [5]. They also suggested two guidelines for researchers who work with ANN. This is a great contribution to machine learning in stock market prediction. Fuzzy Neural Networks has also described on the paper to use a prediction algorithms for stock exchange [4]. It has also shown that the adaptive Neuro Fuzzy Interference system reflect the more accurate result than neural network. They have proposed a training algorithms for artificial neural network which is an improvement of LevenbergMarqurdt(LM) [6]. It can predict the day closing based on training sets.

Stock market involves RBFN(Radial Basis Function Network), SOM(Self Organization Map), BN(Bayesian) and SVM(Support vector machine) to predict the stock holder profit and portfolio value [7]. They have proposed a methodology to predict the value for future and maximum profit for holder using Back Propagation Network. They have also shown the comparison of the different techniques which very easy to understand with its advantage and disadvantage. There are many things related to increase a share on stock market [1]. They have used back prorogation algorithms in ANN to forecast daily stock market with weather. It has given 80% accuracy of the prediction.

Every field has used machine learning and data mining algorithms to predict the next day price. They used machine learning algorithms to predict stock market next day market price. They also observed it for regression algorithms. They had provided a trading model to analyse the performance of those algorithms based on their observation [8].

The annual financial report of a company has added a valuable impact on market [9]. They used text of company's annual financial report to predict trading pattern using machine learning algorithms. As, regression is a well known technique in machine learning algorithms to estimate or predict the relationship using variables. For that reason, they applied regression method to predict stock market risk and real world continuous association. They used known regression technique to build the model which is rival past volatility in prediction the target variable. They also used stock return volatility to formulate the problem formulation.

There are several ontology framework which are predicting market risk, co-relate with market news. An ontology has provide a causal relationships between news and financial instruments. They divided news into four parts and Financial instrument in two parts [10]. The news agency produce a large amount of news. Therefore They have build an plugin named as news plugin to manage the ontology of the news [11]. On the other hand, Stock market manipulation (SMM) becomes a big issue on developed market in presence year [12]. There are proposed three categories of ontologies for the SMM in the financial market. Three categories of ontologies, which include static ontology, dynamic ontology, and social ontology, are developed to deal with different perspectives in this domain.

Market performance is great findings for risk analysis. They have analysed the KSE (Karachi Stock Exchange) using different type of machine learning techniques. Those algorithms use different types of attribute as input to predict the overall Market movement.They have used Single Layer Perceptron, Multilayer Perceptron, Radial Basis Function and Support Vector Machines to predict the market performance [13]. They have proposed a prediction model based on our the analysis.

III. PROPOSED METHODOLOGY

There are three subsections on this section. The first subsection discusses about the methodology of work. The second subsection discusses about our Algorithms and pseudocode and the third sub section discusses about the dataset which is the valuable part of our work. We analyse DSE's data to find out the scenario which is proposed in Proposed Algorithms section.

A. Task Description

The stock exchange is a regular part of an investment. Everyone is doing analysis for safest investment. But the small investor has not enough time to analyse the stock exchange. These large number of investors are either illiterate or do not have any knowledge of the stock exchange. For this reason, A sudden fall happened in 2010-2011 at DSE and people cannot overcome their loss [3]. These paper can assure them to invest according to our algorithms and investor will not getting any loss. we have divided the task into four sections.

1) Analysis of data using DSE(Dhaka stock exchange)
2) Find out the pattern
3) Proposed algorithms
4) Result of Analysis we have described data on *Dataset* Section. We analyse the data and come up with a pattern which is discussed at *Analysis and Discussion* section. Then we have proposed algorithms based on the analysis of *Proposed Algorithm* section.

B. Proposed Algorithm

An algorithm is the best to do an automation of any kind of work. it will give the maximum output with minimum time. we have analysed daily trading data of Dhaka Stock Exchange and find out pattern which really works for stock market illiterate people. They do not need to know about the stock market for safest investment. so, we come up with an algorithm which gives the maximum output at the minimum time. we have written the pseudocode of these algorithms which will find out safest share.

Result: List of share which are safest for investment
while *Do step for different time periods : 2 months, 3 months, 4 months* do
Calculate the percentage of changes (profit gain/loss) based on the date range in trading data for each
share;
Find and Extract the lowest 10 share;
Sort these 10 share by categories;
Calculate the Average Price of gain on that time(day) in the market;
if *category of share is 'A' and price is less than Average Price*
then save the
share ;
end
end
Find and Extract the common share from save share;

Algorithm 1: The prediction algorithm for safest investment using financial data

Here, 'A' category is a variable. it can vary from different stock market. The category 'A' indicate those companies which are regular at annual general meeting, declared divided at least 10% in a year. The average price indicated the today's price of all the gain share which is important to extract the risk-free item. we have built an application over it and analyse and predict over real time data. So, these algorithms help us to find out fundamental most decrease share.

C. Dataset

we have collected data from *Dhaka Stock Exchange* website. we collect Share information. we reorganize data and build a database for our analysis convenient. we divide share information into six parts. such as, Basic Share Information, EPS, AGM, Holding Percentage, Listing types and Categories. Basic Share Information contains trading code, company name, authorized capital, No of share and etc. It also communicates with EPS, AGM, Holding percentage, Listing types and Categories by its trading code. Then we have collected daily trading information on *Data Archive* section at DSE website. There are 254045 rows of daily trading data. we analyse those using graph representation and find out the desired pattern.

IV. Analysis and Discussion

We built the chart for each individual share which is reflected in stock market ie. volume chart, Price chart, Trading chart. we started analysis for each of the shares in DSE. we did not find any certain pattern. Although There is also these types of the chart in the stock exchange. But it has not for any unique dates. It is a dropdown which are options *3 months, 6months, 9 months, 1 year, 2 years*. For that reason, we can not have the access to see more than 2 years of data in the chart. we need to see it. Therefore we did not find out anything for effective things on that. But we noticed a scenario.

we have modified the code to see the scenario more deeply. we added an option, the user can input any past two dates to see the chart in between. Then we clearly found the scenario. we observe that every share has a sudden fall within three years. It falls minimum 30%-50%.

Fig. 1: our algorithms has extracted top most decreases shares for different date range.

Extracting Shares					
OCT-NOV 2016 (2 Months)		OCT-DEC 2016 (3 Months)		OCT,16-JAN,17 (4 Months)	
ALLTEX (Z)	-53.30	ALLTEX (Z)	-48.11	ALLTEX (Z)	-48.75
TALLUSPIN (Z)	-43.87	BANGAS (Z)	-29.93	TALLUSPIN (Z)	-34.84
BANGAS (Z)	-32.87	TALLUSPIN (Z)	-29.68	BANGAS (Z)	-34.04
LEGACYFOOT (Z)	-32.58	BSRMLTD (A)	-28.23	MITHUNKNIT (A)	-29.25
RAHIMTEXT (A)	-29.67	RAHIMTEXT (A)	-26.64	LEGACYFOOT (Z)	-27.86
SINOBANGLA (Z)	-28.03	LIBRAINFU (A)	-26.32	CAPMBDBLMF (A)	-25.99
GOLDENSON (A)	-27.27	LEGACYFOOT (Z)	-25.81	EMERALDOIL (A)	-25.47
LIBRAINFU (A)	-26.74	MARICO (A)	-24.75	YPL (N)	-25.11
DACCADYE (Z)	-26.32	NORTHERN (A)	24.72	LIBRAINFU (A)	-22.14
NORTHERN (A)	-25.14	MITHUNKNIT (A)	-24.39	RENWICKJA (A)	-21.21

we observed that it also increases within few days. we analyse again to find out the time period of increment. we observed it will increase minimum 3 months to a maximum of 6 months. So it was a great finding to invest in the stock market. But we did not do it for all of the shares. It was very difficult to find out which share did a sudden fall. Then we come up with the algorithms.

The algorithms calculate the all share trading price for past 3 months so that we can see it on a window. We can change the time period of as per our needed ie. 2months, 4 months, 5 months. It will not give the good output of fewer than 2 months and more than 6months. we are extracting the common share to invest after getting the result of a different time period. It will give you a minimum 25% profit within 3 months.

V. Result

We have observed those share which extracted by algorithm. we observed that those share gives a profit to our investor. The Fig-1 shows top most decreases shares for different date range. The Fig-2 has shown the common share and its profit percentage. The star mark represent non-fundamental share which was in result-set. Those share has given a 50% of profit to its investor. Although Those are the risky share.

Fig. 2: Some resultant shares which was found on different date range by the algorithm.

Top Resultant Shares (Price at JANUARY,2017)		
RAHIMTEXT(A)	235-305/235 (+30%)	It was at 235/- in October,2016 and It was at 305/- in January,2017
GOLDENSON(A)	15-23/15 (+53%)	It was at 15/- in November,2016 and It was at 23/- in January,2017
MITHUNKNIT(A)	54.5-61/54.5 (+12%)	IIt was at 55/- in December,2016 and It was at 61/- in January,2017
ETL(A)	17-23.5/17 (+38%)	It was at 17/- in November,2016 and It was at 23.5/- in March,2017
ALLTEX(Z)*	9-15/9 (+65%)	It was at 9/- in October,2016 and It was at 15/- in January,2017. Although it is risky share.
BANGAS(Z)*	105-135/105 (+28%)	It was at 105/- in November,2016 and It was at 135/- in January,2017

Our algorithms have return 3 items as risk-free and it gives 53% to 12% of profit. The share named as RAHIMTEXT which was at 235/- in October,2016. It was at 23/in January,2017. It has given 30% profit within 3 months. GOLDENSON was at 15/- in November,2016 which increased at 23 in January,2017. If we give the time period as 2 months, 2 and half months, 3 months, 3 and half months, Then the result has shown 25%-50% of profit and some new item come at the result-set. The share named as ETL which gives the 38% profit of investment which is found by different date range. Therefore it proved that it works on real time.

VI. Limitation and Future Work

The Limitation of stock exchange is widely investigated by the data science researchers. we have also found some limitation from the result set. MITHUNKNIT decrease 16% of their predicted price after it has given 12% profit. Only because of it has given a negative news on the market. So, we cannot co-related any features with market news. Although we will work on an Ontology which will solve this Limitation. On the other hand, we did not show any relation between EPS, AGM, and Holding percentage. we observe that holding percentage plays another role in increasing or decreasing the price of the share. we did not able to show any relation between volume or trading price which the core attribute of daily trading data. Therefore, It will be great findings to predict the more safest investment.

VII. Conclusion

Stock market plays an important role in the financial sector. It is really popular for it volatile nature. The small investor always makes loss of its own nature. They are also very much panic when share price decreases. Although Those are fundamentally strong share. Stockholder is making money for these weakness of small investor. It was really hurt that some investor committed suicide only because of sudden fallen down of DSE in 2010-2011. They did not have the analysis of the invested share. As a result, Those investor committed suicide. On the other hand, A new investor can not have any knowledge over invested share item. These algorithms can guide them to make profit or save from huge loss. If it introduces on all the stock market, it will be a great feature for the small investors.

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