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*Full Length Research Paper*

# Companies' performance in stock exchanges: Using sequential patterns-algorithm

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**This paper communicates the overall behaviour of the stock exchange. Basically, stock exchange is marketing for companies/group(s) assets to sell their shares and in-return generates revenues to invest and grow their company/business. The attitude of giant investors keeps on changing their move to destabilise the market so that the trivial investors cannot become stable/grow and compel to sell their shares on less profit margin to the giant investors. These giant investors try to manipulate/capture the market and try to establish their monopoly/control over the market without strong competition. The relative performance of companies in various stock exchanges around the world is studied, graphs plotted with reference to dates on quarterly and monthly basis are drawn and patterns are analyzed. The stability of companies has been determined by using sequential patterns-algorithm. This algorithm maneuver is followed as a continued process until the surpassed results have yield.**

**Key words:** Currency conversion, databases, decision graph, stock exchanges index, electronic commerce.

## INTRODUCTION

The economical stability of any country can be measured from its industrial growth. Industry is based on three main options for generating revenue, later which is utilized on developmental and non-developmental schemes/projects among different departments to run the country/ government. First option; if the government is stable then it monitors the company(s) by its own system as a department (self governed). This option failed because the level of interest is low and many other problems emerge during its operations. Second option; to lease out the government owned companies on temporary basis and only collect their revenue(s). In this scenario, the margin of losses is high and the interest of party reduces with time. Third option; to privatize on permanent basis, in this scenario, the company(s) sells to private party national or international companies and takes the value of company in one go with additional conditions (the monitoring system). In privatized companies, when the government department did not perform well then the solution is to move to privatization process. In privatized company, performance level is high as they plan for future growth and the next step is to go for the stock exchange to sell its shares. The last option is considered to be the best for both the government and for the buyers (business community) (Khan et al., 2009; Grameen Bank, 2008).

The stability of stock exchange plays a vital role in the economic progress of a nation. It is of paramount importance to the investors. It has been rightly said that stability of a stock exchange plays a backbone role for a country's economy such as oxygen for human beings. It is very important for global economic growth which will boost the fulfilment of human needs. It will also serve as a catalyst to economies and yield positive results to support market economy in any situations. This research is based on the insight into stock exchanges for different companies (Bank of Canada, 2009; Stijn et al., 2003). In stock exchange, each company is identified by an entity, which contributes to the index of stock exchange. The

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**Abbreviations: RBFNN,** Radial basis function neural networks; **L-GEM,** localized generalization error model; **EMH,** efficient market hypothesis; **NASDAQ,** National Association of Securities Dealers Automated Quotations; **MCS,** multiple classifier system.

performance of entity and stock exchange is based on the indicators and they have the regulatory monetary system, which gives the growth of entity (DeMarshall, 1992; http://finance.yahoo.com; Jacob et al., 2009; Ronald, 2004; LeBaron et al., 1999; Zbigniew, 2003).

## Related work

Two stock exchanges in Shanghai and Shenzhen were opened nearly twenty years ago. The Shenzhen stock exchange market is young and energetic. Moreover, it practices a T+1 settlement rule instead of real time trade as in Hong Kong or other exchange markets. One important point is; whether there are patterns that can be identified in stock prices and can be used to develop profitable investment strategies? If strategies can be found, then this represents a violation of the efficient market hypothesis. Authors propose an investment strategy by using radial basis function neural networks (RBFNN) trained by localized generalization error model (L-GEM) and 4 stock price candlestick patterns. Every base RBFNN in the multiple classifier system (MCS) recognizes the occurrence of a particular candlestick pattern and the MCS combines opinions from the 4 base RBFNNs by a weighted sum to provide a final prediction. If the MCS predicts an increase for the next day, it will buy the stock and sell it within three days whenever the opening price is higher than the buy-in price or else after three days have passed. Experimental results with stocks in Shenzhen market show that investment strategy statistically significantly outperforms a random investment, that is, the EMH is invalid in this case (Wei et al., 2009).

It is notice that, tremendous growth in trading volume and the need for fast and accurate transaction execution has made the stock market one of the most technology friendly markets. The fastest growing stock exchange, NASDAQ, is a wholly electronic stock exchange with all transactions conducted over computer networks. However, the transaction model used by NASDAQ and other electronic stock markets still borrows heavily from the older traditional models used by non-electronic stock exchanges. Two important requirements of modern day stock market transactions are: (a) customer's ability to place sophisticated transaction orders to buy/sell stock, and (b) customer's ability to detect transaction delays. Modern electronic stock exchanges lack both the ability to place newer, more sophisticated transaction orders and the ability to detect delays in transaction execution. In this paper, a protocol for stock market transactions that can model a new sophisticated model for transaction orders while continuing to support traditional transaction orders. The protocol is augmented with a mechanism to detect delays in transaction execution (Subramanian and Singhal, 1999). Research of relationship between stock exchange market and macroeconomic variables has realism significance. According to Shanghai stock exchange market index representing stock market, chooses 8 macroeconomic variables to research both long time balance and short time fluctuation relation between Shanghai stock exchange market index and macroeconomic variables using unit root testing, by using integration analysis and vector error correction model. The result of practical example indicates that there exist longtime stabilization relation between Shanghai stock exchange market index and macroeconomic variables. The development of stock exchange market has some promotional effect on economy. That shows that Chinese stock exchange market reflects the development level of macroeconomic (Yan-chun, 2008).

The results of evaluating the tool in a formal experiment are complex. The data mined in this case study is bid-and-ask data - also called depth-of-market data - from the Australian Stock Exchange. In visual-auditory display, the bid-ask-land-scape, this developed over much iteration with the close collaboration of an expert in the stock market domain. From this domain's perspective, the project's principal goal was to develop a tool to help traders uncover new trading patterns in depth-of-market data. The design of the bid-ask-landscape also report on a formal evaluation of visual-auditory display. By using the tested non-experts data just on their ability to use the tool to predict the future direction of stock prices (Nesbitt and Barrass, 2004).

German stock exchange bade farewell at the end of September to the Frankfurt based Neuer Market, its answer to the tech-heavy US NASDAQ stock market. In six years of operation, Neuer Market had treated unwary investors to more of a roller coaster ride than they bargained for, and it was plagued by scandals, despite intending to set higher standards of accountability and openness. Neuer Market's operator, Germany's main stock exchange Deutsche Börse AG, formally shutter the exchange at the end of 2003 and replaced it with two broad segments in the main exchange, which Neuer Markt companies are being encouraged to join. The end of the Neuer Market caused little surprise. At its peak, companies listed on the Nemax 50 index had a market value of €234.25 billion. Today, their value is around €12.6 billion. Trading ceased, and only one company has made an initial public offering in more than a year. The market's steep plunge has been traumatic for investors, who have seen billions of Euros vanish (Blau, 2002).

In the above detailed related work, there was more emphasis on the behavior of stock exchanges and their line of action(s) which are communicated. To establish the background study and to relate the previous approaches, it is connected with the modern approach which leads to the better future.

### *Investors' confidence building*

A stock exchange operates by shares of many companies. To sell these shares investors are attracted.

To attract investors, the first point is to build their confidence. The following are the main indicators for the investor's confidence building (Albuquerque et al., 2008; Henry et al., 2002; Dollars and Sense the magazine of economic justice, 2009).

### *Human values*

There are few factors that determine the human value to attract the investors. The value of life in the country, security wise safety to invest is the major factor that matters. To give the sense of security and protection to the value of property in the country must be protected by government in case of any mishaps. This will enhance human value and its prestige. Strong judiciary is also an important factor in case of trouble. Value of law in the country is considered a very important factor for investor's confidence building.

### *Social setup*

Social setup needs various factors for business environment to attract the investors. People to people interaction are very crucial. The question that "Do they welcome foreign investors?" Obvious hurdles in the country are other component. Similarly, hurdles in the economy are counted in other perspective. Foreign and national policies of the government have impact on social setup. Political stability of the country is a major honey pot for investors.

### *Disseminating Information/warning indicators*

The reliability of disseminating information/warning indicators can be formulated into three factors. (i) Information/warning before time; regarded the best situation for protecting assets (ii) Information/warning on-time; regarded good for decision making (iii) Information/warning after time; regarded lost situation. These three factors must be strong enough in the country through the electronic media so the investors foresee the situation in-advance.

### *Company/Business leadership*

The company/business leadership for the investors is promoted by having clear goals, making the work on top priority, sticking to schedules, no extinction expected on productions, protect the interest of stakeholders, etc. This will increase the level of interest and more investment will come to the country. As the level of growth/production/stability increases, the level of confidence also increases.

### *Behavior of stock exchange*

Behavior of stock exchange is surrounded by the many factors. The index of market increases, the shares of companies are increasing, capital gain tax is fixed for certain period, value added tax must be low throughout fiscal year, withholding tax must be minimum specially on movements, the jobs opportunities in the country increases, the economy of the country is stable, exports of the country increases, many foreign and local investors are investing, the economics growth is stable, tourism of the country is booming, citizen of the country afford to travel frequently and freely.

All the above five parameters are the main indicators for investors to invest and the country economical conditions are stable. Stock exchange is marketplace where they sell their shares and in-return generates revenues. If the performance of company in-terms of profit is increasing, the share value in stock exchange also increases. It is a matter of demand and supply, the number of buyer's increases for the shares due to growth in company execution and sales (Demand and Supply Graph, 2008).

### *Companies' performance*

To observe the performance of different companies' in different stock exchanges, data was downloaded. There was more than 493 companies' data (Demand and Supply Graph, 2008). The data collected was based on their monthly performance for each company. As the data was huge so different strategies were adopted to compare the performance of each company and then compared with others as explained below.

### Description of graphs

Figure 1 shows the performance of the company in stock exchange. This figure depicts that company BAC (Bank of America) in stock exchange is in 1$^{st}$ position with respect to other companies. Company C (Citigroup) is in the 2$^{nd}$ position and company F (Ford Motor Corp.) is the 3$^{rd}$ most prominent company with respect to highly impact stock exchange stability. These three companies contribute in the high indexing of stock market of the world. The strategies adopted by these three companies needs to be adopted to have high impact on stock exchanges. Business companies especially newly established companies' needs to plain their business rules and policies to align their business in success.

## METHODOLOGY

Due to many companies and huge data for a month, it was difficult to figure out the methodology to process it. The best approach for

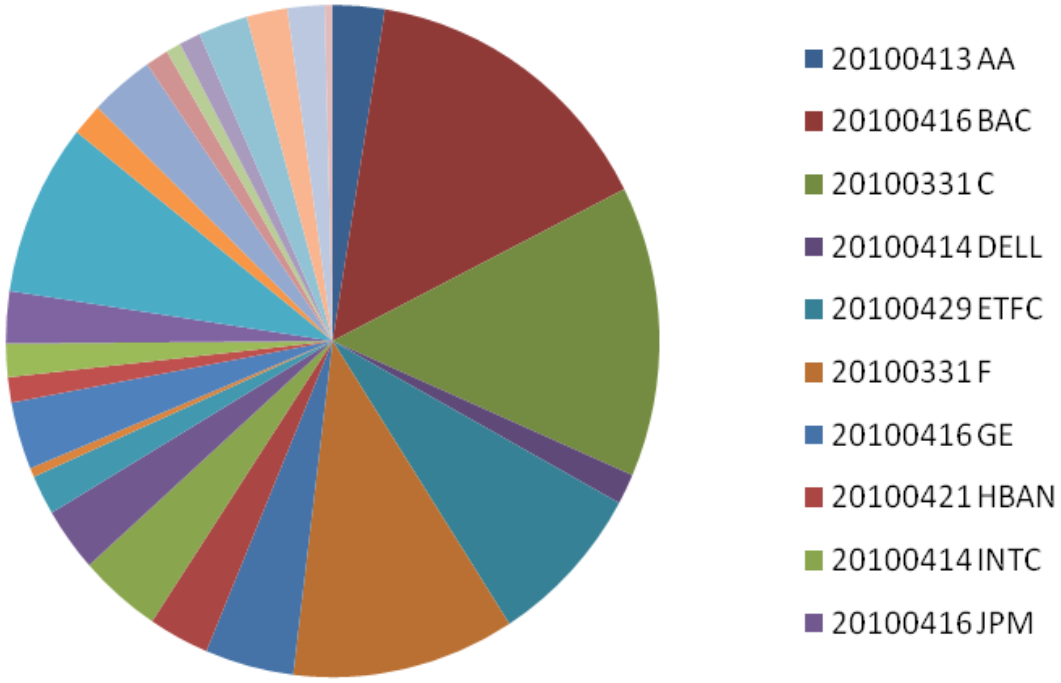


**Figure 1.** Performance of the company in stock exchange.

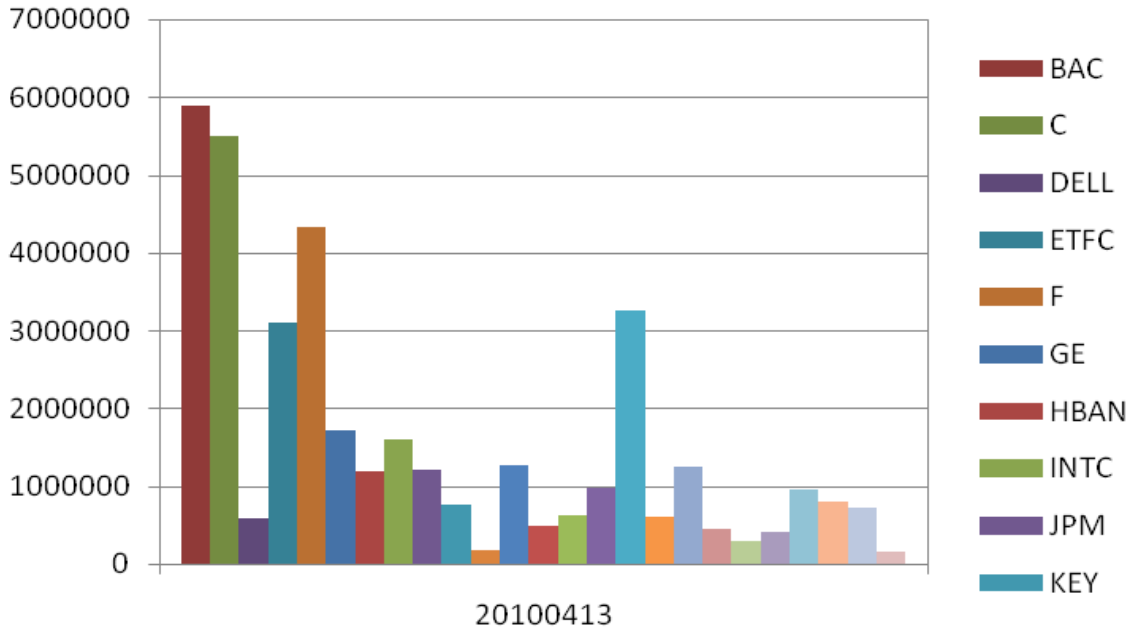


**Figure 2.** Comparison of results.

processing such huge data can handle by the sequential pattern algorithm (Mahdi and Fazekas, 2010; Kloptchenko et al., 2004; Silberschutz et al., 1999; Friedman, 1997; Weiss and Indurkhya, 1998; Sedgwick and Flajolet, 1996; Fox, 1972; Lon-Mu et al., 2001; Hillmer and Tiao, 1978). The sequential pattern algorithm determines the selection of most frequently occurring company's growth in a month which is represented by a universal (U) set. The selection from the whole set of various companies is represented by (S). In this set, the highest index of company with specific dates are noted down and separated from the universal set to yield the result in (X) sets. Specific entries in set (S) are again considered to select more frequently occurring entries among them. This process is continued until it yield the desired results as shown in Figure 2. The sequential pattern algorithm was deployed because of its

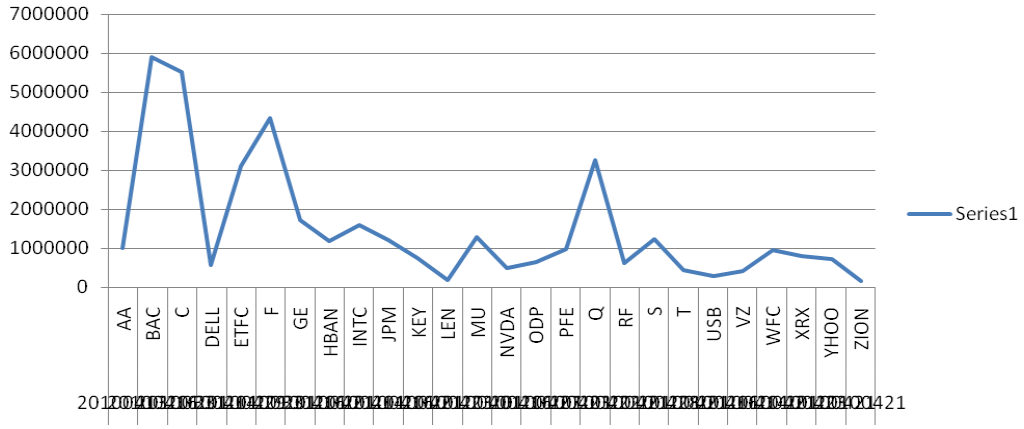


**Figure 3.** Results of companies.

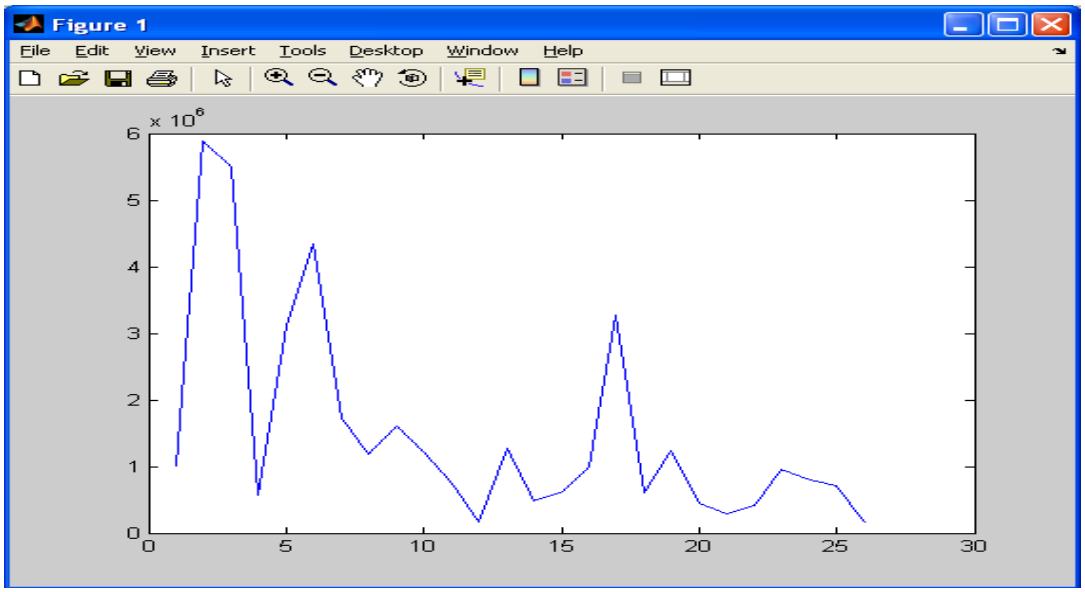


**Figure 4.** Results of companies.

property that is compared to the values on the basis of which we have produced the results. Due to the huge data from various stock exchanges, it was not possible to carry out evaluation using some other algorithm.

## Experimental analysis and findings

Following graphs are obtained during experimental results (Figures 3 and 4).

## Description of Figure 3 and 4

In Figures 3 and 4, the data at the origin is increased as compared to the last company performance. Due to huge data processing involved, date wise separation was possible but its' appearance in graph is not clear. The black strip in Figure 3 shows the related dates. In Figure 4 on the vertical side, the index values are given and on the horizontal side, the dates are given.

## Conclusion

War and social unrest in a country is a factor for inflation, during which the production stops and consumption is still going on, but it does not bring the economic collapse, as the reserves in the country are used for survival. Yes world war brings economic collapse as productions stop altogether, that is what everyone is facing now-a-days.

Stock exchange is a game of numbers and calculations, like chess. Every move is properly calculated based on the behaviour of market and predictions; a blind move may end up in value disaster. The giant investors can finish the trivial investors but determination of the trivial investors cannot be finished if they have proper knowledge of market activity/behaviour.

The main national indicators for strong economy are industry; which runs with full functionalities and proper policies; trade must be high on exports side and less depends on imports, national needs must be met, such as, agriculture, health, education, shelter, jobs, sports, etc., in stock exchange, money is in circulation which will give encouragement and growth to the investors for further investment. This can also be achieved by electronic commerce in case of B2E and E2E. It is concluded that during the middle of the months, the rates are high for all the companies and the investors must sell that in the middle of month, whereas the best time for purchases are either the start or the end of month.

## FUTURE SCOPE

The algorithm presented in this paper can be applied to software in any desired tools; that is, VB.Net and Oracle or ASP.Net and Microsoft SQL Server. This will enhance the algorithm used by the investors to invest in buying shares for advance information prediction.

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