CHAPTER VII

CONCLUSION

7.1 Conclusion

The main focus of this thesis was to develop a novel class of combinational quantitative technical analytics to predict the stock market for solving certain crucial issues in financial stock market prediction identified during literature survey, namely, generation of prominent buy / sell trade signals yielding higher percentage of annual returns on the investment; identifying and combining well oriented technical indicators for the purpose of generating “Correct Profit Trade Signals – CPTS”, a conceptual metric introduced in this research work yielding closed trade signals; transforming inefficient machine learning algorithms (which use simple training techniques ending up in training the ‘less important’ but dominant category of neutral signals) into robust algorithms promptly picking up real prominent buy and sell signals for training though they happened to be less dominant.

Three combinational quantitative technical algorithms, namely, Time Series Quantitative Analytics 3 (TSQA3), Time Series Quantitative Analytics (TSQA4) and Time Series Quantitative Analytics 5 (TSQA5) were ultimately designed and developed to achieve higher annual returns on the investment of money. Due care was taken to impart the capability of generating CPTS (Correct Profit Trade Signal) having CTT (Closed Trade Transaction) into all the above mentioned algorithms.
The efficiency and effectiveness of the proposed analytics were measured using the novel evaluation metrics, "Correct Profitable Trade Signal - CPTS", which was uniquely devised in this research work to meet out the long felt requirements of professional stock trading practitioners, and individual stock and security traders. This method of performance evaluation furnishes a complete view and comprehensive meaning of the stock market forecasting algorithms under study.

A strong test bed of historic data of 7 years pertaining to most frequently traded stocks was created and used to evaluate the consistency of the proposed algorithms in generating prominent closed trade signals CPTS, resulting in considerable net profit.

TSQA3 has outperformed on the test bed by generating lowest average percentage of non-productive signals (29.57%), generating the highest average percentage of CPTS (70.44%) and yielding maximum average annual returns of 34.89% on the investment.

This is not to assure that this algorithm would make anyone rich, but it may be useful for academicians, professional practitioners and individual traders for trading analysis. This may raise the following question.

➢ How much could one lose before the actual gain?

The answer is that it is possible to gain up to 70.44% (by using TSQA3) of the average time, but still the chances to lose remain a reality.

The main contribution of this thesis was achieved by demonstrating that it is possible to extract meaningful and reliable models of financial time series from a collection of popular technical indicators by means of these combinational algorithms.
Another landmark contribution of this research work was the evolution of the concept metric "Correct Profit Trade Signals – CPTS", a conceptual metric ensuring the applicability of future prediction algorithms in yielding closed trade signals, CTT.

7.2 Future Scope of the Work

A detailed study and analysis of these combinational quantitative technical algorithms on inter day stock market data and inter stock market data, can be used for designing more sturdy and modified algorithms to predict the stock market which is more complex and non-linear in nature.

The stock market predictive power can be enhanced by combinational algorithms coupled with Artificial Neural Networks (ANN). A neuro-genetic approach may be introduced for the modeling of financial time series, which opens up opportunities for many extensions, improvements, and sophistications both on the side of indicators, and of the technicalities of the trading strategy.

A natural extension would consist of enriching the data used for modeling with more sophisticated technical indicators. Novel indicators might be evolved or coevolved by means of other evolutionary techniques like genetic programming.

The concept of CTT may also be extended in future to have two buy (short buy and long buy), two sell signals (short sell and long sell) signals and one neutral signal in the system. This will widen the scope of such automatic trading system in assisting the stock traders in decision making.
Even though the concept of CTT looks very fundamental, an extension of CTT by addressing the following open research problem will make it capable of changing the present highly speculative markets into a relatively deterministic scientific market in the near future.

The market regulators should try to work out a tolerance band for the CTT to oscillate during the trading periods. This open research problem should be taken up by the academic research community working on predicting financial time series data; several contributing parameters have to be studied, analyzed and fine-tuned before they are actually deployed for testing and ultimately transferred to market regulators as a monitoring tool and to professional practitioners for prediction tools; This will help in protecting the stock markets against sudden collapses due to the over greedy belligerent speculators.

During the final part of this research work, the researcher witnessed the free fall market mayhem, which not only bulldozed the world economy but also the intellectual competence of the researchers in this area that could not foresee such a catastrophe for the market economy. Therefore, the researcher not only advocates these open problems for future scope but also would like to register his fervent appeal towards this cause so that the future of world economy becomes safe and secure besides bringing laurels to academic research community involved in this field.