CHAPTER 9

CONCLUSION AND FUTURE WORK

“A hard beginning maketh a good endin” – John Heywood

This chapter summarizes the outcome of the research carried out in this thesis. Also included in this chapter, based on the results of this thesis, are some suggestions of what future research can be done in the area.

9.1 CONCLUSION

The thesis started with a description of neural networks. In the literature survey, several methods of NN training algorithms that strive to improve the training speed of NN have been identified and studied. It is concluded that the BPN algorithm is one of the most popular training algorithms for NNs. However, it suffers from the slow convergence. This thesis has developed a new, simple and fast Stochastic Sample Selection (S^3) based training algorithm called AST. The outcome of this research includes the following:

- A time efficient training algorithm namely AST algorithm has been proposed which improves the training speed of NN
- Based on the concept of AST algorithm, different variations of training algorithms, namely Linear Adaptive Skipping Training (LAST), Exponential Adaptive Skipping Training (EAST), Half of Threshold (HOT) Adaptive Skipping Training and Rapid Adaptive Skipping Training (RAST) Algorithm have been developed
A Constant Adaptive Skipping Training (CAST) Algorithm has been developed for incremental learning based on Adaptive Fuzzy Clustering (AFC).

The performance of the new algorithms is evaluated using two binary and two multiclass training datasets from diverse domains.

The results obtained from the simulation experiments proved that the training speed and accuracy have improved significantly in the final variation of AST algorithm.

The statistical analysis also shows that the proposed algorithms perform significantly better than the existing one.

Among the proposed algorithms, HOT algorithm works well for binary classification problem. For multiclass classification problem, RAST attains higher accuracy rate.

### 9.2 Future Work

The thesis has used standard BPN algorithm for implementing new and time effective AST algorithm. However, there are other possible supervised training algorithms which can be used as well. In order to get still better performance, data preprocessing technique, feature extraction technique or weight initialization technique can be combined with the proposed AST algorithms.