CHAPTER 6

CONCLUSION AND SCOPE FOR FUTURE WORK

6.1 CONCLUSION

A Compiler Directed Disk-Seek Algorithm for Power Optimization in Large Disk Based System Using Soft Computing Techniques is being proposed in this thesis. It is a software based approach for disk power management. The soft computing techniques such as neural network and fuzzy logic are used for selecting the appropriate disk-seek algorithm. Then the compiler restructures the application code to reduce the power consumption, by inserting clear disk power management calls in suitable place of the source code.

The Modified Levenberg Marquardt algorithm is used to train the Back Propagation Neural Network (BPN with MLM) for selecting the suitable disk-seek algorithm. The data access pattern and the disk layout are used to construct the Disk Access Pattern (DAP). After extracting the disk access pattern and the selected disk seek algorithm, the compiler can restructure the source code to reduce the power consumption, by inserting clear disk power management calls in suitable place of the source code. The energy consumption against the workload configurations of the system is measured for the BPN with MLM and the percentage of energy saved is compared with the other methods (Traditional Disk Power Management and Dynamic RPM).

Since the BPN has a possibility of getting trapped in local minima due to inadequate weights and insufficient number of hidden nodes, Fuzzy Neural Networks (FNNs) trained with Modified Levenberg Marquardt algorithm (LMFNN) is proposed for effective selection of the appropriate disk-seek algorithm. The data access pattern and the disk layout are used to construct the Disk Access Pattern.
(DAP). After extracting the disk access pattern and the selected disk seek algorithm, the compiler can restructure the source code to reduce the power consumption, by inserting clear disk power management calls in suitable place of the source code.

It is clearly observed from the experimental results that the proposed BPN with MLM and LMFNN minimizes the disk power consumption to nearly 30% by choosing a suitable disk seek algorithm and also it is observed that the performance is very significant with respect to the impact of strip size, strip factor and the starting disk in array implementation, when compared with the other disk power management techniques.

6.2 SCOPE FOR FUTURE WORK

The proposed work may be extended in future by using genetic algorithms for reducing the disk power consumption in large disk based systems. Also, energy saving may be enhanced by modifying the data access pattern in large disk based system.