Comparative Analysis of Bayesian Regularization and Levenberg-Marquardt Training Algorithm for Localization in Wireless Sensor Network

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***Abstract*— Wireless sensor networks (WSNs) have many applications in the field of disaster management, military, healthcare and environmental monitoring. Capability of WSNs is further enhanced by the efficient localization algorithms. Localization is the process by which a sensor node determines its own location after deployment. Neural approaches are gaining popularity in evolving new localization algorithms that are capable of optimizing various parameters of WSNs. In this paper, we analyse two backpropagation algorithms based on multi-layer Perceptron (MLP) neural network. The network is trained using static sensor nodes placed in a grid with their coordinates known. The input values are distances from each anchor nodes to a particular sensor node. The output is the actual coordinates of the sensor nodes. After training, the network will be able to predict the coordinates of unknown sensor nodes. This MLP model is analyzed for Bayesian regularization and Levenberg-Marquardt training algorithm. Both algorithms are tested for the robustness and cross-validation. The simulation results demonstrate the effectiveness of the proposed model on localization error.**

***Keywords*— Localization, Wireless Sensor Network, Backpropagation algorithm, Neural network, Bayesian regularization**

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