

Abstract

To maintain the Quality of service (QoS) at optimum level in cellular mobile network, handoff control mechanism plays a vital role. Handoff is generally used to transfer a call from one base station to another. There are various proposed techniques for handoff management. In this paper, a highly efficient handoff control technique based on neural network is proposed the neural network takes a decision on handoff on the basis of signal strength, distance and traffic intensity the results are analyzed and found to be optimum.

Keywords: Neural network, Handoff, Received signal strength (RSS), Distance.

Introduction

Cellular communication is a technology which mainly makes the mobile phones to communicate with each other. In Cellular communication the end user that is the mobile phone user doesn't stay at a particular place but moves from one place to another. It is the responsibility of the cellular systems to maintain efficient communication between the systems even when the user is mobile. This responsibility of cellular systems gives rise to the concept of Handoff. Handoff refers to a process of transferring an ongoing call or data session from one channel connected to the core network to another. The reason why handoffs are critical in cellular communication systems is that neighboring cells are always using a disjoint subset of frequency bands, so negotiations must take place between the mobile station (MS), the current serving base station (BS), and the next potential BS.

In this paper, handoff status is decided by the neural network. The neural network used is feed forward back propagation neural network. The decision is taken on the basis of Received signal strength, distance and traffic intensity. A code is generated in the MATLAB for the system.

Neural Network

As we discussed above that neural network is mainly used here to take handoff decision. Neural network which works on the basis of input and target output, so, in order to create structure of neural network feed forward back propagation neural network is used. Neural network can handle and improve handoff algorithm. This paper presents the handoff status of each and every node on the basis of three parameters with the help of neural network

training and testing session of parameter. To get results of each node optimum three parameters used are Received signal strength (RSS), Traffic intensity (TI), Distance.

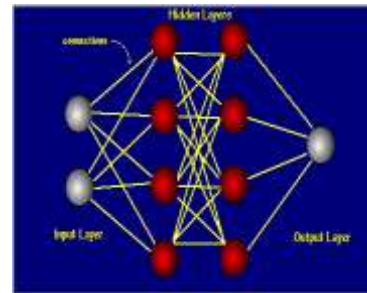


Figure 1: Neural network

As figure 1 represents that neural network consist of three types of layers input layers, hidden layers and output layers these layers are made up of a number of interconnected 'nodes' which contain an activation function. The information flow from input layers to the output layers. Neural network plays a very important role in this paper firstly it generates a pattern means it trained the network and then find the status of each and every node about that handoff occur or not which will we clearly discussed in the methodology.

Methodology

In order to get handoff status in a cellular mobile network by using neural network, firstly user define the number of nodes then after took a location area of 100*100 of X and Y coordinates. We took three inputs to the neural network are signal strength (RSS), traffic intensity(TI), distance. The range of values of these inputs is characterized by three

categories low, medium and high. The output decision taken by neural network divided in to four categories no handoff (NH), wait(WI), handoff(HO), immediate handoff(IH) respectively.

The working principle of neural network states that when the three inputs RSS, TI and Distance are fed to neural network then the neural network takes decision on the basis of specific pattern of inputs then neural network takes decision after checking the status of all nodes inside the given network area. It assigns a particular handoff status to a particular node after checking all input pattern and nodes for example a particular node is assigned immediate handoff (IH) if RSS and Distance is low while the intensity is very high.

Table 1: Input Parameters classification

Strength	Nomenclature
Low	1
Medium	2
High	3

Table 2: Output Parameters classification

Handoff type	Nomenclature
No Handoff (NH)	1
Wait Handoff	2
Handoff	3
Immediate Handoff(IH)	4

Results

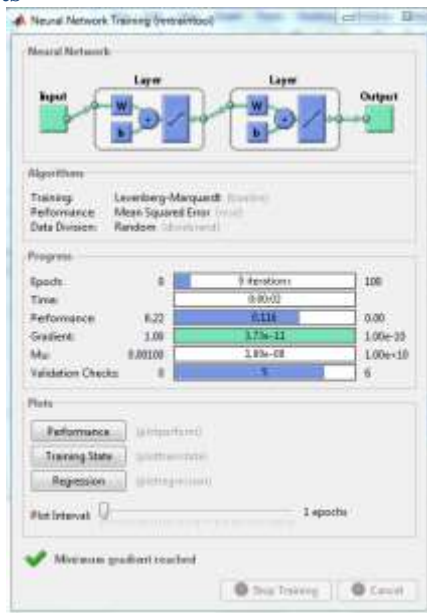


Figure 2: NN Training window

Above figure 2 represents the neural network training window which is mainly used for providing training and testing session of each node in a specific network. So, in order to take handoff decision, this window of neural network generate itself when we compile or run the matlab code.

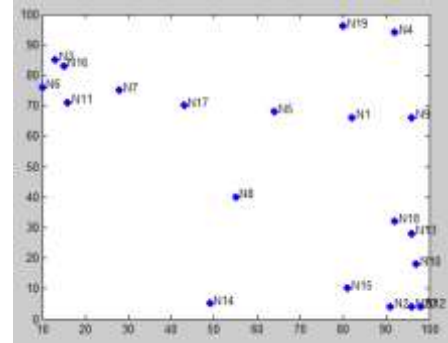
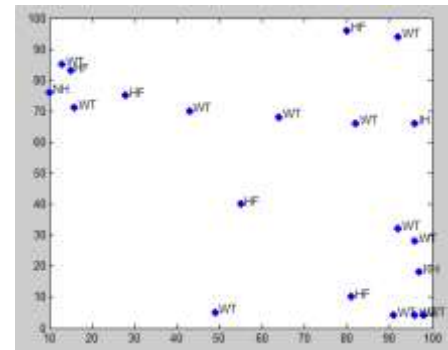


Figure 3: Nodes status

This figure 3 represents location of 20 nodes in a specific area of 100*100.



4: Handoff status Figure

This above figure represents the handoff status of each node in a network on the basis of three input parameters .Some nodes takes handoff, immediate handoff, wait handoff and no handoff decision.

Conclusion and Future Scope

In the end, the work concludes that neural network perform the functioning of training and testing of each node and get the handoff status. So we can provide path to improve the Quality of service (QoS).

The work can be extended by providing a optimum path between source and destination by reducing the delay. AODV protocol can be used for providing best and shortest optimum path between source and destination.

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