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Title of Thesis: Performance Improvement of Routing Protocols in MANET's Using Soft Computing Techniques

Abstract

In wireless networks, the routing protocols are used to find path from source to destination. However, the obtained path chosen for transfer of packet needs to be efficient and optimized. One of the major disadvantages of the existing routing protocols is, that they depend on only one metric to choose their routing path. However, there may be a scenario in which only one metric is inefficient to have optimal path. Therefore, there is a need to develop new routing protocols through which performance of the system can be improved. In this research work, detailed survey has been presented to obtain the research gap. This summary helped to motivate us for the objective of this research work.

Ad hoc on demand distance vector routing protocol is popular MANET's routing protocol. In this research work, the AODV routing protocol has been improved to have effective routing decision based on Fuzzy Inference System and Adaptive Neuro Fuzzy Inference System. Three routing protocol namely M-AODV, FLM-AODV and A-AODV have been proposed for performance enhancement of AODV routing protocol. M-AODV and FLM-AODV proposed routing protocol use Fuzzy Inference System (FIS) and A-AODV uses Adaptive Neuro Fuzzy Inference System (ANFIS) for making effective routing decision. The FIS and ANFIS system used in the proposed protocol has the output as Fcost and Anfcost respectively. On the basis of this output, the selection of effective routing decision takes place. The results obtained from experiment have proved that the proposed routing protocol work more efficiently than the existing AODV routing protocol.

We have tried to improve the performance of another popular on demand routing protocol named Dynamic Source Routing (DSR). In DSR, route from the cache is selected which depends only on hop count metric. In dynamic changing environment, the route selection based on hop count is not effective. Therefore, to have an optimal route more than one metric is considered to be included and in this research work two routing protocol have been proposed for performance enhancement of DSR routing protocol using FIS and ANFIS. The proposed protocol based on FIS consider hop count and stability factor to make effective routing decision. Other proposed protocol using ANFIS considers three metrics as input to ANFIS. It has been observed from the experiments that the proposed routing protocols using FIS and ANFIS give better results than existing DSR routing protocol.

The Multipoint Relay Selection (MPR) in Optimized Link State Routing (OLSR) protocol builds routes based on shortest distance and not consider other effective metrics. In this work, the two routing protocols has been designed to improve the performance of OLSR protocol. The proposed protocols using FIS and ANFIS take two metrics into account for MPR selection. It has been observed from the simulation results that the proposed protocols give better results in term of packet delivery ratio.

Further two protocols by using FIS and ANFIS has been designed to improve the performance of another proactive routing protocol named Destination Sequenced Distance Vector (DSDV). The improvement is made by including the factors like hop count and delay as input to FIS and ANFIS. The output of FIS and ANFIS system is provided to system which helps in effective routing decision in MANET's. It has been found out through the simulation experiments that proposed protocols give better results for packet delivery ratio.