

An Efficient Cluster Head Election Algorithm for Client Mesh Networks using Fuzzy Logic Control

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Abstract

Enough attention has not been paid to the client nodes in the wireless mesh networks architecture which tend to also improve quality of service of WMNs if well managed with a cluster structure. In this paper, a fuzzy logic control clustering algorithm (FLCCA) is proposed for client nodes in WMNs. A detailed process for the fuzzification of client node parameters used in the selection of optimal cluster heads to obtain low control overheads and highly stable clusters is presented. Three client node parameters considered in our proposal are node mobility speed, traffic delivery capacity and the cost of service with the goals to build stable cluster structure with lowest number of clusters formation and minimize the overhead for the clustering and maintenance. The algorithm applied fuzzy logic control to produce score value for each client nodes based on the three parameters for the cluster heads to be selected. Simulation experiments were conducted to evaluate the performance of FLCCA in terms of the number of clusters formed, reaffiliation count and clustering control overheads. The simulation results show that FLCCA performs better than Distributed Fuzzy Score based Clustering Algorithm (DFSCA).

Keywords: Clustering, Client Nodes, Fuzzy Score, Traffic Delivery Capacity, Cost of Service