Cluster Head Selection Protocol using Fuzzy Logic for Wireless Sensor Networks

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Abstract

Recent trends in field of wireless networks is setting up Wireless Sensor Networks that, senses specified parameter(s) related to environment; processes sensed data and wirelessly communicates it to a base station. Such networks open up a whole new range of applications, including precision agriculture, monitoring and tracking vehicles, animals and humans, battle-field surveillance, civil structural monitoring etc. All these applications require extended network lifetime, scalability, and traffic balancing among nodes in the network. Clustering is one of the effectual techniques for achieving these requirements. In clustering, geographically adjacent nodes are organized into virtual groups called clusters. One of the cluster node acts as a cluster head and rest as cluster members. This paper presents Cluster Head selection protocol using Fuzzy Logic (CHUFL). It uses node's parameters like: residual energy, reachability from its neighborhood, quality of communication link with its neighborhood and distance from base station as fuzzy input variables for cluster head selection. A comparative analysis of CHUFL with cluster head selection mechanism using fuzzy logic by Indranil et. al.; Cluster Head Election mechanism using Fuzzy logic (CHEF) by Kim et. al. and cluster head selection method for wireless sensor networks based on fuzzy logic by J. Anno et. al. shows...
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that CHUFL is up to 20% more energy efficient and sends 72% more packets to base station compared to protocol by J. Anno et. al., one of the energy efficient clustering protocol.

References

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Index Terms

Computer Science  Wireless

Keywords

Wireless sensor networks; clustering; cluster head selection; fuzzy logic