

Chapter 5

LEACH–VD:

A Hybrid and Energy– Saving Approach for Wireless Cooperative Sensor Networks

Proshikshya Mukherjee
KIIT University (Deemed), India

ABSTRACT

Wireless sensor networks act as an important role in the wireless communication area because of its properties, its intelligence, cheaper costs, and its smaller size. Multiple nodes are required for cooperative communication, the low energy adaptive clustering hierarchy and LEACH-Vector Quantization are used for cluster and active cluster head formation. Further, Dijkstra Algorithm is used to find the shortest path between the active CHs and high-energy utilization, respectively. The main issue of inter-cluster communication is carried out in earlier work using LEACH and LEACH-V protocols. The chapter illustrates the LEACH-Vector Quantization Dijkstra protocol for shortest path active CH communication in a cooperative communication network. In the application point of view, LEACH-VD performs the lowest energy path. LEACH-V provides the intra-cluster communication between the cluster head, and using Dijkstra Algorithm, the minimum distance is calculated connecting the active cluster heads, which creates the shortest path results using an energy-efficient technique.

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INTRODUCTION

Wireless sensor network (WSN) it sometimes called wireless actuator network. The WSN is specially consists of distributed autonomous sensors which monitored environmental or physical conditions like temperature, pressure, sounds, etc. and passes their sensed information through the path to the main location (Yadav and Sunitha, 2014). These paths are made by using routing. The routing is a process to create a path between a source node to the destination node. Various types of routing protocol are used for the communication purpose. These routing protocols are affected in WSN by several exigent factors like throughput, scalability, bandwidth utilization, network lifetime, etc. Routing protocol can be classified five ways like, according to the ways, according to the way of establishing the routing paths, according to the network structure, according to the protocol operation, according to the initiator of communications and according to how a protocol selects a next hop on the route of forwarded message (Li et. al, 2011).

When the energy efficiency and stability is needed, then the cluster based routing protocols are used. In hierarchical cluster based is more energy efficient because high energy nodes are randomly data selected for processing and sending information and low energy nodes are used for sensing and sending data to the clustered (CH). In this process network life time and stability of the network are increased. LEACH (Low Energy Adaptive Clustering hierarchy) is one of the cluster based hierarchical protocol. This protocol is self-adaptive and self-organizing. LEACH (Heinzelman, Chandrakasan, and Balakrishnan, 2002) with vector quantization is used for the intra-cluster communication between the cluster head (CH). This reason less amount of power is used than the LEACH. So, that the network lifetime is increased than the LEACH. Dijkstra's algorithm is used for the shortest path between the nodes in a graph. The proposed methodology is the combination of LEACH-V with Dijkstra's algorithm which show that the optimum path between the active cluster head (CH) and amount of energy utilized in this path. This paper flow is: LEACH protocol overview and its energy utilization, then LECH-V protocol and its inter-cluster communication and its energy utilization. The next section is the Dijkstra's Algorithm and where the optimum shortest path between the active cluster-head (CH) network. Then the compression among them. Then finally, the conclusion and future work of the proposed methodology in WSN.

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