Abstract
Wireless sensor networks (WSNs) are recently attracting a lot of interest due to their low cost. They are rapidly replacing the wired data acquisition systems due to the ability to use them in benign environments. However, WSNs suffer from many constraints, including low computation capability, small memory, susceptibility to physical capture, the lack of infrastructure and limited energy resources which impose unique challenges. One of the methods to improve the performance of a WSN is to introduce multiple hops between the source and destination. In this paper, an attempt has been made to analyze the relationship between network lifetime and the energy consumption in a multi-hop wireless sensor network (WSN). Network lifetime can be defined as the maximum time for which the network is able to successfully transmit data from the source to the sink, using all possible alternate routes. It has been shown that as the network lifetime increases, the percentage energy consumption decreases with increase in the number of hops and attains a minimum at critical hops. After the critical hops, the energy consumption gradually increases due to increase in cumulative energy consumption of the intermediate nodes.

Reference

- Alan Mainwaring, Joseph Polastre, Robert Szewczyk, David Culler, John Anderson. “Wireless Sensor Networks for Habitat Monitoring” WSNA’02, ACM.

**Index Terms**

Computer Science Wireless

**Key words**

Multiple hops WSN

Network Lifetime

Energy Consumption