
Abstract

WSN (Wireless Sensor Network) has energy constraints. Main energy consumption is at the (Tx) transmitter/ receiver (Rx) side, which is proportional to data/command packets /frames. Failure at the receiving end asks for re-transmission leading to more power consumption. WSN follows structured layers like medium access control (MAC), physical layer (PHY), link layer etc. PHY deals with RF transmission including antenna. In this paper the focus is given on smart antenna as, WSN deals with systems which need to be adaptive, especially in unknown time varying scenarios. With data transmission; location positioning (localization) and efficient routing are the factors to be considered. Localization of node is done using range measurements which include received signal strength, time of arrival, time difference of arrival (TDOA) and angle-of-arrival (AoA) measurement. By improvising antenna performance i.e. small beam width, we can achieve less erroneous data reception, leading to less energy consumption. In this work, we propose a method based on Non-dominated Sorting Genetic Algorithm (NSGA-II) for localization of nodes using smart antennas. Comparative analysis of its performance is done with different algorithms like LMS (Least Mean Square), LMS and PSO (Particle Swarm Optimizer).
Algorithm) for varying number of elements and spacing between elements. We demonstrated that the proposed method achieves very good accuracy and precision in angle measurements as compared with existing approaches.

References


Index Terms

Computer Science  Wireless

Keywords

NSGA-II, LMS, PSO, WSN, AoA, PHY, MAC, TDOA,