Abstract

Recent advances in electronic and computer technologies have paved the way for explosion of wireless sensor networks. Sensor network usually consists of a large number of ultra small autonomous devices. The resource constraint nature of these ultra small devices poses an immediate need for resource management. A fundamental component of resource management is transmitter power control and an efficient power control technique is essential to support system quality and efficiency in wireless sensor networks. The data transmitted from the sensor nodes is highly susceptible to error in a wireless environment which increases the transmit power. Error control coding (ECC) schemes can improve the system performance and has an impact on energy consumption as node energy is sturdily influenced by the modulation and error correction coding used. This paper proposes a power control solution for wireless sensor network (WSN) considering ECC in the analytical setting of a game theoretic approach. The
game is formulated as a utility maximizing distributed power control game while considering the cost function and the existence of Nash equilibrium is studied. With the help of this equilibrium a distributed power control algorithm is devised. From the analysis it is evident that the system is power stable only if the nodes comply with certain transmit power. The utility of nodes employing ECC and without ECC is compared; the results show that the proposed algorithm employing ECC achieves the best response for the sensor nodes by consuming less power.

Reference

- Lymberopoulos, D., Lindsey, A., Savvides, 2006. Characterization of the radio signal strength variability in 3-D IEEE 802.15.4 networks using monopole antennas. EWSN, ETH, Zurich,

**Index Terms**

Computer Science

Wireless

**Key words**

Equilibrium

Utility

Reed Solomon codes

Nash