

Abstract

Wireless sensor networks drawn huge attention in the recent years due to their vast implementation scenarios and possible applications in many fields in our daily lives, opening the venue for a new era of technological evolution in human history.

Still WSN suffer from many constrains affecting their performance and operation, such as the energy consumption due to the fact that they are battery powered, latency, coverage and connectivity of the network, which may limits the network life time and operational efficiency.

Careful placement of WSN nodes has been proved to solve some of these issues, a new area in this topic, is actor nodes placement problem, our work falls into this category.

This work focuses on decreasing the average energy consumption of the WSN nodes, and the average communication delay in the WSN network by clustering the network and optimizing the actor's location within each cluster to achieve a better and more efficient network topology.

The Delay and Energy saving by Actuator positioning algorithm (DEMA) outperforms the average delay and average energy consumption when benchmarked with random, uniform, and COLA algorithms with around 25% reduction in the average communication delay, and around 40% in the average energy consumption. It also has a topology maintenance phase to readjust the network to optimal time periodically or when a percent of the node fail. Also it's built on the fact that the nodes use necessary amount of energy to communicate and not full energy mode as in other algorithms.