Abstract

Most of the existing algorithms in Wireless Sensor Network (WSN) used to track the movement of animals consumes a lot of energy. These have led to discontinuation of tracking when the energy runs down. In this paper, an energy-efficient animal tracking model is proposed to improve the connection availability and duration of tracking by decreasing the energy consumption for sensing. An existing animal tracking model, which employed an energy-saving algorithm approach was selected. A simulation was carried to observe the energy consumption of the model using connection availability and connection duration as performance metrics. Then, an energy-efficient model was formulated by employing Prediction-based Variable Radius Sensor Activation algorithm (PRVARSA). A 15 minutes simulation was performed in a Wireless Sensor network consisting of 50, 100 and 200 sensor nodes randomly distributed in the network area. The performance of the formulated model was evaluated by benchmarking it with the existing model using the same metrics. The results showed that the average energy consumption of proposed and existing models are 3.93 J and 24.38 J respectively. It was observed that the proposed model consumed less energy for sensing and kept tracking the
target after 13 minutes with an average energy consumption value below 20 J. Also, the proposed model provided higher connection availability of 115 compared to 0 for the existing model. The study concluded that the proposed model provides better energy-saving and thus extended the lifetime of the Wireless Sensor Network in a tracking system.

References


Index Terms
Computer Science Wireless
Keywords

Tracking, Energy efficient, Network lifetime, Prediction-based Algorithms