

ESAM: Endocrine inspired Sensor Activation Mechanism for multi-target tracking in WSNs

Abstract

Target tracking is a significant application of wireless sensor networks (WSNs) in which deployment of self-organizing and energy efficient algorithms is required. The tracking accuracy increases as more sensor nodes are activated around the target but more energy is consumed. Thus, in this study, we focus on limiting the number of sensors by forming an ad-hoc network that operates autonomously. This will reduce the energy consumption and prolong the sensor network lifetime. In this paper, we propose a fully distributed algorithm, an Endocrine inspired Sensor Activation Mechanism for multi target-tracking (ESAM) which reflecting the properties of real life sensor activation system based on the information circulating principle in the endocrine system of the human body. Sensor nodes in our network are secreting different hormones according to certain rules. The hormone level enables the nodes to regulate an efficient sleep and wake up cycle of nodes to reduce the energy consumption. It is evident from the simulation results that the proposed ESAM in autonomous sensor network exhibits a stable performance without the need of commands from a central controller. Moreover, the proposed ESAM generates more efficient and persistent results as compared to other algorithms for tracking an invading object.

Keywords: Wireless sensor networks, Endocrine system, Hormone, Target tracking, Energy efficiency

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