Jordan University of Science and Technology

Performance evaluation of selective and adaptive heads clustering algorithms over wireless sensor networks

Authors: Khalid A. Darah, Shereen S. Ismail, Mohammad Al-Shurman, Iyad F. Jafar, Eman Alkhader, and Mamoun F. Al-Mistarihi

Abstract: Target tracking in wireless sensor networks can be considered as a milestone of a wide range of applications to permanently report, through network sensors, the positions of a mobile target to the base station during its move across a certain path. While tracking a mobile target, a lot of open challenges arise and need to be investigated and maintained which mainly include energy efficiency and tracking accuracy. In this paper, we propose three algorithms for tracking a mobile target in wireless sensor network utilizing cluster-based architecture, namely adaptive head, static head, and selective static head. Our goal is to achieve a promising tracking accuracy and energy efficiency by choosing the candidate sensor nodes nearby the target to participate in the tracking process while preserving the others in sleep state. Through Matlab simulation, we investigate the performance of the proposed algorithms in terms of energy consumption, tracking error, sensor density, as well as target speed. The results show that the adaptive head is the most efficient algorithm in terms of energy consumption while static and selective static heads algorithms are preferred as far as the tracking error is concerned especially when the target moves rapidly. Furthermore, the effectiveness of our proposed algorithms is verified through comparing their results with those obtained from previous algorithms.