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# Efficient Event Handling in Wireless Sensor and Actor Networks: An On-line Computation Approach

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## Abstract

The real time response of actors to events occurring in a network area is of critical importance in Wireless Sensor and Actor Networks (WSANs). This in turn requires fast notification of actors from Sensor Nodes (SNs) about events as well as effective coordination of actors for prompt event handling. In this paper, we introduce an on-line distributed protocol for event handling in a WSAN. Existing techniques usually select actors nearby the current event for handling it. However, this greedy approach may eventually lead to a slow response to events because it does not consider the spatial distribution that future events might have. In contrast, in order to cater for future events, the proposed solution probabilistically selects actors for event handling, allowing distant actors to be selected as well. This randomized approach guarantees fast average responsiveness to events, a balanced energy consumption among actors and low energy consumption for SNs. These merits have also been confirmed in the experimental results where the performance of the proposed approach has also been evaluated. In addition, the event-handling scheme presented in this work features efficient distributed algorithms for sensor to actor and actor to actor coordination which are of independent interest.

*Keywords:* Wireless Sensor and Actor Networks, on-line algorithms,  $k$ -server problem, routing

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## 1. Introduction

WSANs represent an important enhancement over the conventional Wireless Sensor Networks (WSNs), featuring a number of active elements (actors) that can directly act on events sensed by the SNs of the network. The most common

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