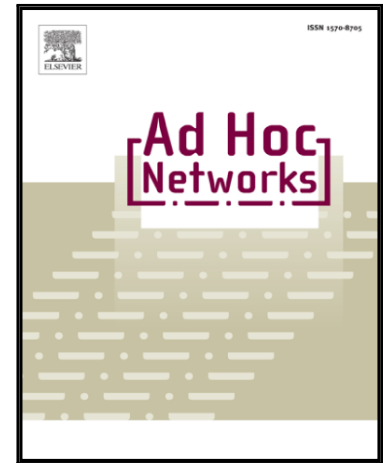


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Secure Localization using Hypothesis Testing in Wireless Networks

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Abstract

Localization is the method of estimating the location of a wireless node using measured inputs such as distances from nodes with known locations. When the measured distances from anchor nodes are used for localization, compromised nodes that are involved in the process can give false information that produces inaccurate location estimates. This paper proposes a Generalized Likelihood Ratio (GLRT) based approach to find the compromised nodes that deliberately give false information. After detecting such malicious nodes, the measurements given by them are eliminated from the localization computation to improve the location estimate. The proposed method works for Gaussian range measurement errors, which is considered more realistic, as compared to a method available in literature that works only for uniformly distributed range errors. Extensive simulations were carried out to assess the performance of the algorithm under various conditions. The proposed method was found to give better localization accuracy as compared to previous methods available in the literature which address the same problem. Simulations also showed that the algorithm performs well even when some of the assumptions used in the algorithm do not hold true.

Keywords:

Wireless Sensor Networks, Wireless Adhoc Networks, Network Security, Localization

1. Introduction

Localization is an important application in most wireless networks, particularly in sensor networks, as the information reported by nodes in the network is interpreted with reference to its location. Therefore, accurate

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