A Distributed Method for Localization in Large-Scale Sensor Networks based on Jarvis

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Abstract

This paper addresses target localization problem in a cooperative 3-D wireless sensor network (WSN). We employ a hybrid system that fuses distance and angle measurements, extracted from the received signal strength (RSS) and angle-of-arrival (AoA) information, respectively. Based on range measurement model and simple geometry, we derive a novel convex estimator based on Jarv’s scan. The network is said to be uniquely localizable if there is a unique set of locations consistent with the given data. This paper presents an improved localization algorithm with high accuracy in large-scale Sensor networks with a large number of sensor nodes based on the Jarvis’ March, called SLSNJ. The Jarvis’ March adapted here for our approximation technique to determining the convex hull of a set of sensors used instead of the Grid-Scan method, to take into account the requirements in memory, to make it scalable and rapidly convergent with small location estimation error. We verify our algorithm in various scenarios and compare it with AT-Dist method. Our simulation results show that the new estimators have excellent performance in terms of the estimation accuracy and convergence, and they confirm the effectiveness of combining two radio measurements in large-scale.
References


Index Terms

Computer Science Networks

Keywords

Wireless Sensor Network (WSN), Routing, Multiple Sink, Localization, Geographic Routing