

A Special Localization Algorithm in Wireless Sensor Networks for Telemetry Application

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Abstract

Accurate positioning in Wireless sensor networks [1] is an important and emerging technology for many research areas, such as health care, telemedicine [2], sports, commercial, public-safety and military applications. This paper presents an exact positioning approach for a telemetry system in ad hoc sensor network measuring vital and motion parameters of the patients. The telemetry system includes two kinds of wireless data-gathering devices (sensors) neither of them knowing their own positions: 1. reference point devices, which retain fix positions, and are uniformly distributed over an area of interest, 2. all the other sensors (mobile nodes) which are allowed to change their positions during the measurements. The presented algorithm is based on measurements of distances between sensor nodes with 4 Hz sampling frequency. The aim is to compute the exact positions of the nodes in some fixed coordinate system. The measurements of distances between sensor nodes are not sufficiently accurate. The developed algorithm at first estimates the exact position of the reference points from initial measurements based on the minimization of the localization error. During the measurements the positions of the reference points do not change. The mobile nodes localize themselves continuously with the help of location references received from the reference points using trilateration. Different algorithms are presented to get the optimal solutions in different environments. Future research directions for improving node localization in the telemetry system are also discussed.

Keywords: Wireless Sensor Networks, Localization algorithms, Telemetry system

References

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