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Critical Density for Coverage and Connectivity in Two-Dimensional Aligned-Orientation Directional Sensor Networks Using Continuum Percolation

3 Author(s)

Khanjary, M. ; Dept. of Comput. Eng., Islamic Azad Univ., Tehran, Iran ; Sabaei, M. ; Meybodi, M.R

Abstract | Authors | References | Cited By

Sensing coverage is one of the fundamental design issues in wireless senso
reflects the surveillance quality provided by them. Moreover, network connec
gathered data by sensors to reach to the sink node. Given an initially uncove

and more directional sensors are continuously added to the sensor network, covered areas increases. At some point, the situation abruptly changes from covered areas to a single large covered area. We call this abrupt change the phase transition (SCPT). Likewise, given an originally disconnected sensor r more sensors are added, the number of connected components changes su network suddenly becomes connected at some point. We call this sudden ch connectivity phase transition (NCPT). The nature of such phase transitions is percolation theory. In this paper, we introduce aligned-orientation directional which nodes are deployed based on Poisson point process and the orientati the same. Then, we propose an approach to compute density of nodes at cri of the SCPT and NCPT problems in such networks, for all angles of field-of-v using continuum percolation. Due to percolation theory, the critical density is densities above it SCPT and NCPT almost surely occur. In addition, we prop percolation in directional sensor networks, which provides a basis for solving problems together.

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