Abstract

In recent times, research in the area of large scale wireless sensor networks has been growing rapidly. Due to advent of low cost sensors, it is now possible to deploy a large number of sensors for sensing a region of interest. For certain reasons (reducing radio interference, limited battery capacity, etc.), these sensors are small and can communicate with each other within a small distance. There are many fundamental problems that arise in the research of wireless sensor networks. One of the important issues is that optimizing coverage area. A point in a region said to be ***covered*** *by a sensor if the point is within a distance r from the sensor, where r is the sensing radius of the sensor. The area of interest is said to be covered if every point in that area is covered by at least one of the many sensors.* ***Coverage*** *in wireless sensor networks is usually defined as a measure of how well and for how long the sensors are able to observe the physical space. After deployment of sensors in a region, there may exist some subspaces in that region that are not covered by any of the deployed sensors. These uncovered regions are called* ***coverage holes****. The* ***coverage holes*** *appears in the region may be due to limiting sensing range or may be due to some opaque obstacles obstructing the sensing range . Non-invasiveness of some type of sensors may give rise to the coverage hole problem. In this work we study the coverage hole problem due to opaque obstacle in a orthogonal polygonal area. Our aim is to decide whether there exist coverage holes in the given physical space and estimate the size of the detected holes in the presence of some opaque obstacles. In our work we consider the obstacles as vertical line segments. We also consider the problem of finding the best target locations to place sensor nodes such that the coverage holes are eliminated maximally. We use the Delaunay triangulation to determine the area of the coverage hole.* The implementation work was done in MATLAB.

Key words: Wireless Sensor network; Coverage; Coverage hole; Obstacle; Computational Geometry.