1. sensor node works on its voronoi cell

1. Related Work Two of the most essential andcommon problems in WSN are holes area coverage and node connectivity. So many researchersfocused on maximizing coverage and enhancing connectivity across the ROI 10. Authorsin 15 presents strategies for efficient deployment in a mobile sensornetwork, where the priority function is defined by a coverage priority of some proposedpoints in the ROI. The coverage holes of the network for unequal sensing rangesof the sensors is utilized by variable weighted Voronoi technique. Each sensor nodeworks on its Voronoi cell to detect the coverage holes, and then tries toreduce their size by moving another direction. The weight of the verticesinside the each Voronoi cell determines the target location of each sensor node.

The authors in 16 propose a novelalgorithm based on algebraic objects, such as Cech complex and Rips complex to accuratelygain information about coverage hole, it depends on the ratio betweencommunication and sensing radius of a sensor. The authors in 17 propose two novelalgorithms to detect the coverage holes in ROI. The holes borders and theiradjacent nodes can be easily detected by the first algorithm, DistributedSector Cover Scanning (DSCS), while locating the coverage holes is done by thesecond algorithm, Directional Walk (DW). In 18by defining anew deep sleeping technique the authors propose an energy efficient algorithm based onthe sentinel scheme to reduce the sleeping node detection density. Network lifetime and power consumption are the factors to calculate the detection rate.

Inaddition, the coverage holes is addressed by using triangle coverage repairprocedure to heal the coverage hole. The authors in 19propose a method that reduces the complexity of the relocation of the

initialdeployment and coverage hole healing of mobile sensor nodes in the hybrid WSNs. Their method finds the ways to get the shortest distance movements for themobile nodes in WSNs.

An adaptive threshold distance is used to eliminate somemobile nodes, which are already occupied or situated within the threshold distancefrom the optimal new positions. The authors in 20 propose an optimal sensordeployment in ROI under different nodes communication ranges to achieve thefull coverage. They introduces a novel triangle based pattern called theDiamond to easily detect and cover the holes while the nodes are in the samecommunication range. The authors in 21propose a coverage hole detection algorithms for detecting the holes boundaryin ROI, where sensor nodes can detect their points of intersection of their sensingdiscs.

The algorithm takes in consideration these points of intersection todetect the boundaries of the coverage holes. The authors in 22 proposean algorithm based on the well-known Voronoi diagram. It can recognize the coverageholes by comparing the size of Voronoi cell to this corresponding node’ssensing disc, and label the border nodes of coverage holes effectively by usingsimple geometric calculations.