**Abstract**

In wireless sensor networks (WSNs), accurate localization is the fundamental to various applications like geographic routing and position-aware data processing. It is challenging in the large scale 3-D WSNs because of the irregular topology, such as holes in the path, of the network. This work develops a distributed algorithm to acquire 3-D WSN localization. Hence to improve the 3-D WSN localization, the proposed work composed of two steps, segmentation and joint localization. Especially, the complete network is first divided into a number of sub networks by applying the approximate convex partitioning. A spatial convex node recognition method is developed by Convex Coverage Support Vector Machine (CCSVM) to support the network segmentation that relies on the connectivity information. Then, every sub network is accurately localized by with the multidimensional scalingbased algorithm. The proposed localization algorithm uses a new 3-D coordinate transformation algorithm that helps to reduce the errors introduced by coordinate integration between sub networks and improve the localization accurateness. Results using broad simulations, exhibit that the ICCSVM system to segment a complex 3-D sensor network successfully and significantly increases the localization rate when compared with existing methods.