

Flood Control Distance Vector Hop (FCDV-Hop) localization in wireless sensor networks

ABSTRACT

Distance Vector-Hop (DV-Hop) localization is a distributed, hop by hop positioning algorithm. Anchor nodes generate the packets of nodes position information to calculate the number of hops between the beacon nodes and the anchor nodes, and these packets are flooded in the respective Wireless Sensor Networks (WSN). The DV-Hop algorithm obtains the distance information from the unknown nodes to the anchor nodes through the network topology calculation rather than the radio wave signals measurement which are used in the range-based algorithm. However, flooding information from all anchors to all beacon nodes will become too expensive for large networks (i.e., cost, energy), even with low anchor fraction. The region of nodes flooding through the network needs to be confined within logical constraints to produce better accuracy to reduce the localization error while reducing the cost. This research proposes and develops an enhanced algorithm that can improve the region area for sensor nodes placement within the specific localization area. This research aims to produce a longer network lifetime by reducing the energy used of the sensor nodes and at the same time minimize the localization error. This research describes the flooding control of the node's placement for the localization of the DV-Hop algorithm. The placement of nodes is limited inside the region of the anchor nodes. The simulation environment setup comes with parameters such as the radius, area, number of nodes, types of nodes, the anchor proportion, and the value of the regions. The result shows an improvement for the localization error, the power consumption, and the accuracy of the nodes positioning.

Keyword: DV-Hop; Localization; Range-free localization; WSN