Distributed Landmark Election and Routing Protocol for Grid-based Wireless Sensor Networks

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Abstract

In wireless sensor networks, a well landmark-aware routing protocol considers both the cost of initial construction and data routing. If there are holes (within the region without any sensor) in the environment, it is reliable by electing some landmarks to assist in data transmission, like HVC (Hexagonal Virtual Coordinate), which is a non-GPS devices supporting protocol, but it is waste some cost on flooding restrictively for constructing a virtual coordinates system by finding which nodes should be landmarks of the network. Besides, each node must maintain HVC chart that the relative coordinates among the landmarks in the network. Once there are a lot of landmarks in the network, the resource usage of sensors will increase due to huge and complex HVC chart. However, based on HVC chart, a source node can find an auxiliary routing path (ARP) to indicate the direction of the journey from the source to the destination. In order to achieve a suitably virtual coordinates system, HVC must restrict transmission radius and the hops of flooding. If there are less landmarks in the network, that may also lose the meaning for assisting. In this paper, we propose a distributed landmark election and routing (LER) protocol, to reduce the total cost of construction and routing. Simulation results show that LER achieves a better solution in total consumption of construction and routing.

Keyword：Routing Protocols, Geographical routing