

RSSI Based Path-Aware Positioning Algorithm for Wireless Sensor Networks

簡志豪、黃培壘

E-mail: 360574@mail.dyu.edu.tw

ABSTRACT

Recently, a family of methods have been proposed for ad hoc sensor networks that estimate the approximate positions of sensor nodes in the network. They can be classified into two classes: Range-based improving the accuracy of distance estimation with different signal techniques, and Range-free employing distance vector exchange to estimate positions. Range-based methods apply the distance and angle based position estimation. However, they need expensive equipments to improve accuracy. In another way, Costs of Range-free methods can be significantly reduced. But, Range-free methods maybe result in poor accuracy. Both methods have to use GPS-equipped node for initial position reference. In this paper, we propose RP(RSSI based path-aware positioning algorithm. Intend to archive accurate and costless positioning; we develop the algorithm by applying Received Signal Strength Indication (RSSI) received signal strength measurement features, DV-hop distance features, and Angle of Arrival (AOA) methods. The Algorithm marks all nodes by a number at first, and then the network is segmented into several blocks. For each block which has anchor nodes, the algorithm find best path by searching all paths. And, using RSSI、DV-hop to identify the node and the nodes within a range of certain distance. In best path, the algorithm can get the estimated position of nodes, which has at least two anchor nodes. Simulations show that the proposed RP positioning algorithm significantly reduces the positioning error with comparison to DV-hop positioning algorithm.

Keywords : RSSI、AOA、DV-hop、Best path、Positioning

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