Simple yet effective intelligent indoor positioning system

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Abstract

Seeing that GPS fails to function inside a building, indoor positioning system (IPS) has recently gained much attention in the field of rescue, medical application, public facilities, emerging indoor location based services, etc. This study proposes a novel strategy based on wireless sensor network (WSN) to achieve high positioning accuracy for moving entities. Firstly, radial basis function network (RBFN) model for indoor location estimation is constructed in an unknown environment. Secondly, owing to the shortcoming of locating instant received signal strength (RSS), we introduce the benefits of using the average RSS to reduce noise interference and exclude transient APs. In addition, we integrate Zigbee hardware to realize a set of convenient wireless IPS with comparatively low cost. Finally, in order to reach an optimal accuracy, we adopt multiple similar networks within the same environment. Experiments in this study have demonstrated effective enhancement of existing IPS accuracy when compared with other approaches.

Keyword：Indoor Positioning System, Wireless Sensor Network, RBFN, ZigBee.