



一种基于RFID原理的交通信息获取系统与车辆定位方法

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A RFID Based Traffic Information Acquisition System and Vehicle Positioning Method

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摘要 车辆的无线定位技术已成为近年来一个研究热点。该文首先提出了一种基于RFID(射频识别)技术的交通信息获取系统,并在此基础上,提出了一种新的多基站TDOA(到达时间差)车辆定位方法。该方法是一种基于鲁棒性估计的两步定位方法。第1步利用多个基站的TDOA信息通过鲁棒性估计找到车辆的大致位置,然后进一步采用与车辆距离最近的3个基站的TDOA信息对车辆进行精确定位。该方法可有效地克服传统Chan算法当信号衰减引起TDOA估计误差较大时性能迅速恶化的问题。仿真实验结果表明该方法的定位精度优于传统的Chan算法和基于直接平均的2次定位法,可满足交通信息获取系统中对机动车辆定位的要求。

关键词: 智能交通系统 交通信息获取 到达时间差 被动定位 鲁棒性估计

Abstract: Vehicle positioning method is a hot research topic for many years. In this paper, an ITS (Intelligent Transportation System) based on RFID is proposed, including the structure and communication protocol. A novel vehicle positioning method, based on the Time Difference of Arrival (TDOA) is proposed. This vehicle positioning method is a two-step robust positioning method. The rough position of a vehicle can be estimated by a robust estimation in the first step. Then the three base stations which are closest to the vehicle can be found, and the two TDOA of these three base stations are employed to calculate the vehicle's final position. Simulation results show that the performance of the proposed algorithm is better than the classic Chan algorithm and 2-step algorithm based on averaging method. The performance of the proposed algorithm can meet the requirement of positioning service in ITS.

Keywords: ITS (Intelligent Transportation System) Traffic information acquisition TDOA (Time Difference Of Arrival) Passive positioning Robust estimation

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