

基于射频识别的立体停车场设计

摘 要

栉风沐雨 40 年，我国已经一跃成为世界第二大经济体，人民的生活水平也在稳步提高，与此同时我国的汽车数量也呈几何指数增长。这一现象对于现有的城市交通基础建设而言无疑是严峻的考验。由于我国存在发展不平衡的现实问题，传统停车场仍在不少基层地区大行其道，传统的停车场通常采用平面建设和人工管理方式，不仅落后低效，而且不利于基层地区的未来发展。因此现实迫切需要采用简单便捷，自动化程度高的智能化停车场来改变眼前的窘境。

本文以基层小型停车场为研究背景，提出了一种基于射频识别的立体停车场系统作为解决方案。根据实际的需求，采用无接触信息交互的射频识别技术结合三层升降横移立体停车场，对整体系统进行具体分析与设计。

总体设计分成硬件和软件两大部分。其中的硬件部分包括 52 单片机、RFID 模块、LED 显示屏幕、LED 点阵以及其他外围模块的设计。软件部分则可以归纳为信息的收集与显示以及整体系统的参数设置。

系统的硬件通过制作实际模型的方式进行功能展示，同时以 Altium Design10 作为辅助开发工具。软件部分主要是通过 Keil μ Vision5 进行编写与修正，并最终实现整体系统的良好运行。

总的来说，整体系统的最终完成实现了 RFID 技术的交互便利性，以及体现了立体停车场的较高土地利用率。

关键字：射频识别技术；立体停车场；系统；便捷

ABSTRACT

With the rapid development of 40 years of reform and opening, people's living standard are also steadily improving. But at the same time the number of cars in China has also increased exponentially, which is undoubtedly a serve test for the existing urban transportation infrastructure. Due to the practical problems of uneven development in our country, traditional parking lots are still popular in so many grass-root areas. Traditional parking lots usually adopt plane construction and manual management, which is not only backward and inefficient, but also not conducive to the future of those places. Therefore, we urgently need a simple, convenient, and highly automated intelligent parking lot to change the dilemma.

Based on the research background of small-scale parking lots, this paper proposes a three-dimensional parking lot system based on RFID as a solution. According to the actual needs, the radio frequency identification technology with non-contract information interaction is used in conjunction with the three-story lifting and traversing three-dimensional parking lot conduct specific analysis and design of the overall system.

The overall design is divided into hardware and software. The hardware part includes the design of 52 microcontroller, RFID module, LED display screen, LED dot matrix and other peripheral modules. The software part can be summarized as information collection and display and overall parameter settings.

The hardware of system demonstrates by making actual models, and Altium Design 10 is used as an auxiliary development tool. The software part is mainly written and revised through Keil μ Vision5, and finally achieves a good operation of the whole system.

In general, the final completion of it has realized the interactive convenience of RFID technology and higher land utilization rate of the three-dimensional parking lots.

Keywords: RFID; Three-dimensional parking lot; System; Convenience

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