

基于 51 单片机的机场服务机器人设计

摘 要

针对现有机场空间大，人员复杂，服务项目繁多等问题，设计一种用于机场环境检测，协助工作人员管理的服务机器人。该机器人能够实现语音识别预设应答、避障移动、体温检测三项功能。该系统由单片机控制模块、电机驱动模块、HC-SR04 超声波传感器、SX-TTSC 语音识别模块、温度传感器和报警器组成。51 单片机作为处理器控制整个系统电机驱动模块放大电流带动机器人前进、后退、转弯；利用 HC-SR04 超声波传感器实现自主避障功能；SX-TTSC 语音识别模块帮助旅客查询机场信息，实现预设应答；利用温度传感器和报警器，检测周围旅客体温，当温度高于设定的体温阈值时，就会启动报警功能。

本设计利用对比分析法进行方案设计，利用实验法得出机器人与障碍物的距离，利用仿真法实现体温检测报警功能。该机器人给机场的管理以及机场旅客的出行带来便利大大提高了机场的工作效率，使机场服务更加合理化、人性化、全面化。

关键词： 51 单片机；机场服务；机器人；体温检测报警

Design of airPort service robot based on 51 single chiP microcomPuter

Abstract

Aiming at the Problems of large airPort sPace, comPlex Personnel and numerous service items, a service robot is designed for airPort environment detection and staff management. The robot can realize the three functions of Automatic SPeech Recognition Preset resPonse, obstacle avoidance movement and body temPerature detection. The system consists of single chiP microcomPuter control module, motor drive module, HC-SR04 ultrasonic sensor, SX-TTSC Automatic SPeech Recognition module, Pyroelectric infrared sensor, temPerature sensor and alarm. 51 single-chiP microcomPuter as a Processor to control the whole system; motor drive module to enlarge the current to drive the robot forward, backward, turn; use HC-SR04 sensor to achieve autonomous obstacle avoidance function; SX-TTSC Automatic SPeech Recognition module to help Passengers query airPort information to achieve default resPonse; use Pyroelectric infrared sensor and alarm to detect the. When the temPerature is higher than the set body temPerature threshold, the alarm function is activated.

This design uses the contrast analysis method to carry on the Plan design, uses the exPerimental method to obtain the robot and the obstacle distance, uses the simulation method to realize the body temPerature detection alarm function. The robot brings convenience to the management of the airPort and the travel of airPort Passengers, greatly imProving the efficiency of the airPort and making the airPort service more rational, user-friendly and comPrehensive.

Keywords: 51 MCU; AirPort services; Robot; TemPerature detection

alarm

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