智能交通灯的设计与实现

摘　要

在这个信息时代人们生活水平的不断提高，汽车已成为所有家庭的必需品。现在城市的交通堵塞极其严重。而通过交通灯控制系统来解决这个问题，是优化交通控制的主要手段。然而，现有的交通信号控制系统已经不能适应城市的发展，导致交通紊乱越发严重。

所以本文设计了基于物联网技术的交叉口比较精密、强有力的信号控制系统，提高了整个路网的交通效率和各个交叉口的交通容量。其中智能信号控制系统由单片机、LED 信号灯、JSN-SR04T 嵌入式超声波测距模块、蜂鸣器报警模块、电感感应传感器等组成。开发板会汇总到来自周边车辆的交通数据信息和等候在人行横道附近的人群数据进行处理，在通过配合交通灯调度算法完成基本信号灯倒计时和信号切换功能。仿真结果表明，系统具有交通流检测和调整、红色执行判断和处理等相关功能。设计可以达到预定的控制目标，提高交通道路的交通效率。

关键词：物联网；调度算法；机器学习；智能传感器技术

Abstract

With the improvement of people's living standard in this information age, the automobile has become a necessity for all families. The traffic jam in the city is very serious now. To solve this problem through traffic light control system is the main means to optimize traffic control. However, the existing traffic signal control system has been unable to adapt to the development of the city, resulting in more and more serious traffic disorder.

So this paper designs a more precise and powerful signal control system based on Internet of things technology, which improves the traffic efficiency of the whole road network and the capacity of each intersection. The intelligent signal control system is composed of mcu, LED signal lamp, JSN-SR04T embedded ultrasonic ranging module, buzzer alarm module and inductor sensor. The Development Board will aggregate traffic data from surrounding vehicles and crowd data waiting near the crosswalk, and perform basic signal countdown and signal switching functions with traffic light scheduling algorithms. The simulation results show that the system has the functions of traffic flow detection and adjustment, red execution judgment and processing. The design can achieve the predetermined control goal, enhances the traffic efficiency of the traffic road.

Key words: Internet of things; scheduling algorithm; machine learning; intelligent