
基于 NB-IoT 的智慧路灯的设计

摘 要：随着社会的进步和发展，路灯在人们的生活中显得越发重要，已经成为人们生活中不可分割的一部分。传统的路灯照明都是采用分散时控的方法控制的，按照预先设定的时间状况自动开关，这种传统的老式路灯存在很多弊端，很容易出现故障，而且排查问题很麻烦，有一些路灯采用的串联工作，其中一盏路灯出现故障，会导致其他路灯都不工作，不可以单灯控制，无法实现路灯的精细化管理。传统路灯的节能措施一般为时间控制和光照控制，节能效果很不理想。当下随着 5G 技术的出现与物联网的快速发展，使用物联网技术来实现路灯的精细化控制与节能是必然的趋势。路灯的智能化不仅能实现路灯的精细化管理，还可以使路灯的能耗降到最低。

本设计硬件部分由 ATMEGA328 主控芯片，光敏传感器，驱动电路，电源管理电路，NB260 和调压电路组成。软件部分先明确设计思路，了解软件程序要求，绘制流程图，逐一实现各模块的程序和算法，最终实现软件程序的要求，最后通过各模块将数据上传到计算机。

该设计的大致工作流程为先由光敏传感器检测外界的光照强度数据，采集结束以后将数据发送到 ATMEGA328 主控芯片中，主控芯片经过一系列的数据处理后将最后的结果传送到 NBIOT 模块中，NBIOT 模块通过基站将获得数据发送到云服务器，最后由上位机对结果进行人工控制，实现最终的控制需求。

关键词：智慧路灯；NB-IOT；物联网

Design of Smart Street Lamp Based on NB-IoT

Abstract: With the progress and development of society, street lamp is more and more important in people's life, and has become an integral part of people's life. The traditional street lamp lighting is controlled by the method of decentralized time control, according to the pre-set time condition automatic switch, this traditional old-fashioned street lamp has many drawbacks, it is easy to malfunction, and the troubleshooting problem is very troublesome, there are some street lamps used in series work, one of the street lamps failure, will lead to other street lamps are not working, can not be single lamp control, can not achieve the fine management of street lamps. The energy saving measures of traditional street lamp are time control and illumination control, and energy saving effect It's not ideal. At present, with the emergence of 5 G technology and the rapid development of the Internet of things, it is an inevitable trend to use the Internet of things technology to realize the fine control and energy saving of street lamps. The intelligence of street lamp can not only realize the fine management of street lamp, but also minimize the energy consumption of street lamp.

The hardware part of this design consists of ATMEGA328 main control chip, photosensitive sensor, drive circuit, power management circuit, NB260 and voltage regulation circuit. The software part first clarifies the design idea, understands the software program request, draws the flow chart, realizes each module program and the algorithm one by one, finally realizes the software program request, finally uploads the data to the computer through each module.

The general workflow of the design is that the light intensity data of the outside world is detected by the photosensitive sensor, the data is sent to the ATMEGA328 master control chip after the acquisition is finished, the final result is transmitted to the NBIOT module after a series of data processing result to the NBIOT module. NBIOT module sends the obtained data to the cloud server through the base station result is manually controlled by the upper computer to realize the final control requirement.

Key Words: Intelligent street lamp; NB-IOT; Internet of things

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