A Review On Industrial Automation By Zigbee Based Wireless Remote Controller

Minal Nikose, Pratibha Mishra, Avinash Agrawal

Abstract: Proper use of wireless sensor networks (WSNs) can lower the rate of catastrophic failures, and increase the efficiency and productivity of industrial operations. Diversification of remote control mode is the inevitable trend of development of smart appliances. This paper proposes a review on remote control system of smart appliances based on Zigbee wireless sensor network. Status of the home appliances can be queried and controlled through the remote controller. The proposed work presents the design and implementation of a novel wireless sensor network based home security system with a modular self-reconfigurable remote controller.

Keywords: Remote controller, Dimmer, Zigbee, GSM, Triac, Wireless sensor network.

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1. Introduction

IN today's world, industries, companies, and manufacturers deals with constant and increased supplies of products, and growing demands for services. Intelligent and low-cost automation of industrial processes are crucial in order to improve process efficiencies, deliver quality products, and ensure timeliness and accuracy of systems. A short survey on reliability and security issues of WSNs in industrial automation and control systems is provided in [5].General characteristics of WSNs are briefly described followed by some WSN applications. A number of cryptographic methods currently used in the wireless environment along with existing security paradigms and standards are discussed. In [1], Modular self-reconfigurable robot is presented. Traditional indoor security systems usually use some monitoring devices mounted on fixed locations such as walls, doors, and roofs with wired communication. Some surveillance systems which are based on low-power and low-cost wireless sensor networks are proposed in this. It also presents the design and implementation of an intelligent home security system with a modular self reconfigurable robot as the surveillance and assisting terminal. It can pass through narrow spaces and reach the target region quickly. Robot also can separate into several modules. Each module is equipped with the same sensors as the static monitoring node. The important character of the robot is the function of security system repairing [1] In [2], developed a remote control system of smart appliances based on wireless sensor network, applying the rapid developing mobile network and Internet to the field of remote control.

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Remote control system of smart appliances mainly consists of two parts: household internal control network and remote control network. Each remote control mode has account login and information matching settings to add to security of the system. In [4], the author's main focus is on developing integrated remote controller to control electric appliances in the home or office network with no extra attachment of communication device to the appliances using ZigBee protocol and infrared remote controller technology. The integrated remote controller system for home automation is composed of integrated remote controller, ZigBee to infrared converter, and ZigBee power adapter. ZigBee power adapter is introduced for some appliances which do not have even infrared remote device to be connected in home network. In [3], common IR (Infrared) based TV remote controller is interfaced with the 'Smart Box' as a communication medium, which makes it very much user friendly and cost effective. A solid state temperature sensor is interfaced with the microcontroller which senses room temperature and on remote command shows the temperature in Celsius on the 7-segment display connected with the 'Smart Meter'. To display the light fan intensity-speed levels there are two 7-segment displays, which also displays the room temperature when corresponding remote controller button is pressed. When not necessary, to save power consumption, the displays can be turned off by pressing corresponding remote controller button.

2. Overview Of Remote Controller

This section presents main features of remote controller and the design requirements. Saeed Uz Zaman Khan et al [3] presented a microcontroller based programmable home appliance manager, named as 'Smart Box' .It assembled lots of useful features as Appliance On/Off , Speed and Intensity Control, Operating Modes, Room Temperature Sensor, Programmability, Adaptive Automatic Control, Display, Built in Power Source. All the operations and features of 'Smart Box' are accomplished by using advanced features of PIC16F877A microcontroller. The coding and compilation is done in 'MikroC Pro' for PIC and tested with 'Proteus'. After finalizing the code, the microcontroller is burned using'PICkit2'. Guifang Qiao et al [1] proposed the design and implementation of an intelligent home security system with a modular self reconfigurable robot which works as the surveillance as well as assisting terminal. The local wireless network consists of Transmote, a gateway, a mobile phone, and several static monitoring

213

nodes which are equipped with digital camera and PIR sensor. In indoor environment, monitoring nodes are scattered above windows and doors. They can communicate with each other and exchange data with the home server and Transmote. If the monitoring node detects an intruder passing through doors or windows, it will take photos and send an alarm message to the remote PC or mobile phone of the house owner. Tengfei Zhang et al [2] proposed a system in which household internal wireless sensor network adopts ZigBee technology. It consists of ZigBee coordinator and the ZigBee node. Remote control mode adopts SMS and Internet. Internet control method mainly depends on the host computer interface to operate smart appliances in a remote distance. User's login information, parameters' real-time display, remote control button are the main three parts of the interface. Users can refer to the parameters and control remote appliances with the button in the host computer interface. The remote control system they have developed includes the following control method : Key, infrared control, SMS, Internet.
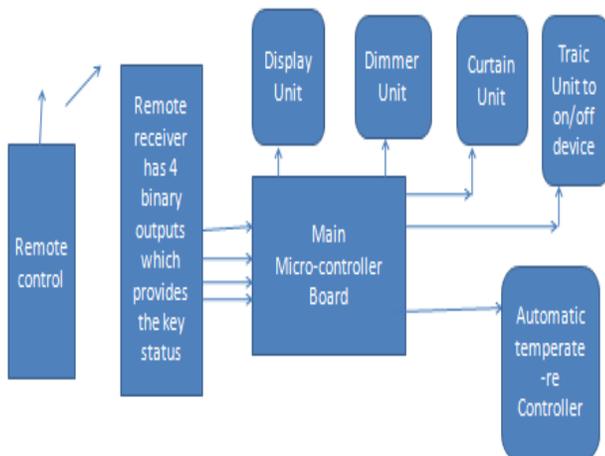
Figure 1. System Architecture

Il-Kyu Hwang et al [4] An integrated remote controller system for home automation is composed of Integrated Remote Controller (IRC), ZigBee to Infrared Converter (ZB2Ir), and ZigBee Power Adapter (ZPA), IRC is composed of a micro processor, a ZigBee module, an Ir receiver, and a touch screenThe Ir receiver is a device to take Ir signals from the Ir remote controller of electric appliances for the learning. IRC has a function of code learning by the users.

3. Conclusion

The review on a home and industrial automation system is presented. Paper proposes an integrated remote controller scheme to control electric appliances in the home network with no extra attachment of communication device to the appliances using Zigbee protocol and infrared remote controller technology. It is cost effective and flexible office appliance manager by using Zigbee protocol as a communication technology.

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