Scope International Journal of Science, Humanities, Management and Technology. ISSN : 2455-068X
Vol.2 Issue 1 (2016) 30-32. Submitted 25/01/2016. Published 2/02/2016

WIRELESS LIGHTING SYSTEM WITH ZIGBEE

Arun Manohar.U, Department Of Computer Science,
Dr.Neela Madheswari, Department of Computer Science Engineering,
Mahendra Engineering College, Namakkal.

Abstract:

Smart lighting systems go far beyond merely replacing lamps. These modern systems are now able to reproduce arbitrary spectra, color temperatures, and intensities and pivot on smart sensors and actuators incorporating information and communication technologies. This paper presents an interoperable smart lighting solution that combines heterogeneous lighting technologies enabling intelligent functions. The system can shift light intensity to increase visual comfort, and it is oriented toward human centric lighting studies. Moreover, this system follows the guidelines defined by the ISO/IEC/IEEE 21451 standards and ZigBee Light Link and also, it includes an additional transducer signal treatment service for artificial intelligence algorithms.

Keywords – Zig bee, Artificial intelligence, Intensities.

1. INTRODUCTION

SMART lighting is a buzzword that defines heterogeneous lighting technologies: High-intensity discharge lamps (HID), fluorescent, solid state LED and OLED luminaires, composed of numerous smart sensors and actuators, and with the possibility of incorporating a wide set of capabilities and connectivity interfaces. These systems allow us to control and monitor modern and heterogeneous electrical equipments such as ventilation and lighting devices. The main interfaces conceived for wired lighting systems are Digital Addressable Lighting Interface, Power Line Communications (PLC), Digital Multiplex and KNX for intelligence buildings. The most important wireless physical interfaces for distributed intelligent devices are WiFi, Bluetooth, ZigBee, WPAN, Wireless HART, MiWi) and RFID compatible for automation applications. Now modern smart lighting systems contain wired and wireless interfaces, and they can be harmonized in a set of ISO standards . This harmonization covers Transducer Electronic Datasheets (TEDS) formats. TEDS are different electronic data sheets stored in a non volatile flash memory.

2. EXISTING SYSTEM

Most currently available inexpensive home systems use wired technology, which is complex and difficult to install. Various wireless technologies have been developed and introduced into the home environment such as infrared light for short-range applications and wireless local area networks (WLANs), Bluetooth and ZigBee for mid-range applications. However, a WLAN home automation system can malfunction, and the system fails when there is no connectivity. The system security is also vulnerable to hackers because IP addresses are required to connect a wireless home automation system to various devices. The WLAN can be accessed by many devices but requires a high bandwidth for data transfer. Thus, WLAN is expensive. In addition, there are delays and jitters in data transmission when too many devices are connected to the wireless system. . In this paper, a ZigBee communication technology system is designed and implemented for use in a smart home wireless sensor network.

3. HARDWARE STRUCTURE

The smart lighting system is deployed as an ecosystem of smart sensors located in walls, windows, the chilled beam system and the luminaires installed in the ceiling of the office. This section is focused on describing the luminaire architecture and the sensor node capabilities, including an energy harvesting module. The platform designed is shown in Figure 1.

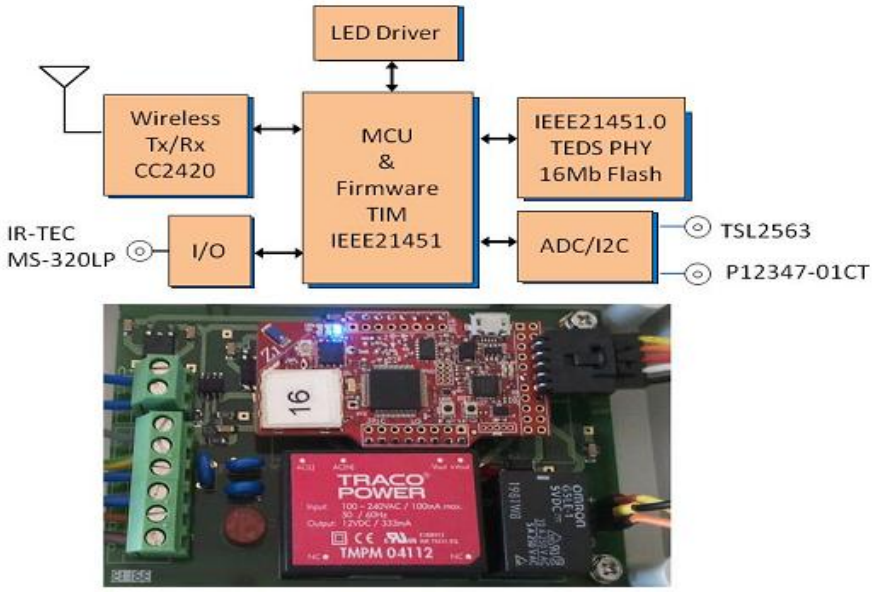

Fig.1. Smart Luminaire block diagram and implemented system

The second approach, introduces occupancy sensors in the lighting system. These solutions are often based on innovative strategies, rules or principles of data fusion. For this reason, we chose a Fuzzy logic algorithm to determine light levels required on the work plane during a working day in an office.

The Li-Fi technology was first proposed by Harald Hass a German physicist, number of industry group sand companies combined form the Li-Fi association to promote the high speed wireless communication using VLC technique to overcome the shortage in spectrum distribution for the purpose of high speed wireless communication. The technology is demonstrated for the first time in los Vegas using a pair of smart phones up to the distance range of 10 meters.

4. SIGNAL SERVICES

Lighting control systems have been defined historically to minimize power consumption and/or increase visual comfort. Traditionally, these strategies are divided into four different approaches. The first one involves updating the lighting system with energy-efficient luminaires. The second approach, introduces occupancy sensors in the lighting system. The third, the lighting system contains daylight harvesting and control. Finally the fourth approach, a lighting system further includes motorized blinds. However, in our lighting control system prototype, we attempt to cover these different approaches by considering a heuristic model to determine control actions based on user experience and

with the support of smart sensors and actuators. With the increasing use of Wi-Fi, the existing radio frequency is getting blocked slowly and simultaneously, there is an increasing number of people who want to connect to the internet. Wireless radio frequencies are getting higher, complexities are increasing and RF interferences continue to grow. The LI-FI technology helps us to overcome these problems.

5. RESULT ANALYSIS

Although there are a lot of advantages of LI-FI, there are still certain challenges which need to be overcome. LI-FI requires Line of Sight. If the apparatus is set up outdoors, it would need to deal with changing weather conditions. If the apparatus is set up indoors, one would not be able to shift the receiver. The problem of how the receiver will transmit back to the transmitter still persists. Light waves can easily be blocked and cannot penetrate thick walls like the radio waves can. We become dependent on the light source for internet access. If the light source malfunctions, we lose access to the internet.

6. CONCLUSION

The WLAN can be accessed by many devices but requires a high bandwidth for data transfer. Thus, WLAN is expensive. In addition, there are delays and jitters in data transmission when too many devices are connected to the wireless system. WLAN needs to be centralized by an expensive super computer and wired system. Furthermore, existing WLAN home automation does not ensure data transmission security. In this paper, a ZigBee communication technology system is designed and implemented for use in a smart home wireless sensor network.

REFERENCES

1) J. Byun, I. Hong, B. Lee, and S. Park, “Intelligent household LED lighting system considering energy efficiency and user satisfaction,” IEEE Trans. Consum. Electron., vol. 59, no. 1, pp. 70–76, Feb. 2013.

2) Q. Chunhui and W. Wei, “A LED control system with brightness and color temperature adjustable,” in Proc. Int. Conf. Control Autom. Syst. Eng. (CASE), Jul. 2011, pp. 1–4

3) F. J. B. Outeirino, F. Domingo-Perez, A. del Rocio Gil-de-Castro, J. Flores Arias, and A. Moreno-Munoz, “In-building lighting management system with wireless communications,” in Proc. IEEE Int. Conf. Consum. Electron. (ICCE), Jan. 2012, pp. 83–85

4) H. Cho, J. Kim, and Y. Baek, “Large-scale active RFID system utilizing ZigBee networks,” IEEE Trans. Consum. Electron., vol. 57, no. 2, pp. 379–385, May 2011.

5) ISO/IEC/IEEE Information Technology—Smart Transducer Interface for Sensors and Actuators—Part 1: Network Capable Application Processor (NCAP) Information Model, ISO/IEC/IEEE Standard 21451-1:2010(E), May 2010.