ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 9, April 2017

AUTO-CONFIGURATION AND WISDOM CONNECTION SYSTEM ON IOT APPLICATIONS

G VIMALA SHALINI AND MAHENDER VESHALA

Dept Of Electronics and Communication Engineering,

KU College of Engineering & Technology,KU campus,Warangal,Telangana,India.

Vimalashalini256@gmail.com and mahi415@gmail.com

ABSTRACT: The rapid development of wireless communication technology facilitates the realization of the Internet of Things (IOT). Self-configuration and smart connection system have become relative important issue in accordance with wide applications of IOT and the energy saving concepts.This paper presents the integration of 'Auto-configuration and Wisdom Connection System' with Wireless Sensor Networks (WSN), IOT and ZigBee technology.Auto configuration based on a Received Signal Strength Indicator (RSSI), regional allocation, lighting auto configuration area and sub-areas. The proposed 'Auto-configuration and Wisdom Connection System' automatically configures different lightings to the same position within in the range -3dBm when the RSSI value varies only slightly. The system is configured to the same lighting site within the experimental environment when the sub-area range set - 3dBm. This study presents a significant contribution to new configuration of objects in IOT, context awareness control, and optimization of network control platform.

Keywords: IOT, Auto-configuration, Smart binding, WSN, RSSI.

I.INTRODUCTION

The tremendous development in the wireless technology motivated to provide military detection applications. Since then, ZigBee technology has been extensively used in a large range of fields, providing communications and sensing with high reliability ,low power consumption, and multi-node networking. Presently this technology is extensively used in applications such as home electronic devices, process monitoring in industry, consumer products for health testing for monitoring or detecting intruders, medical sensing, elderly care, the collection of patients' information, such as blood pressure, heartbeat, and pulse, and environmental applications such as the detection of pollution water, soil and air using sensors. The popularity of smart devices has resulted in new applications of WSN, the new IOT and ZigBee technology. With respect to the consumer market, ZigBee-related technologies have been available for a long time but not yet universally. The costs, installation and operational complexity of such technologies will not provide the acceptance of consumers. This system eliminates cumbersome setting, and cause users to feel that using a remote

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 9, April 2017

controller is as simple as using a cell phone may provide new opportunities in the IOT. This concept proposes a 'Auto-Configuration and smart Connection System' that integrates WSN, the IOT and GPRS technology, and confirms its feasibility in both theory and practice. Lighting control systems with sensors are constructed with Auto-configuration and smart lighting control. The system configures lighting based on RSSI information of reference points, and provides information about lighting RSSI for controlling devices, facilitating reference alignment. This work proposes the concept of sub-area regional configuration, changing sub-area range by setting RSSI error, to increase controlling in lighting numbers and to enhance the effectiveness of automatic control .Configuration is an arrangement of elements or parts in a particular format based on our requirement. It is the automatic arrangement of system without manual intervention and any software configuration programs. Binding is a act of providing the security and fastening the operation of the system .smart binding is that a user can able or disable operation on any individual port(port-based).once smart binding is enabled on a switch port, the switch will restrict or allow client access by checking the pre configured data. Smart connection system balances the connections and it chooses the best system for giving the best performance.

II .LITERATURE SURVEY

The Development of the WSN has involved the development of battery-powered WSN environments. The MIT Technology Review identified the ten emerging technologies which change the fields of computing, medicine,manufacturing, transport and energy infrastructure.Among all of them, wireless sensor networks is the most usefull. WSNs are widely used for controlling electronic consumer products, monitoring homes, monitoring monitoring industrial processes, medical conditions, environmental monitoring and other purposes. The increasing prevalence of smart devices in recent years has supported new applications of the IOT.

PROPOSED METHOD

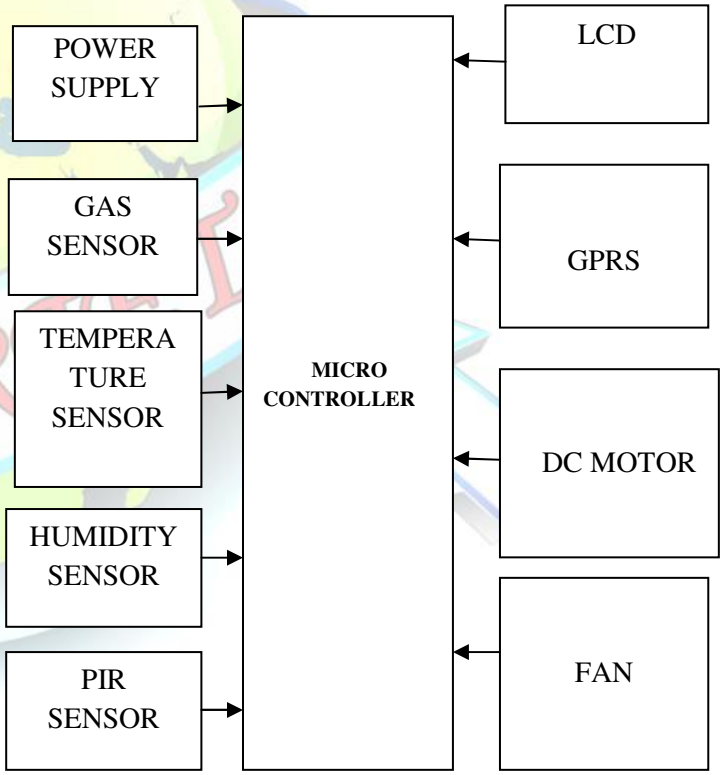

Figure 1. Block diagram

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 9, April 2017

III. METHODOLOGY

The architecture of the Auto configuration and smart connection system is composed of ZigBee devices, sensors, lights and other components. The system is operated using a ZigBee remote controller, tablet or mobile phone through an Ethernet or Wi-Fi. The system is divided into controller, light sensing area, and movement sensing area. This section forms the control unit of the whole project.

MICRO CONTROLLER

This section basically consists of a Microcontroller with its associated circuitry like Crystal Oscillator Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI

ARM7TDMI is a type of micro controller which is used in the system.It is the heart of the system. The main purpose of the arm7 is to provide the interface between the other devices.It links the devices in the system with main program.

LCD

LCD is used to display all the sensored values which are sensed by the system sensors present in the system. It displays temperature gas values infra red values. Basically it is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

Temperature sensor

As the system is designed to monitor the situations in the industry, this temperature sensor sense the temperature increase in industry. when the temperature increased beyond room temperature then it will intimate us by sending a message. A thermistor is a type of resistor whose resistance is dependent on temperature. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting over current protectors, and self-regulating heating elements. The TMP103 is a digital output temperature sensor in a four-ball wafer chip-scale package (WCSP). The TMP103 is capable of reading temperatures to a resolution of 1°C.

Figure 2.Temperature sensor

Co2 sensor

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 9, April 2017

CO2 Sensor is a type of gas sensor. It will sense the gas values of type LPG, i-butane, propane, methane, alcohol, hydrogen and smoke. These are used in gas leakage detecting equipments in family and industry.The surface resistance of the sensor Rs is obtained through effected voltage signal output of the load resistance Rl which series-wound. It will helps us to avoid the gas related accidents in the industry.

Figure 3. Co2 sensor

PIR sensor

It will give the information of the unauthorized persons who are entering into the industry. The main source of PIR sensor is black body radiation. It is usually infrared radiation that is invisible to the human eye but can be detected by electronic devices designed for such a purpose. A Passive Infra Red sensor(PIR) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are often used in the construction of PIR-based motion detectors. Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall. [9] discussed about Intelligent Sensor Network for Vehicle Maintenance System. Modern automobiles are no longer mere mechanical devices; they are pervasively monitored through various sensor networks & using integrated circuits and microprocessor based design and control techniques while this transformation has driven major advancements in efficiency and safety. In the existing system the stress was given on the safety of the vehicle, modification in the physical structure of the vehicle but the proposed system introduces essential concept in the field of automobile industry. It is an interfacing of the advanced technologies like Embedded Systems and the Automobile world. This "Intelligent Sensor Network for Vehicle Maintenance System" is best suitable for vehicle security as well as for vehicle's maintenance. Further it also supports advanced feature of GSM module interfacing. Through this concept in case of any emergency or accident the system will automatically sense and records the different parameters like LPG gas level, Engine Temperature, present speed and etc. so that at the time of investigation this parameters may play important role to find out the possible reasons of the accident. Further, in case of accident & in case of stealing of vehicle GSM module will send SMS to the Police, insurance company as well as to the family members.

The term passive in this instance means that the PIR device does not emit an infrared beam but merely passively accepts incoming infrared radiation. "Infra" meaning below our ability to detect it visually, and "Red colour" because this color represents the lowest energy level that our eyes can sense before it

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 9, April 2017

becomes invisible. Infrared means below the energy level of the color red, and applies to many sources of invisible energy.

Figure 4.PIR Sensor

Ethernet

Ethernet is the basic technology which is used for computer networking. This technology mainly used by local area networks (LANs) and metropolitan area networks (MANs). The main function of ehernet in this system is to provide the link to the communication for longer distances without any loss of data. It was commercially introduced in 1980 and first standardized in 1983 as IEEE 802.3, and has since been refined to support higher bit rates and longer link distances. Over time, Ethernet has largely replaced competing wired LAN technologies such as token ring, FDDI, and ARCNET. The primary alternative for contemporary LANs is not a wired standard, but instead a wireless LAN standardized as IEEE 802.11 and also known as Wi-Fi. The Ethernet standards comprise several wiring and signaling variants of the OSI physical layer in use with Ethernet. The original 10BASE5 Ethernet uses coaxial cable as a shared medium, while the newer Ethernet variants use twisted pair and fiber optic links in conjunction with hubs or switches. Ethernet data transfer rates have been increased from the original 2.94 megabits per second (Mbit/s) to the latest 100 gigabits per second (Gbit/s), with 400 Gbit/s. Systems communicating over Ethernet divide a stream of data into shorter pieces called frames. Each frame contains source and destination addresses and error-checking data so that damaged data can be detected and re-transmitted. As per the OSI model, Ethernet provides services up to and including the data link layer.

GPRS

GPRS is a data transfer technology. In this user data (such as sensored values) is transferred in the form of packets. It uses packet radio principle to transfer user data packets in an efficient way. It is done between GSM mobile stations and external packet data networks. Packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-I36) networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end. GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 9, April 2017

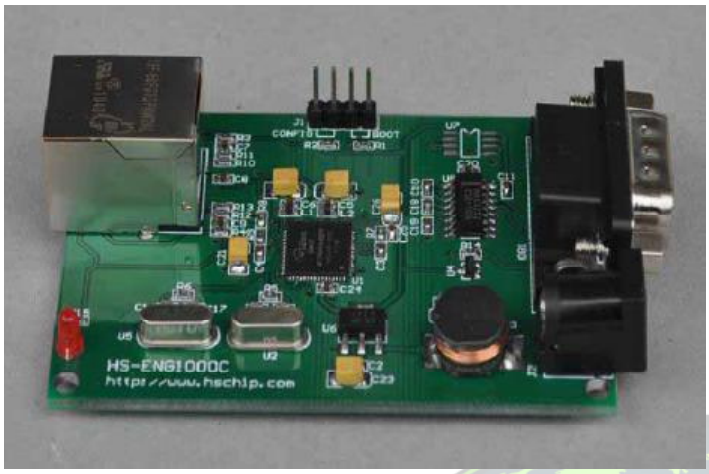

Figure 5.GPRS module

RESULTS

The main aim of the system is to monitor and verify the system functions which are happening in the testing environment (say industry). The system hardware includes light sensors, mobile sensors, analog or digital remote controller, arm7, GPRS, Ethernet. These all combinely giving the required output. The system is designed to perform all the functions in various environments. This section verifies the effectiveness of the system function in a real environment.. Regard to smart families costs, system installation and operational complexity affect consumer acceptance. The seamless binding of wireless technologies to all types of home appliances, elimination of the cumbersome setting, and causing users to feel that using a remote control is as simple as using a cell phone may provide new opportunities related to the IOT.

The verification of the system functions cover three major items, which are auto-configuration of the lighting device, smart connectivity, and multi function remote control along with their sub functions..

Self-configuration

i) When a new lamp is added, the system detects the new lighting; displays the RSSI value of its reference point, and estimates the lighting configuration area.

ii) Click 'new site allocation' to activate auto configuration which supports multi-lighting.

iii) The 'clear lighting function' restores initial value to lighting.

iv) Click 'site reallocation' to reallocate sites for all lighting or designated.

v) In the 'lighting configuration state', records of sites in each area can be queried or deleted.

RSSI variation analysis

i) Comparison of volatilities of RSSI values in various lighting position, and at different times in the same place.

ii) Comparing the difference between actual value and activating site allocation with averaging of 30 RSSI values.

iii) Analyzing RSSI variation and the influence to site allocation variation with two lighting placing closely in the same time.

CONCLUSION

The 'Auto configuration and Smart Connection System' is developed and its feasibility is verified. The results of verification of its major functions includes auto-configuration, indicate that the system provides auto-configuration for multi-lighting, with an RSSI value variation within -3dBm, and regional configuration in each sub-area validated.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 9, April 2017

REFERENCES

[1] M.C. Shie, P. C . Lin, T.M. Su, P. Chenand and A. Hutahaean, "Intelligent Energy Monitoring System Based on ZigBee-Equipped Smart Sockets, "Proceedings of the IEEE Intelligent Green Building and Smart Grid (IGBSG

[2] C. Perera, P. P. Jayaraman and A. Zaslavsky, "Sensor Discovery and Configuration Framework for the Internet of Things Paradigm," ISBN 978-89-968650-6-3 84 Jan. 31 ~ Feb. 3, 2016 ICACT2016

[3] Proceedings of the IEEE World Forum on Internet of Things, pp. 94- 99, 2014.

[4] J. Bahi, A. Makhoul and A. Mostefaoui, "Localization and Coverage for High Density Sensor Networks," Proceedings of the IEEE Conference on Pervasive Computing and Communications Workshops, pp. 295–300, 2007.

[5]] P. Corke, T. Wark, R. Jurdak, H. Wen, P. Valenci and D. Moore, "Environmental Wireless Sensor Networks," Proceedings of the IEEE Invited Paper, pp. 1903-1917, 2010

[6] C. Gezer and C. Buratti, "A ZigBee Smart Energy Implementation for Energy Efficient Buildings," Proceedings of the IEEE 73rd Vehicular Technology Conference (VTC Spring), pp.1-5, 2011.

[7] D.M. Han and J.H. Lim, "Smart home energy management system using IEEE 802.15.4 and ZigBee," Proceedings of the IEEE Transactions on Consumer Electronics, vol.56, issue 3, pp.1403-1410, 2010.

[8] J. Han, C. S Choi, W. K Park, I. Lee and S. H Kim, "Smart Home Energy Management System Including Renewable Energy Based on ZigBee and PLC," Proceedings of the IEEE JOURNALS Consumer Electronics, IEEE Transactions on Volume: 60, Issue: 2, pp.198-202, 2014.

[9] Christo Ananth, C.Sudalai@UtchiMahali, N.Ebenesar Jebadurai, S.Sankari@Saranya, T.Archana, "Intelligent sensor Network for Vehicle Maintenance system", International Journal of Emerging Trends in Engineering and Development (IJETED), Vol.3, Issue 4, May 2014, pp-361-369.

[10] A. Golestani, N. Petreska, D. Wilfert and C. Zimmer, "Improving the Precision of RSSI-based Low-Energy Localization Using Path LossExponent Estimation" .