Self-Configuration And Smart Control System

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Abstract:

The development of wireless communications technology was proposed for detection appliances and radar information and home appliances monitoring, control. Wireless sensor networks (WSNs) made a remarkable change in the electronic industry the system that has developed with wireless sensor networks have grown to be more and more to watch and manage situational information for various intelligent services. The design and development of the monitoring and controlling system of electrical appliances in real-time reported within this project. In this project we primarily monitors the information of sensors such as LDR, PIR, gas temp and humidity then based on the sensor information it control the parameters of household home appliances. The system that was developed is a low-cost and high reliable functioning and with this we can save electricity cost of most effective. The other sensors gas, humidity, pir and Temp are used to collect the information of various objects. Information can be collected from house hold objects. The prototype to be tested in various zones and atmospheric conditions will provide the results in better understanding of project and working standards of experimental objects of the defined system.

1. INTRODUCTION

The development of wireless communications technology was proposed for detection appliances and radar information and home appliances monitoring, control. ZigBee technology used in many applications like providing communication and sensing parameters from large range of fields with low power consumption, high reliability, and multi-node networking. Today, this ZigBee is widely used in applications like process control and monitoring in industry, consumer products for electronic devices for monitoring and controlling home appliances, testing applications in the medical and collection of patient information such as heart beat, pulse rate and body temperature. ZigBee was used for environmental applications such as the detection of pollution water, air and moisture level using sensors. As the technology increases smart devices has resulted in new applications of Wireless sensor networks with respect to the consumer goods for a long time.

Self-Configuration and smart Connection System proposes the integration of Wireless Sensor Networks and ZigBee technology. LDR light dependent resistors are connected to self configure the system and used control the automatic lighting system. The system that control the lighting based on information provided by sensor called LDR. With this the effectiveness of automatic lighting control can be improved.

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Wireless sensor networks (WSNs) made a remarkable change in the electronic industry

the system that has developed with wireless sensor networks have grown to be more and more to watch and manage situational information for various intelligent services. The system that was developed with wireless sensor networks can be control the devices automatically. It was predicted that the service and private care wireless mechatronic systems will end up increasingly more ubiquitous at home soon and will also be very helpful in assistive in control the devices automatically.

2. LITERATURE SURVEY

WSNs have been used in like the military, industry, ecological monitoring, and healthcare. The Wireless sensor networks are used in automation system which will be reducing the consumption of energy. There are many New technologies that came into the society will include cutting-edge advancements in information technology, sensors, transmission, distribution, and electricity storage technology, in addition to supplying new information.

The Main idea behind this project is as we are wasting so much power unnecessarily. With the use of technology we can reduce the power consumption as well as the security precautions like gas leakages and Temperature in the house hold or industry. Within this project, we were designed and implemented a system called as Zigbee based intelligent home energy management and control service. We had used the ZigBee technology for networking and communication, since it has low-power and less cost, which enables it to be broadly utilized in home and building conditions. The project was developed as a solution for Monitoring and control of household appliances.

Zigbee was used by the IEEE 802.15.4 group. ZigBee was extensively used for automatic control and remote control and can be embedded in various applications levels [1]. ZigBee was used for short-range wireless connections. By using ZigBee we can able to interface thousands of sensors. In short range, ZigBee is a relatively inexpensive, low-power, short range wireless network communication technology.

A sensor network that is composed of a large number of sensor nodes, were densely deployed on the hardware kit to prepare the circuitry as per the required output. This allows deployment in emergency levels like terrains or disaster relief operations.

3. CURRENT WORK

Within this section, we briefly discuss the present works about smart home automation systems in line with the wireless communication technology. This project suggested a sensor network associated with ZigBee network to acquire the sensor values and send the information to processor which is used to control the appliances. This projects recommends a system which includes an automatic power cutoff outlet, a ZigBee hub along with a PC. The power outlet having different devices reduces the ac power when the energy use of the unit attached to the power outlet is below a set value. The processor which is used to collects information from the sensor nodes and controls the devices through the ZigBee module. The controller used to transmit the present state information to PC along with user can monitor or control the current energy usage by on or off devices based on requirement. The main area of the development may be the interoperability of different systems in home atmosphere wireless sensors can be calculating Current illuminations and also the lighting is controlled by applying based on user requirement.

The above mentioned pointed out home monitoring and controlling systems have restrictions in automation system for example:
i) Consumption of Energy control is restricted to light illumination, Temperature variation and humidity, with these several household appliances could be controlled.
ii) Manipulating home appliances through management functions.

OBJECTIVE

This project was organized as following chapters. Chapter1 and 2 present's relevant background. Chapter 3 shows the architecture

and functional design of the proposed system. Chapter 4 discusses the validation of the system and analyzes of its effectiveness. Finally, conclusions are drawn and ideas for future work are presented.

The report is organized into seven chapters. The present chapter introduces the concept of the project work and the research issues. The literature survey of the problem is done and the objective of the project work is formulated. Chapter 2 includes Introduction to Embedded Systems, its Classification, common components, design flow Chapter 3 deals arm7 family,arm7tdmi processor core, LPC2148, microcontroller, features of LPC2148microcontroller,LPC2148,microcontrol

ler,Pin diagram, architectural overview, interrupt controller, pin connect block, fast general purpose parallel i/o concept deals are also discussed. And also describes about serial communication, RS 232, MAX 232 standards. Chapter 4 describes about Hardware components used like Power supply unit, Zigbee, LCD display, DC Motors, L293D drivers. And also deals Software requirements like, Software design introduction ORCAD design, KEIL C compiler, flash programmer, hardware, software are discussed. Chapter 5 describes about Implementation Phase of the Project, Interfacing Diagrams. Chapter 6 deals with Results of the project and Chapter 7 deals with Conclusions and future scope.

Block diagram of transmitting section
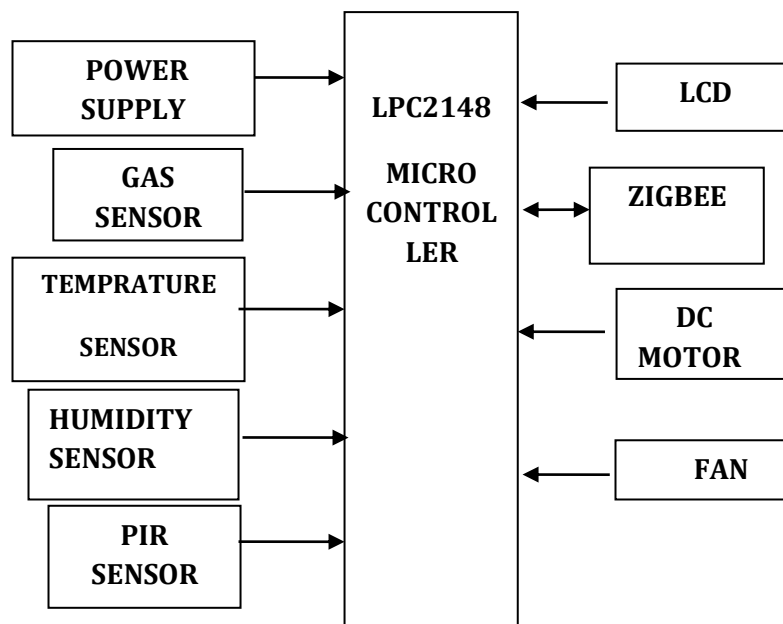
Fig1. Block diagram of Information process center (Transmitter)

Block diagram of receiver section
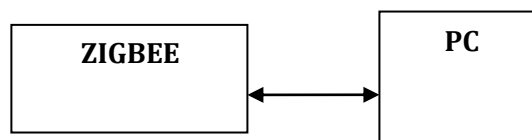
Fig2. Block diagram of Receiver

4 Description about Project

In this provide we were devided the project into 2 sections namely transmitting

section and receiving section. Transmitting section we generelly consider Micro Controller Unit And Power Unit and also Zigbee network and Display circuit and switching network all are given details in previous chapters.

In this project we were used 2X16 characters LCD, ARM LPC2148 Processor, MAX232, LM35 temperature, humidity sensor, gas sensor and PIR sensor are the fundamental components required for working of this project.

The proposed method using this system principally monitors and controls the electrical devices status. We also control the devices based on the sensor values. However it is low-cost, flexible, and robust system to continuously monitor and control based on consumer requirements, Zigbee technology for networking and communication, because it has low-power characteristics, which enable it to be widely used in home and building environments.

The required operating voltage for Microcontroller LPC2148 is 3.3v. Hence the 3.3V D.C. power supply is needed. This regulated 5V is generated by stepping down the voltage from 230V to 12V using step down transformer. Now the step downed AC voltage is being rectified by the Bridge Rectifier using 1N4007 diodes. The rectified AC voltage is now filtered using a 'Capacitor' filter. Now the rectified, filtered DC voltage is fed to the Voltage Regulator.

In this project smoke, humidity and pir Sensors are connected P0.3, P0.4 and P0.5. Temperature sensor connected to P1.16. Output devices are connected to P0.16, P0.17 and P0.18 through Relays. LCD data lines are connected to P1.18, P1.19, P1.20, and P1.21. Register selection pin connected to P1.16, read and write pin is connected to ground and Enable pin is connected to P1.17.

The purpose of this project is to designs a low-power consumption energy can be saved by this project i.e., wireless sensor network for energy efficient light monitoring. This project proposes a 'Self-Configuration and smart Connection System' that integrates WSN, the IOT and ZigBee technology, and confirms its feasibility in both theory and practice. Lighting control systems with sensors are constructed with Self-configuration and smart lighting control. The system configures lighting based on LDR information of reference points, and provides information about lighting for controlling devices is achieved.

General purpose I/O (GPIO)

GPIO is used to connect the devices or peripherals and other IO Devices. Pins may be dynamically configured as inputs or outputs based on the architecture. The value of the output register may be read back, as well as the current state of the port pins. GPIO pins that are used to connect the various input and output devices. Such as Temperature sensor, heart beat sensor, WIFI, GSM, buzzer and LCD. Defining heart beat sensor to P0.3 pin of GPIO operation, buzzer to P0.4 pin of the GPIO operation will be displayed as shown below.

#define heart   P0_3 0x00000008

#define buzzer P0_4 0x00000010

Pin selections were used to connect the communication devices like wifi and gsm. Temperature sensor connected to ADC, LCD is connected as output Device to pins of PORT1 as shown below.

PINSEL0=0X00050005;

//SELECTING PIN OPERATION

PINSEL1=0X15000000;

PINSEL2=0X00000000;

ADC

The LPC2148 contains two analog to digital converters. Successive approximation technique used for converting the data from analog to digital. The ranges of voltages that can include are 0v to V_{ref}. ADC inputs connected to Port0 pins 18, 19, and 20 of LPC2148 processor. Here in our project we were using the 1 ADC channel to connect the temperature sensor.

Communication

Communication is a process of sending information from one place to other place based on wired or wireless. Serial communication and

parallel communication are part of the communication. In parallel data transfers, often 8 or more lines (bus lines) are used to transfer data to a device that is only for small distance.

To transfer the data to a device located at long distance serial communication used. In serial communication individual lines are used to transmit and receive the data. The data can be sent one bit at a time, in contrast to parallel communication, in which the data is sent a byte or more at a time.

For serial data communication data must be converted to serial bits using a parallel-in-serial-out shift register, it can be transmitted over a single data line. This also means that at the receiving end there must be a serial-in-parallel-out shift register to receive the serial data and pack them into a byte.

UARTs

The LPC2148 each contains two UARTs. LPC2148 introduce a fractional baud rate for both UARTs and works with a standard baud rate such as 9600, 19200 and up to 115200 by using crystal frequency above 2 MHz LPC2148 has 2 UART blocks which are UART0 and UART1. For UART0 the TxD pin is P0.0 and RxD pin is P0.1 and similarly for UART 1 the TxD pin is P0.8 and RxD pin is P0.9.

Gas Sensor (MQ4)

The MQ4 is used in gas leakage detecting equipment in consumer and industry markets, this sensor is suitable for detecting CH4,Natural gas, LNG, avoid exposure to alcohol, cooking fumes, and cigarette smoke. The sensitivity can be adjusted by the potentiometer.


Fig2. Block Diagram of MQ4 gas Sensor

PIR sensor and Humidity sensor:

This pir is used to identify that any objects that are available at working place. We can able to identify and we can provide the facilities like lighting control, devices on or off based on requirement. Humidity Sensor that is used to calculate the humidity in the atmosphere. The value can be calculated by using digital signal output. By using digital-signal-acquisition technique humidity can be sensed easily, which will be high reliable and sustain for long term. Humidity sensor connected through LM358 comparator which is used to compare with threshold value and provide the status of humidity whether ON state or OFF state. Here LM358 is also used as amplifier.

HARDWARE IMPLEMENTATION PHASE

Schematic Diagram
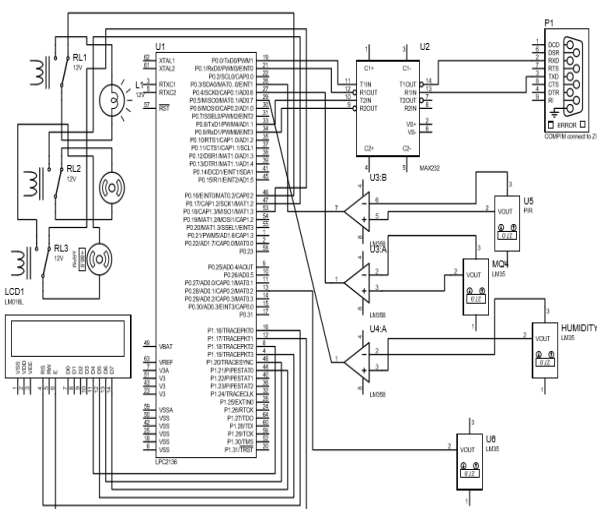
Fig4 schematic Diagram of Transmitting Section

In the Monotor Section We generelly consider Micro Controller Unit And Power Unit and also Zigbee network and Display circuit and switching network all are given details in previous chapters.

Working Principle

In this project 2X16 characters LCD, ARM LPC2148 Processor, MAX232, LM35 temperature, humidity sensor, gas sensor and IR sensor are the fundamental components required for working of this project.

The proposed method using this system principally monitors and controls the electrical devices status. We also control the devices based on the sensor values. However it is low-cost, flexible, and robust system to continuously monitor and control based on consumer requirements, Zigbee technology for networking and communication, because it has low-power characteristics, which enable it to be widely used in home and building environments.

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RESULT Analysis

The purpose of this project is to designs a low-power consumption energy can be saved by this project i.e., wireless sensor network for energy efficient light monitoring. This project proposes a 'Self-Configuration and smart Connection System' that integrates WSN, the IOT and ZigBee technology, and confirms its feasibility in both theory and practice. Lighting control systems with sensors are constructed with Self-configuration and smart lighting control. The system configures lighting based on LDR information of reference points, and provides information about lighting for controlling devices is achieved.

APPLICATIONS

- Industrial Plant
- Medical systems
- Home Awareness
- Commercial Building
- Home Entertainment and Control

ADVANTAGES

- Reduce Human Interaction
- Dynamic control of industry and daily life
- Improve the resource utilization ratio
- Integrating human society and physical systems.
- Flexible configuration.

CONCLUSION & FUTURE SCOPE

A wise power monitoring and control system continues to be designed and developed toward the implementation of the intelligent automation. The developed system effectively monitors and controls the electrical appliance usages in a sensor node. Thus, the actual-time monitoring from the electrical home appliances can be seen via terminal. The machine could be extended for monitoring the entire intelligent building. The sensor systems are designed with assorted user interfaces suitable for customers of different ability as well as for expert users such the system could be maintained easily and interacted with plain and simply. This research also aims to evaluate consumer's response toward awareness of wise grid technologies, their advantages and downsides, possible concerns, and overall perceived utility. The developed product is robust and versatile functioning. Forth last three several weeks, the machine could carry out the remote monitoring and charge of home appliances effectively. Local and remote user connects are simple to handle with a novice consumer and therefore are efficient in handling the procedures.

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