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Smart Buildings Power Management System With Monitoring And Controlling Using Wsns

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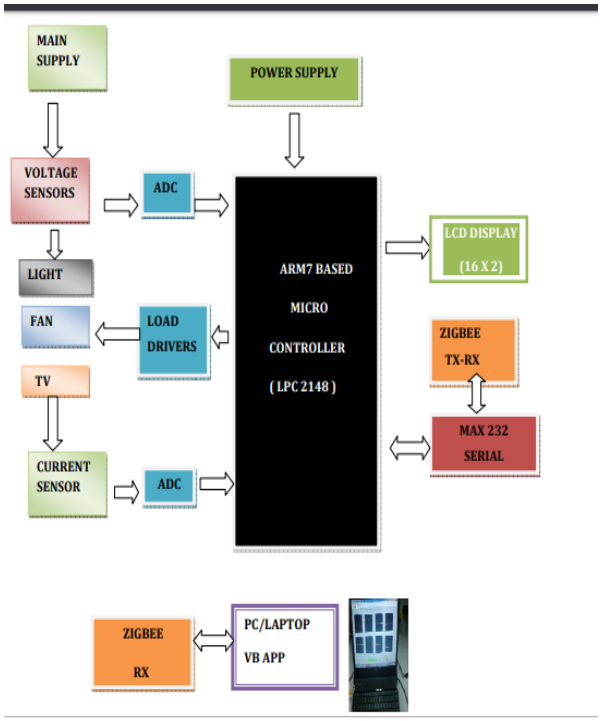
ABSTRACT: Wireless sensor network(WSN) which integrates sensor technology,wireless communication technology, embedded computing technology and disturbed information management technology, has been under rapid development A wireless sensor network is a collection of nodes organized into an interactive network.each node consists of processing capability (one or more microcontroller's chips) and contains types of memory,with a zigbee transceiver module and also,each node have a stable power source and the last part of a node, it is accommodate various sensors and actuators. the nodes communicate wirelessly and often self organize after being developed in an adhoc method.such systems can revolutionize the way we live and work therefore in this project we want to use WSN technology to control and manage energy in building. The acquired data wirelessly transmits to the gateway, which can operate independently or connect to a host system where you can collect, process, analyze, and present your measurement data using software. Routers are a special type of measurement node that can be used to extend WSN distance and reliability. The world facing the biggest problem of power. Because the production of power is less than the demand power of consumer side.

1.INTRODUCTION

Wireless sensor network(WSN) which integrates sensor technology,wireless communication technology, embedded computing technology and disturbed information management technology, has been under rapid development A wireless sensor network is a collection of nodes organized into an interactive network.each node consists of processing capability (one or more microcontroller's chips) and contains types of memory,with a zigbee transceiver module and also,each node have a stable power source and the last part of a node, it is accommodate various sensors and actuators. the nodes communicate wirelessly and often self organize after being developed in an adhoc method.such systems can revolutionize the way we live and work therefore in this project we want to use WSN technology to control and manage energy in building. The acquired data wirelessly transmits to the gateway, which can operate independently or connect to a host system where you can collect, process, analyze, and present your measurement data using software. Routers are a special type of measurement node that can be used to extend WSN distance and reliability. The world facing the biggest problem of power. Because the production of power is less than the demand power of consumer side. In many countries the increase in demand is growing at a faster rate than transmission capacity and also the cost of providing power is also increasing due to the higher coal prices and deficiency of fuel. Also the reason of not getting the full power to consumers side is that the growing population of countries. To overcome the problem of power distribution this paper provides an overview of wireless sensor network by managing the equal power distribution by using zigbee network sensor. A smart environment is a physical world that is interconnected through a continuous network

abundantly and invisibly with sensors, actuators and computational units, embedded seamlessly in the everyday objects of our lives. A smart home is a residence in which computing and information technology apply to expect and respond to the occupants' needs and can be used to enhance the everyday life at home. Potential applications for smart homes can be found in these categories: welfare, entertainment, environment, safety, communication, and appliances.

BLOCK DIGRAM



LIQUID CRYSTAL DISPLAY (LCD) In order to display the interactive messages,the LCD Module is used. An intelligent LCD display for two lines, 16 characters foreach line is interfaced with the controllers. The D0 to D7 bits are defined as the Data lines, RS, RW and EN pins are referred to the control pins and the remaining pins are +5V, -5V and GND for providingthe power supply.The RS is defined as the Register Select, RW is defined as the Read Write and EN is defined as the Enable pin. The display will contain two internal byte-wide registers, one is used for commands (as RS=0) and the second one is used for the characters that are to be displayed (as RS=1). It will also contain a user-programmed RAM area (called the character RAM) which can be programmed in order to generate any of the desired character which can be formed by using a dot matrix. For differentiating among these two data areas, the hex command byte 80 can be used for signifying that the display of RAM address as 00h may be chosen. The Port1 is used for furnishing the command or the data type and ports of 3.2 to 3.4 will furnish the register select and read or write levels. The Liquid Crystal Display is also called as LCD. The LCD is very helpful in case of providing the user interface as well as forthe purpose of debugging. Most common type forthe LCD controller is HITACHI 44780 thatwill provide a simple interface among the controller and an LCD. These LCD's are regarded as a very simple for interfacing with the controller as well as they are of cost effective.

Current Sensors: sensor is a device which convert a signal detected by these devices into an electrical signal. Sensors measure multiple physical properties and include electronic sensors, biosensors, and chemical sensors. The ACS712 current sensor provides economical and precise solutions for AC or DC current sensing in industrial, commercial, and communications systems. The device package allows for easy implementation by the customer. Typical applications include motor control, load detection and management, switch mode power supplies, and over current fault protection. The device is not intended for automotive applications. The device consists of

a precise, low-offset, linear Hall circuit with a copper conduction path located near the surface of the die. Applied current flowing through this copper conduction path generates a magnetic field which the Hall IC converts into a proportional voltage.

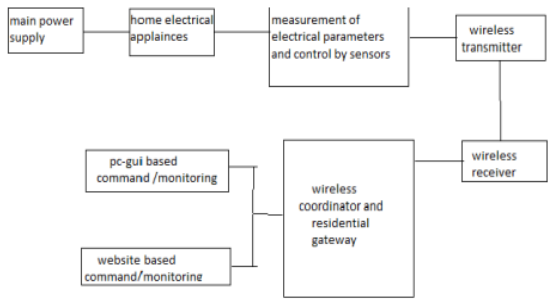


fig4.2:functional block diagram

Voltage sensor: Introduction: The Smart Q Voltage Sensors are used to measure the potential difference between the ends of an electrical component. This range of Voltage Sensors can be used to measure both DC and low-voltage AC circuits. The Smart Q Voltage Sensors are equipped with a micro controller that greatly improves the sensor accuracy, precision and consistency of the readings. They are supplied calibrated and the stored calibration (in Volts) is automatically loaded when the Voltage Sensor is connected. Figure 4.9: Smart Q voltage Sensor Practical Information The Voltage Sensor is used to measure the potential difference between the ends of an electrical component and is therefore connected across the component (i.e. in parallel). Voltage Sensors can be used in conjunction with a Current Sensor anywhere in a circuit.

ZIGBEE: ZigBee is a specification for a set of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4, 2006 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short-range radio. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio frequency (RF) applications that require a low data rate, long battery life and secure networking. Figure 4.13: ZigBee Module ZigBee is a low data rate, two-way standard for home automation and data networks. The standard specification for up to 254 nodes including one master, managed from a single remote control. Real usage examples of ZigBee includes home automation tasks such as turning lights on, setting the home security system, or starting the VCR. With ZigBee all these tasks can be done from anywhere in the home at the touch of a button.

Features:

- Data rates of 250 kbps with 10-100 meter range
- Two addressing modes; 16-bit short and 64-bit IEEE addressing
- CSMA-CA channel access
- Power management to ensure low power consumption
- 16 channels in the 2.4GHz ISM band

• Low duty cycle - Provides long battery life

• Low latency

• Support for multiple network topologies: Static, dynamic, star and mesh

• Up to 65,000 nodes on a network

zigbee/ieee 802.15.4

general characteristics:

• Dual PHY (2.4GHz and 868/915 MHz)

• Data rates of 250 kbps (@2.4 GHz), 40 kbps (@ 915 MHz), and 20 kbps (@868 MHz)

• Optimized for low duty-cycle applications

CSMA-CA channel access

• Yields high throughput and low latency for low duty cycle devices like sensors and controls
• Low power (battery life multi-month to years)
• Multiple topologies: star, peer-to-peer, mesh
• Addressing space of up to 18,450,000,000,000,000,000 devices (64 bit IEEE address) 65,535 network nodes

• Optional guaranteed time slot for applications requiring low latency

• Fully hand-shacked protocol for transfer reliability

• Range: 50m typical (5-500m based on environment)

RESULTS

Project mainly designed for power management with monitoring and controlling using application. As we find that lot of power is wasted by turning ON appliances without usage. so, we can save power easily by control through application. In this we can use internet as an interface and mail as an login for application control. In this project initially both light are in OFF condition & relay ON then the values& graphs of voltage and current on the LCD screen and application are 0's.

CONCLUSION AND FUTURE SCOPE

A smart power monitoring and control system has been designed and developed toward the implementation of an intelligent building. The developed system effectively monitors and controls the electrical appliance usages at an home. Thus the power consumption is minimized by providing periodic alert and managing the power consumption based on the usage of the customer automatically.The sensor networks are programmed with various user interfaces suitable for users of varying ability and for expert users such that the system can be maintained easily.The advantages are as follows: no cabling required, easy inclusion of significant data coming from other meters similarly equipped with center to manage the power in an efficient manner.

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