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Energy Efficient Handling of Big Data

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Abstract:- The big data is collection of data sets which is complex and large information it is difficult to process using traditional data processing technique. There are some challenges occurs when storage data,capture,sharing.the big data is collection of large information and it is applied to the data sets whose size beyond capability of commonly used software tools like manage,capture and storage.the efficient use of energy is more important because of energy consumption is more in traditional system. To avoid the waste of energy and time the proposed system is better choice for efficient use of energy.In this system the big data monitored by server section through the zigbee transceiver. There are some techniques for energy efficient of data reduction which is reducing data process,transmit and energy efficient routing,duty cycle.when sensor values go above the threshold value then energy will be saved. In this paper, we propose a technique to efficient use of energy for handling the large amount of information called as big data.

Keywords:- Lcd display, temperature sensor,humidity sensor,LDR sensor,Microcontroller(LPC 2148),GSM Module,Zigbee transceiver.
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I. INTRODUCTION

The big data is set of collection of data sets difficult to process on hand database management tools or traditional data processing applications.The challenges to share, transfer, capture and storage. search. big data applied to data sets whose size beyond capability of commonly used software tools to and process, capture, manage. the big data used in multiple ways, often referring to both types of data managed as well as the technology being used to manage it. These technologies originated from companies such as google,facebook,amazon where they are developed for each company's own use in order to analyze massive amount of social data   The explosive growth in the volume of data only because of the Recent development of various areas of Information and Communication Technology (ICT). According to a report published by IBM in 2012.The 90% of data generated in the world only in these previous 2 years. The concept of big data has a widely recognized trend and which is attracting much attention from industry, government and academy. The big data has high variety of information, high volume and high velocity. The variety indicates that data is in highly varied structures[1].

The volume refers to the that a lot of data needs to be gathered for processing and analysis. currently used services are already generating much volume of the big data. The more and more data will be generated by sensors such as temperature sensor, humidity sensor, light dependent sensor(LDR).the volume of data generated by sensors. Gathering the large volume and wide variety of the sensor data is critical as a number of important domains of human endeavor are becomes trust on these wireless sensing information. In order to gather these Information and the sensors relay their data to the "sink" where constructed Wireless Sensor Networks (WSNs). However, in case of widely and densely distributed WSNs. there are two types of problems to gathering sensor data which is sensed by millions of sensors. first the network divided into the sub-networks because of limited wireless communication range. Second, the energy of the sensors consumes by wireless transmission. Even the volume of data generated by individual sensor is not significant, each sensor require lots of energy relay the data generated by the surrounding sensors. specially the dense wsn,the life of sensors are very

short because each sensor node have relay lots of data to solve these problems, we need energy-efficient method to gather large volume of data from large number of sensors in the densely wsn.

II. SYSTEM ARCHITECTURE

It consists of system architecture. It diagrammatically describes the whole system. That is it includes all fundamental components. the nodes communicate their sensors information transfer into the server section.
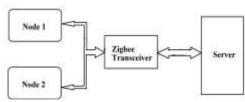

Fig.1 system block diagram

The block diagram of system shown in fig.1. The collected sensor data transfer into server section through zigbee transceiver and sensor readings display on LCD display. the collected big data posted into the web server. the microcontroller(LPC 2148) used as contol unit of whole system. All sensor modules were designed with microprocessor as the core of control system and consumers combine some certain module to case-by-case set up the energy-saving system in their own need[8].

1.HARDWARE SPECIFICATION
A. Microcontroller (LPC2148):-

Fig.2. LPC2148 microcontroller board

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The LPC2148 is the widely used IC from ARM-7 family. The LPC2148 is 32 bit RISC microcontroller and manufactured by Philips (NXP).the microcontroller have low power consumption and small size it is ideal for the applications where miniaturization is requirement for point of sale and access control[6].

Features of lpc2148 microcontroller
☐It can enables high-speed 60 MHz operation for 128-bit wide interface/accelerator.
☐ PWM unit (six outputs)Two 32-bit timers/external event counters and watchdog.
☐ The Real-Time Clock (RTC) is low power with 32 kHz clock input and independent power.
☐ Endpoint RAM of 2KB in USB 2.0 Full-speed compliant device controller.
☐ The LPC2146/48 provides 8 kB of on-chip RAM accessible to USB by direct memory access.
☐ variable analog output (LPC2142/44/46/48 only) provide by Single 10-bit DAC.
☐ Multiple serial interfaces including two Fast I2C-bus (400 kbit/s), two UARTs (16C550).
☐ The buffering and variable data length capabilities in SPI and SSP.
☐ configurable priorities and vector addresses in Vectored Interrupt Controller (VIC).
☐ The tiny LQFP64 package have Up to 45 of 5 V tolerant fast general purpose I/O pins.
☐ Up to 21 external interrupt pins available.
☐ 16-bit/32-bit ARM7TDMI-S microcontroller in small LQFP64 package.
☐ on-chip static RAM of 8 kB to 40 kB and 32 kB to 512 kB of on-chip flash memory.
☐ External interrupt can wake up the processor from power down mode.
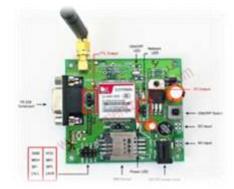
B. GSM Module

Fig.3. GSM Module

Global system for mobile communication is 2nd generation cellular standard developed to cater data delivery and voice services using digital modulation. GSM has maximum data speeds of 9.6 kbit/s and is based on circuit switching technology.gsm uses variation of time division multiple access(TDMA) and most widely used for the three digital wireless telephony technologies(GSM,TDMA and CDMA).GSM standard originally optimized for full duplex voice telephony. The

GSM can expand over time with including data communications, first by by packet data transport, circuit-switched transport via Enhanced Data rates for GSM Evolution and General Packet Radio Services.GSM network operate in different frequency ranges with gsm operate in 900MHz or 1800MHz.GSM have one of the key feature is subscriber identity module(SIM).it is detachable smart card having user's subscription information and phone book.gsm is secure wireless system.it has user authentication using challenge response and pre -shared key.

C. Energy Meter

The energy meter used to measure amount of electric energy consumed by residence, business or electrical powered device. this is calibrated in billing units the common one being kilowatts hour.the periodic readings of electric meters established in billing cycles and energy used during cycle. meters measures demands, maximum use of power in some interval in meters meters have relays to turn off nonessential equipment.

D. Opto couplers

Opto coupler also known as opto-isolator is component that transfers electrical signal between two isolated ckts by using light. Opto-coupler prevent high voltages from affecting the system receiving the signal.the common type of opto-isolator consist of LED & phototransistor in same opaque package.
Features:-
➢ Low power cmos
➢ Active current less than 2ma
➢ Standby current less than 8ma

E. Relays

It is electrically operated switch. relays are switches that open and close ckts when actuated with electrical signal and switch is device that can open and close ckts when actuated manually through electrical action by person. Relay used in applications where it necessary to control one or more ckts by power signal that may or may not be isolated from the ckts being controlled and when manual actuation is not possible.

D.Max232

The max232 device is dual driver/receiver that includes capacitive voltage generator to supply voltage levels from single 5v supply. the max232 ic have two drivers and two receivers levels from single 5v supply. these is operates upto 120kbits/s.it has low supply current 8ma .the max232 is serial line driver used to established communication between microcontroller and pc.

III.   SOFTWARE SPECIFICATION
A. Keil Software

Keil used to create the source files in a text editor such as Notepad, specifying a list of controls, run the Assembler on each Assembler source file, run the Compiler on each C source file, specifying another list of controls, It can run either the Library Manager or again specifying a list of controls and convert the Linker output file to an Intel Hex

File when only running the Object-HEX Converter. Once the Hex File can be downloaded to the target debugged and hardware and Alternatively KEIL can be used to create source files then this source files automatically link, comiple and covert using options set with easily simulate or perform debugging on the hardware with access to C variables and memory and use user interface Unless we have to use the tolls on command line and the choice is clear. KEIL can simplifies the process of testing and creating an embedded application[7].

B. Simulator/Debugger

The detailed simulation of microcontroller along with external signal can perform only in simulator/ debugger of keil. It is possible to view the precise execution time of a single line of C code or a single assembly instruction, all way up to the entire application, simply by crystal frequency is entering. Each peripheral on device can be opened by window for showing the state of the peripheral. The Breakpoints may be set on either lines of C code or assembly instructions and execution may be stepped through C line at a time or one instruction. All the areas of memory content may be viewed along with ability to find specific variables. In addition that the registers allowing a detailed view of what the microcontroller is doing at any point in time.

IV. WORKING METHODOLOGY

The first thing of any system is to which initialize & power supply will be given to the system through bridge rectifier circuit. the nodes have different sensors like temperature sensor which Values are calculated for the pot output in mv, normal temperature in degree Celsius and threshold in degree. If normal temperature goes above threshold value then the fault is occur which is in then given to the controller & controller will send command to switch on the fan to cool down the system. And if normal temperature is below threshold then the system is OK so no need of controlling only we can monitor the values of temperature. and Humidity sensor is used to sense the moisture level present in air and LDR sensor is very useful in light/dark sensor circuits. They are illuminated with light resistance drops & controller switch on the bulb at the node section by sending command through the monitoring side. the collected big data is transfer into the server section. The data communication is done by zigbee transceiver which is wireless networking technology.

The present days Automated systems have less manual operations, accurate, flexibility and reliability. Due to this demand every field prefers automated control systems. Zigbee is new wireless technology have Personal Area Network standard IEEE 802.15.4. It currently operates in Worldwide at a maximum data-rate of 250kbps.the system uses compact circuitary built around LPC2148 microcontroller programs are developed in embedded c. flash magic used for loading programs into microcontroller. these sensors are work independently and successfully implemented. we are collecting the information from different sensors & we uploading it on the server so we can call it as big data handling. we are controlling the devices as

per our need therefore the energy will be saved when the sensors value will go above the threshold value. Therefore we can control devices as per our requirements & energy will be saved[3].

V. CONCLUSION

In this paper we introduce the challenges to collection of big data generated by distributed wsn. the data gathering is necessary in energy efficient handling of big data. the big data is collection of data sets the big data have economic and scientific importance. the big data is define in 3v models volume, velocity, variety. intelligent energy saving system used reduce energy consumption and energy will be saved when sensor values go above the threshold value. the efficient use of energy for big data handling.

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