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WSN BASED EFFICIENT ENERGY HANDLING OF BIG DATA IN EMBEDDED SYSTEMS

Shivannagari Pravalika [1], Y. David Solomon Raju [2], K V Murali Mohan [3]

[1] Shivannagari Pravalika, Dept of ECE, Holy Mary Institute of Technology and science, Bogaram, Keesara, Rangareddy Dist., Telangana, India

[2] Y. David Solomon Raju, Associate Professor, Holy Mary Institute of Technology and science, Bogaram, Keesara, Rangareddy Dist., Telangana, India

[3] K V Murali Mohan, Professor, H.O.D., Holy Mary Institute of Technology and science, Bogaram, Keesara, Rangareddy Dist., Telangana, India

Abstract: In this paper, based on ZigBee technology and GPRS a wireless remote and detecting system for smart system is developed which realized the state of home environment. The system consists of the host control centre and several sub function modules and software In the future, massively connected, highly dynamic wireless sensor networks such as vehicle-2-vehicle communication scenarios may hold an even greater information potential. This is mostly due to the increase in node complexity. Consequently, data volumes will become a problem for traditional data aggregation strategies traffic-wise as well as with regard to energy efficiency. Therefore, in this paper we suggest to call such scenarios big data scenarios as they pose similar questions and problems as traditional big data scenarios. We then propose an aggregation strategy tied to technological prerequisites which enable the efficient use of energy and the handling of large data volumes. Furthermore, we demonstrate the energy conservation potential based on experiments with actual sensor platforms.

Keywords: *Microcontroller, Zigbee, GPRS.*

I INTRODUCTION

As the science and technology has advanced, many applications developed in each and every field. In the communication field the technologies used such as GSM, Bluetooth, WI-FI so on. The wireless communication technology exists in wide range. The smart home application is also one of the important applications which led to luxury home environment and more to the pursuit of security which made the people living life style more comfort and improved the people living standard. Many applications have been developed and many smart home applications have come into existence which led to luxurious home environment. Wireless remote systems for smart home application is developed to analysis and detect the status of home equipments based on ZIGBEE and GPRS technology.The aim of the smart home application is to discover a valuable wireless system that will provide controlling of the home equipments remotely whenever the home host is absence of home, the host remotely manipulates the home equipments by the smart home application which is the main aim of this system. Based on Zigbee technology and GPRS a wireless remote and detecting system for smart home is developed which realized the detecting of home equipment and the state of the home environment. In this from section2 we will get the status of our home Zigbee will send it to the section1 in this section GPRS will update status of our home. Based on that by passing command from our mobile GPRS we will operate the home appliance by using GPRS and Zigbee technology

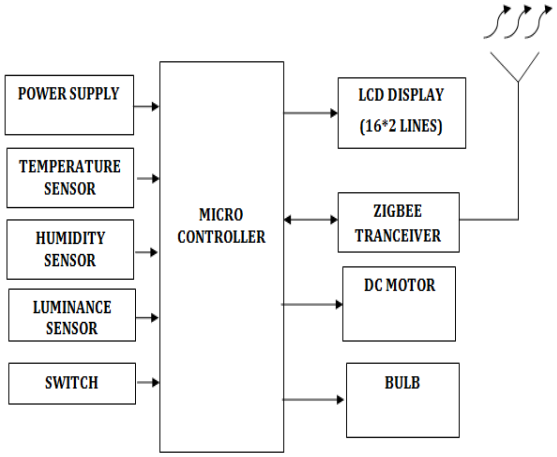
II. THE HARDWARE SYSTEM

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, 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.

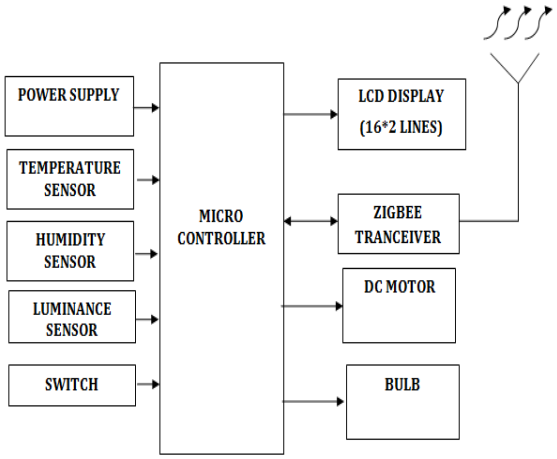
ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display (**LCD**) 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. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

III. DESIGN OF PROPOSED HARDWARE SYSTEM



NODE 1



NODE 2

Fig.1.Block diagram (TRANSMITTING SECTIONS)

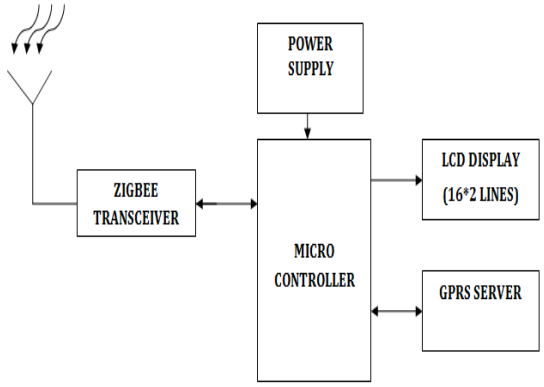


Fig.2.Block diagram (RECEIVING SECTION)

The energy-saving system would collect all the running parameters in the energy-consumption system such as room, house, office, factory, community, or any space. The collected parameters including people number, light luminance, temperature. CO2, power used, and humidity which would influence the dynamic running of the system, and the collected parameters would be sent to Servo-computer and embedded system middle-way through ZigBee web-net to decide the feedback control parameters. The sensors of temperature, luminance, humidity, power used in this energy-saving system were design with modules to meet with different situations of power consumption such as power system, lights luminance, air conditioning, official affairs machines and facilities, and the information

stream was used large number of technology of Wireless Sensor Network (WSN) so as to construct an, active & intelligent energy-saving system. All sensor modules were designed with microprocessor as the core of control system, consumers could combine some certain module to case-by-case set up the energy-saving system in their own need.

IV. BOARD HARDWARE RESOURCES FEATURES

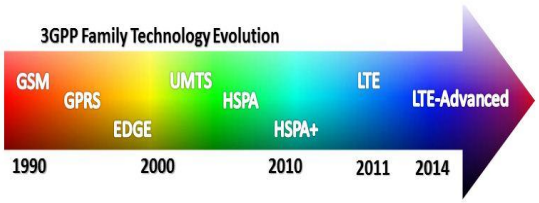
ZIGBEE:

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this ase is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The below table gives the pin description of transceiver. The X-Bee RF Modules interface to a host device through a logic-level asynchronous Serial port. Through its serial port, the module can communicate with any logic and voltage Compatible UART; or through a level translator to any serial device.

Data is presented to the X-Bee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART.

GPRS:

General Packet Radio Service (GPRS) is a packet-data technology that allows GSM operators to launch wireless data services, such as e-mail and Internet access. As a result, GPRS provides operators with the ability to use data to drive additional revenue. GPRS is often called a 2.5G technology because it is a GSM operator's first step toward third generation (3G) and a first step in wireless data services



Although GPRS is a data-only technology, it helps improve GSM voice capacity. When an operator deploys GPRS, it also can upgrade to a vo-coder, a new type of voice coder that turns voice into digital signals before they pass across the wireless network. The vo-coder uses Adaptive Multi-rate speech transcoding (AMR) technology, which can handle twice as many simultaneous voice calls as a network that uses the old vo-coder. As a result, GPRS allows GSM operators to accommodate additional voice traffic without the expense of acquiring additional spectrum.

GPRS supports peak download data rates of up to 115 kbps, with average speeds of 40 to 50 kbps, which is comparable to other 2.5G technologies, such as CDMA2000 1x. GPRS speeds are fast enough for applications such as Multimedia Messaging Service (MMS) and a web browsing experience comparable to a wired dial-up modem. GPRS also allows customers to maintain a data session while answering a phone call, which is a unique and exclusive feature to GSM. GPRS also provides an always-on data connection, so users do not have to log on each time they want data access. The packet architecture also means that users pay only for the data itself rather than for the airtime used to establish a connection and download data.

GPRS is the most widely supported packet-data wireless technology in the world. Like GSM, GPRS supports international roaming so customers can access data services whether they are at home or abroad. When users travel to areas that have not yet been upgraded to GPRS, they still can access many data services via circuit-switched GSM.

V. CONCLUSION

This design is based on ZigBee and GPRS technology. The main purpose of this paper is, we introduced two cases where we see data aggregation in embedded, wireless networks as big data

applications. The first case represents sensor networks with a high node density so that the combination of the sensor data collected by each node is enormous. The second case deals with networks with high node complexity (such as vehicles)m where each individual node holds a multitude of sensor data and deductions. Within such networks, traditional aggregation approaches reach their limits with respect to energy-efficiency. With further developments, such as vehicle-to-vehicle communication networks and the smartdust vision, the efficient handling of big data volumes in embedded, wireless sensor networks is growing more and more important. Therefore, if we speak about more than thousand (probably energy self-sufficient) network nodes, self organization and energy efficiency are the main points to consider and optimize. There have to be flexible and robust ways of self-organization for such networks as well as a dynamic way to extract data from them.

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