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SMART SENSOR INTERFACE FOR INDUSTRIAL ENVIRONMENT USING XBEE AND GPRS

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Abstract: In proposed system we overcome disadvantage of existing system by scheduling tasks of the systems on a single chip using internet connection between heterogeneous multi-core systems. In our system we use arm 7 micro controller which supports operating system acts as core unit performing multi tasking each task assigned with same priority. Here our application performs two tasks wireless camera having same priority. The devices connected to wireless camera and temperature sensor continuously transmits data to controller. The controller transmits data which is coming from wireless camera to server through internet by using http. http is a protocol through which users can upload files from their systems to server. once data is placed at server we can view the data at remote pc (with internet) on web page with unique ip address provided. we can view continuous streaming of video as well as temperature data. Along with the data acquisition we can also monitor the devices status and control the devices through pc via zigbee.

Key words: LPC2148 development board, Zigbee Module, Smart phone, Sensors, Controlled devices.

I. Introduction

Focusing on the use of home area networks to improve disabled people's autonomy at home, this paper presents a display design for accessible home control. In the past years, computational devices have turned faster, smaller, connected and cheaper. It brings the "intelligent house" vision, promised for decades, closer to reality. This pervasive, intelligent home, a luxury item for many people, could have a key role in assuring the autonomy of people with disabilities. In Brazil, assistive resources and their use are relatively recent as compared to the United States, for example, where specific laws were established in 1988. In Brazil, similar regulations have existed since 2004 and establish general standards and basic criteria to promote accessibility.

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.

Thermistor:

Thermistors are a temperature sensing devise. It is used to sense the temperature. In this project by depends on the value of temperature the exhaust fan will run.

LDR:

The LDR is used to measure the light intensity. According to that the sensed information is given to Microcontroller which will send to monitoring section through zigbee.

III. Design of Proposed Hardware System

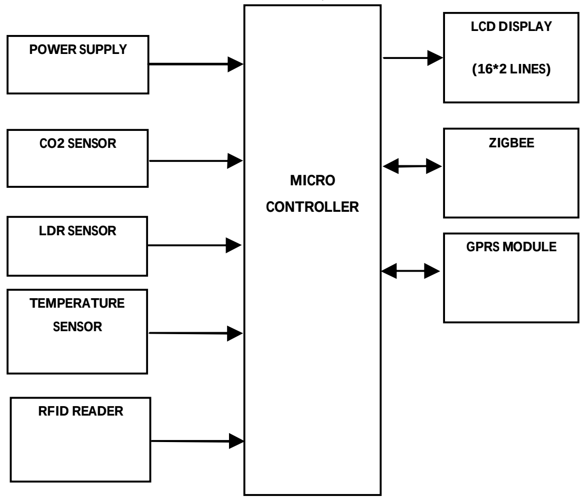


Fig: Transmitting section

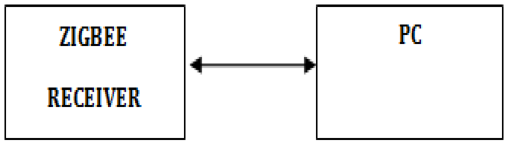


Fig: Monitoring section

The design of entire system consisted of two part which are hardware and software. The hardware is designed by the rules of embedded system, and the steps of software consisted of three parts. Zigbee based wireless technology which consists of transmitter at the site location and receiver at control panel. Information received at the receiver will be send to the PC through Zigbee. So the people living at home with internet connection can see the received data. The system uses a compact circuitry built around LPC2148 (ARM7) microcontroller Programs are developed in Embedded C. Flash magic is used for loading programs into Microcontroller.

IV. Board Hardware Resources Features

THERMISTOR:

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in ^{o}C)

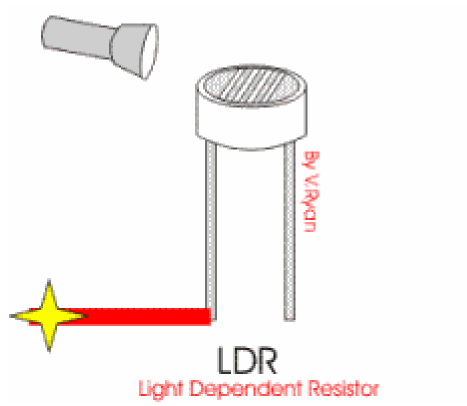
The LM35 - An Integrated Circuit Temperature Sensor You can measure temperature more accurately than a using a thermistor. The sensor circuitry is sealed and not subject to oxidation, etc. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

It has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/^{o}C The LM35 does not require any external calibration or trimming and maintains an accuracy of +/-0.4 ^{o}C at room temperature and +/- 0.8 ^{o}C over a range of 0 ^{o}C to +100 ^{o}C. Another important characteristic of the LM35DZ is that it draws only 60 micro amps from its supply and possesses a low self-heating capability. The sensor self-heating causes less than 0.1 ^{o}C

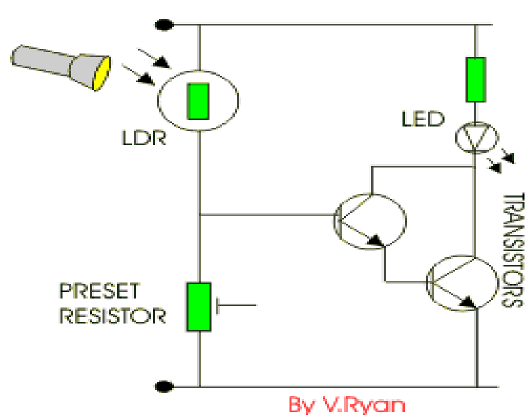
LDR:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.

The animation opposite shows that when the torch is turned on, the resistance of the LDR falls, allowing current to pass through



This is an example of a light sensor circuit: When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently the LED does not light. However, when light shines onto the LDR its resistance falls and current flows into the base of the first transistor and then the second transistor. The LED lights on. The preset resistor can be turned up or down to increase or decrease resistance, in this way it can make the circuit more or less sensitive.



CO2 SENSOR:

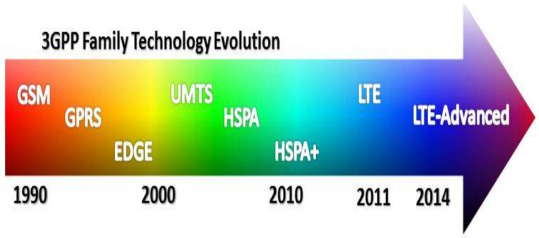
A carbon dioxide sensor or CO_2 sensor is an instrument for the measurement of carbon dioxide gas. The most common principles for CO_2 sensors are infrared gas sensors and chemical gas sensors. Measuring carbon dioxide is important in monitoring indoor air quality,

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. 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 to control the industrial appliance remotely from monitoring section. The host can know information from anywhere as all the information is posted in web page. The host control according to the condition given by the host control that particular device. The important aim of this project is to detect the person (or) any damage of the industrial equipment and also can monitor results in web pages continuously.

VI. REFERENCES

[1] Texas Instruments, Inc., “OMAP3 Platform,” technical report,Texas Instruments, http://www.ti.com/lit/ml/swpt024b/swpt024b.pdf, 2009.

[2] Texas Instruments, Inc., “OMAP4 Platform,” technical report,Texas Instruments, http://www.ti.com/lit/ml/swpt034b/swpt034b.pdf, 2011.

[3] Qualcomm, Inc., “Snapdragon,” technical report, Qualcomm,http://www.qualcomm.com/media/documents/snapdragons4-processors-system-chip-solutions-new-mobile-age, 2011.

[4] L. Sha, R. Rajkumar, and J. Lehoczky, “Priority Inheritance Protocols: An Approach to Real-Time Synchronization,” IEEE Trans. Computers, vol. 39, no. 9, pp. 1175-1185, Sept. 1990.

[5] T.P. Baker, “Stack-Based Resource Allocation Policy for Real-Time Process,” Proc. Real Time Systems Symp., 1990.

[6] P. Gai, L. Abeni, and G. Buttazzo, Multiprocessor dsp Scheduling in System-on-a-Chip Architecture,” Proc. Euromicro Time Systems, 2002.

[7] K. Kim, D. Kim, and C. Park, “Real-Time Scheduling in Heterogeneous Dual-Core Architecture,” Proc. Conf. Parallel andDistributed Systems, 2006.

[8] S. Kato, K. Lakshmanan, R. Rajkumar, and Y. Ishikawa, “Timegraph:Gpu Scheduling for Real-Time Multi-Tasking Environments,”Proc. USENIX Ann. Technical Conf., 2011.

[9] S. Kato, K. Lakshmanan, Y. Ishikawa, and R. Rajkumar, “Resource Sharing in gpu-Accelerated

Window Systems," Proc. Real-Time and Embedded Technology and Applications Symp., 2011.

[10] S. Saewong and R. Rajkumar, "Cooperative Scheduling of Multiple Resources," Proc. Real-Time Systems Symp., 1999.

[11] Y.-S. Chen and L.-P. Chang, "A Real-Time Configurable Synchronization Protocol for Self-Suspending Process Sets," Real-Time Systems, vol. 42, no. 1, pp. 34-62, 2009.

[12] L. Benini, D. Bertozzi, A. Guerri, and M. Milano, "Allocation,Scheduling and Voltage Scaling on Energy Aware MPSoCs," Proc.Conf. Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems, 2006.

[13] M. Kim, S. Banerjee, N. Dutt, and N. Venkatasubramanian,"Design Space Exploration of Real-Time Multi-Media mpsocs with Heterogeneous Scheduling Policies," Proc. Conf. Hardware/Software Codesign and System Synthesis, 2006.

[14] C.-F. Kuo and Y.-C. Hai, "Real Time Task Scheduling on Heterogeneous Two-Processor Systems," Proc. Conf. Algorithms and Architectures for Parallel Processing, 2010.

[15] B. Andersson, G. Raravi, and K. Bletsas, "Assigning Real-Time Tasks on Heterogeneous Multiprocessors with Two Unrelated Types of Processors," Proc. Conf. Real-Time Systems Symp., 2010.

[16] Texas Instruments, Inc., "DSP/BIOS II Timing Benchmarks on the TMS320C54x DSP," technical report, Texas Instruments, http:// focus.ti.com, 2000.

[17] K.-Y. Hsieh, Y.-C. Lin, C.-C. Huang, and J.-K. Lee, "Enhancing Microkernel Performance on VLIM DSP Processors via Multiset Context Switch," J. Signal Processing Systems, vol. 51, no. 3, pp. 257-268, 2008.

[18] F.M. David, J.C. Carlyle, and R.H. Campbell, "Context Switch Overheads for Linux on Arm Platforms," Proc. Workshop Experimental Computer Science, 2007.

[19] J. Rosen, P. Eles, Z. Peng, and A. Andrei, "Predictable Worst-Case Execution Time Analysis for Multiprocessor Systems-on-Chip,"Proc. IEEE Int'l Symp. Electronic Design, Test and Application, 2011.

[20] L. Steffens, M. Agarwal, and P. van der Wolf, "Real-Time Analysis for Memory Access in Media Processing Socs: A Practical Approach," Proc. Euromicro Conf. Real-Time Systems, 2008.