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Zigbee-Based Smart and Secured Buildings

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Abstract - Wireless sensor networks (wsn) have been Employed to collect data about physical phenomena in Various applications such as habitat monitoring, and ocean monitoring, And surveillance. As an emerging technology Brought about rapid advances in modern wireless telecommunication, Internet of Things (iot) has attracted a lot of attention and Is expected to bring benefits to numerous application areas including Industrial wsn systems, and healthcare systems manufacturing. Localization techniques in mobile networks, such as global system for mobile communications, perform time, angle or signal power measurements to estimate user position.

Introduction

WSN systems are well-suited for long-term industrial Environmental data acquisition for iot representation. Sensor Interface device is essential for detecting various kinds of sensor Data of industrial WSN in iot environments. It enables us to acquire sensor data. Thus, we can better understand the outside Environment information. However, in order to meet the requirements Of long-term industrial environmental data acquisition in the Iot, the acquisition interface device can collect multiple sensor Data at the same time, so that more accurate and diverse data Information can be collected from industrial WSN.

Existing system

In many public speeches and in auditoriums one need to continuously watch and control the people entering into that auditorium. If that place is completely full of public and if it is not possible to control others coming in.The people waiting outside may not know the condition whether the seats are vacant or not. Then that the security people should restrict others entering into auditorium by telling them each and every time.

We have a solution to count the number of people entering into the auditorium and also to display that. Microcontroller is the heart of the entire system. IR sensor is interfaced to the microcontroller and it is used to determine the number of persons entering inside. IR follows the principle of line-of-sight and if it experiences any obstacle then there will be an increment in the counter of a microcontroller.

A buzzer is also interfaced to the system to make intimation when the limit exceeds. So that when one listens the buzzer they can easily know that the seats were full. Here there is no need of presence of a person. Here we are using 16x2 alphanumeric LCD(liquid crystal display).

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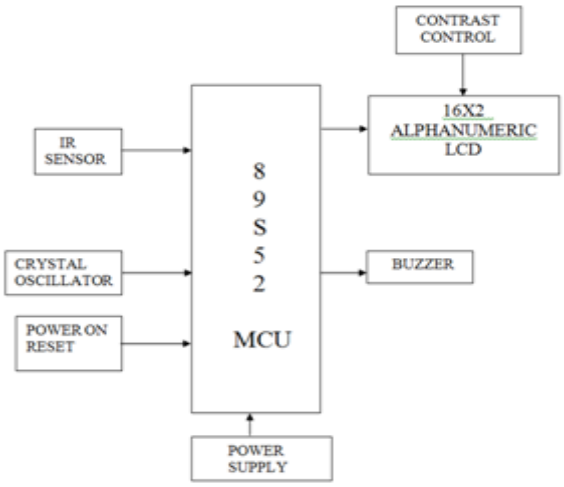

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Draw back: In the above project there is no remote monitoring and no camera interfacing to find the person's images.

Proposed system

In this project, the major challenges we envision are 1) to achieve occupancy monitoring in a minimally intrusive way, e.g., using the existing infrastructure in the buildings and not requiring installation of any apps in the users' smart devices, and 2) to develop effective data fusion techniques for improving occupancy monitoring accuracy using a multitude of sources. This paper surveys the existing works on occupancy monitoring and multi-modal data fusion techniques for smart commercial buildings. The goal is to lay down a framework for future research to exploit the spatio-temporal data obtained from one or more of various IoT devices such as temperature sensors, surveillance cameras, and RFID tags that may be already in use in the buildings. A comparative analysis of existing approaches and future predictions for research challenges are also provided.

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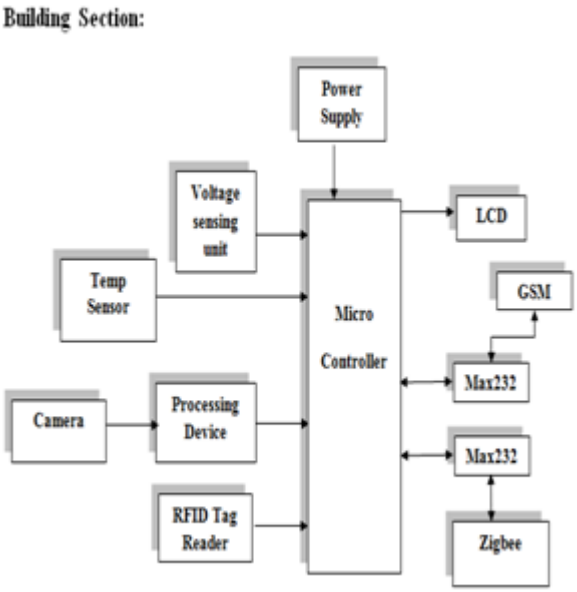
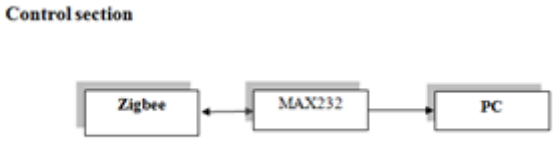
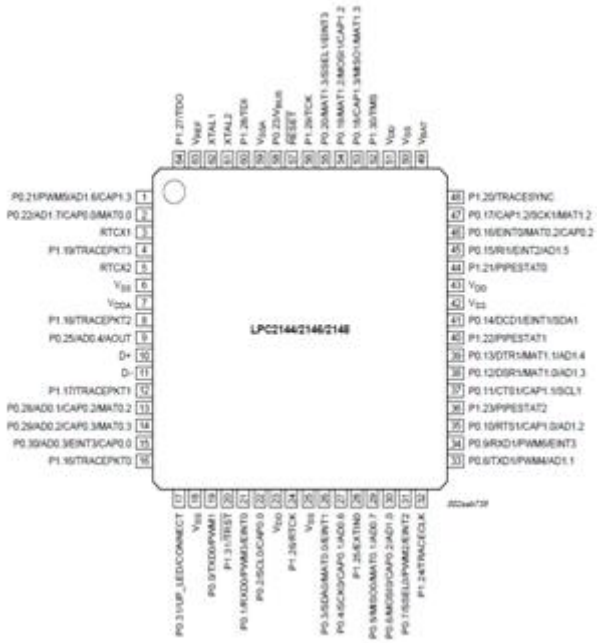




ARM7 PROCESSOR



The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal

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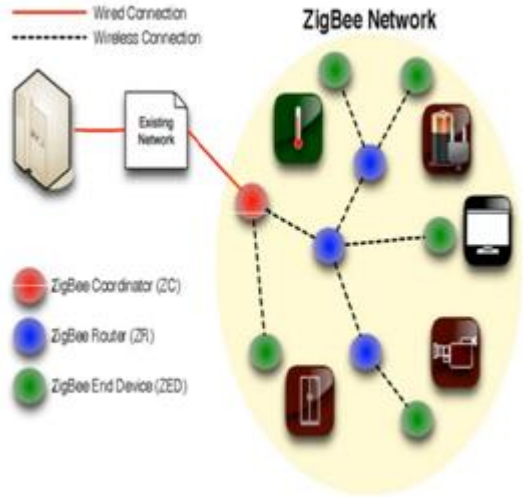
performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

MATLAB -Recognition methods in image processing

Image recognition is the process of identifying and detecting an object or a feature in a digital image or video. This concept is used in many applications like systems for factory automation, toll booth monitoring, and security surveillance. Typical image recognition algorithms include:

- Optical character recognition
- Pattern and gradient matching
- Face recognition
- License plate matching
- Scene change detection
-



It is the wireless device for transmitting and receiving purpose or simply it called as Transceiver. Zigbee is based on the IEEE802.15.4 protocol. The range of the Zigbee is covered as 100m. It range is 10 times better than bluetooth device so it can be more preferable one in wireless device. The data rate is very low for transmission while using this device.

GSM

The SIM300 is a complete Tri-band GSM solution in a compact plug-in module.

Featuring an industry-standard interface, the SIM300 delivers GSM/GPRS900/1800/1900Mhz performance for voice, SMS, data and Fax in a small form factor and with low power consumption.

The leading features of SIM300 make it deal fir virtually unlimited application, such as WLL applications (Fixed Cellular Terminal), M2M application, handheld devices and much more.

1. Tri-band GSM/GPRS module with a size of 40x33x2.85
2. Customized MMI and keypad/LCD support
3. An embedded powerful TCP/IP protocol stack
4. Based upon mature and field proven platform, backed up by our support service, from definition to design and production.

RFID

Radio-frequency identification (RFID) is the use of a wireless non-contact system that uses radio-frequency electromagnetic fields to transfer data from a tag attached to an object, for the purposes of automatic identification and tracking. Some tags require no

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battery and are powered by the electromagnetic fields used to read them. Others use a local power source and emit radio waves (electromagnetic radiation at radio frequencies).

The tag contains electronically stored information which can be read from up to several metres (yards) away. Unlike a bar code, the tag does not need to be within line of sight of the reader and may be embedded in the tracked object.

LCD

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1. The declining prices of LCDs.
2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.
4. Ease of programming for characters and graphics.

These components are "specialized" for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.

LM35

Features

• Calibrated Directly in ° Celsius (Centigrade)

• Linear + 10 mV/°C Scale Factor • 0.5°C Ensured Accuracy (at +25°C) • Rated for Full −55°C to +150°C Range

• Suitable for Remote Applications

• Low Cost Due to Wafer-Level Trimming

• Operates from 4 to 30 V

• Less than 60-µA Current Drain

• Low Self-Heating, 0.08°C in Still Air

• Nonlinearity Only ±¼°C Typical

• Low Impedance Output, 0.1 Ω for 1 mA Load

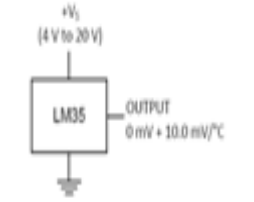

Figure 1. Basic Centigrade Temperature Sensor (+2°C to +150°C)

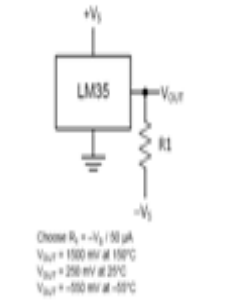

Figure 2. Full-Range Centigrade Temperature Sensor

Software tools

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

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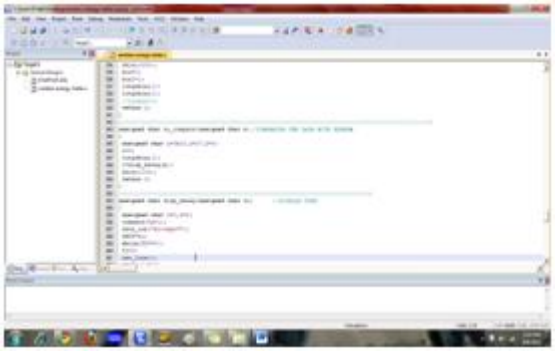
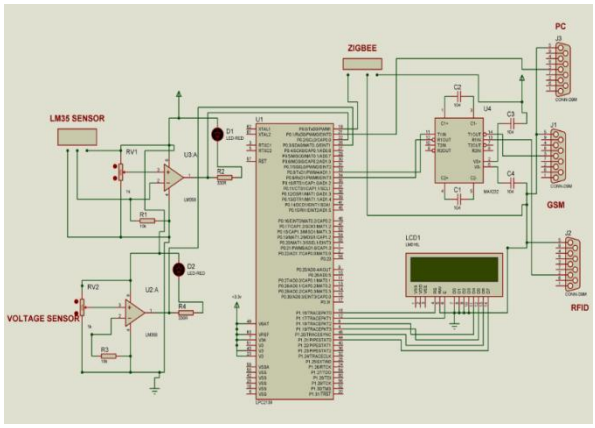
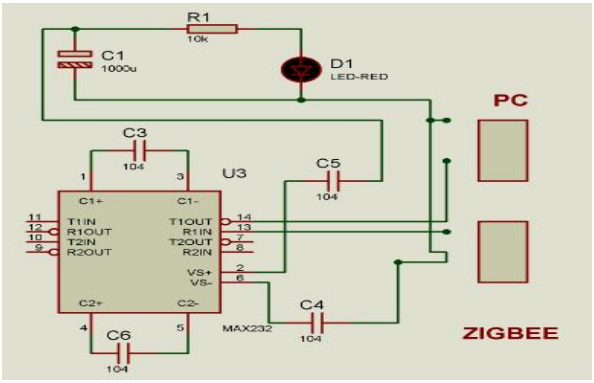


Flash Magic

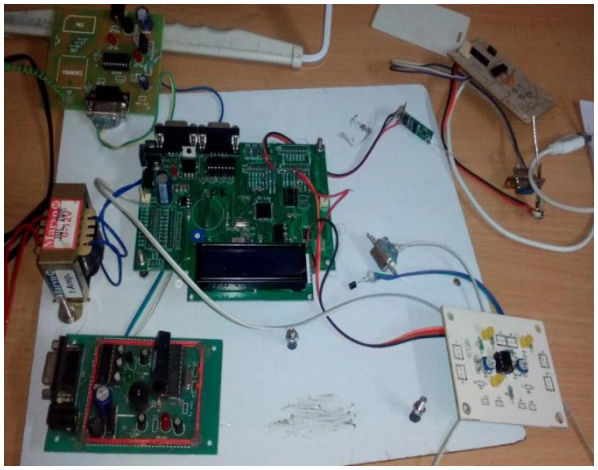
Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like **ARM Cortex M0, M3, M4, ARM7 and 8051.**

Schematic diagram





Results



Advantages

- Image recognition
- Wireless information sending to remote area
- SMS alert using GSM
- Monitoring voltage and temperature

Applications

- It is used in on Smart Building Automation

Conclusion

Hence we have implemented a secured and smart building using wireless communication and a unique ID card.

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