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Automatic Control of Light Intensity and Image Capture for Burglar

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Abstract:
This Project illustrates the design and implement ation of "Automatic Control of Light Intensity and Image Capture for Burglar " proposed not only takes photograph but also sends them over to an ftp server using which we can view the photos from a remote location. These kinds of intelligent systems are more useful in banks, museums, jewelry shops, and other high security zones. In this system the burglar is not aware of the ultrasonic sensor, which senses the occurrence of the person near to it, and initiates a photo capture process through MATLAB image processing.

Technical Specifications: ***Microcontroller,Ultrasonic sensor, Power supply, FTPServer.***

I. INTRODUCTION

An embedded system can be defined as a computing device that does a specific focused job. Appliances such as the air conditioner, VCD player, DVD player, printer, fax machine, mobile phone etc. are examples of embedded systems. Each of these appliances will have a processor and special hardware to meet the specific requirement of the application along with the embedded software that is executed by the processor for meeting that specific requirement. The embedded software is also called "firm ware". The desktop/laptop computer is a general purpose computer. You can use it for a variety of applications such as playing games, word processing, accounting, software development and so on. In contrast, the software in the embedded systems is always fixed.

A sensor is a device that detects and responds to some type of input from the physical environment.

The specific input could be light, heat, motion, mois ture, pressure, or any one of a great number of other environ mental phenomena. The output is generally a signal that is converted to human-readable display at the sens or location or transmitted electronically over a network for reading or further processing.

File Transfer Protocol (FTP) is a standard Internet pr otocol for transmitting files between comp uters on the Internet over TCP/IP connections.FTP is a client-serv er protocol that relies on two communications chann els between client and server: a command channel for controlling the conversation and a data channel for transmitting file content. Clients initiate conversations with servers by requesting to download a file. Using FTP, a client can upload, download, delete, rename, move and copy files on a server. A user typically needs to log on to the FTP server, although some servers make some or all of their content available without login, also known as anonymous FTP

II.RELATED WORK

The PIR (Passive Infra-Red) Sensor[1] is a pyroele ctric de-vice that detects motion by measuring changes in the infrared levels emitted by surrounding objects. This motion can be detected by checking for a high signal on a single I/O pin.A Passive Infrared sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view.

PIR sensors are often used in the construction of PIR-based motion detectors. Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with an-other temperature, such as a wall. This is not to say

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that the sensor detects[4][5] the heat from the object passing in front of it but that the object breaks the field which the sensor has determined as the "normal" state. Any object, even one the exact same temperature as the surrounding objects will cause the PIR to activate if it moves in the field of the sensors. In this system we are going to use an obstacle detection sensor[2]as the heart of the system. It is not suitable for real time motion tracking because of its sluggish response time [7].A laser scanner can measure the distance between the sensor and objects in 2-D space 10–60 times per second using an infrared ray [6], [8], and it is not affected by light [9]. Therefore, a laser scanner is suited to the detection of moving objects. However, even though a laser scanner can obtain sensor data accurately and quickly, it has difficulty in distinguishing humans from objects.

In this module we are going to interface an obstacle sensor that will keepon emitting a signal generated by the Microcontroller. Thissignal after hitting the obstacle will be received back. The proposed architecture consists of a GPSsignal receiver and GSM connected to ARM7[3]. Thiscomplete setup will be fixed to stick. The GPS will besending the location information to the controller continuously. The same will be routed to the GSM modem through the controller. GSM will forward this information to the pre fed mobile numbers the user after receiving the message. In this system we are using ARM7TDMI basedLPC2148 microcontroller, which is having 512KB flash memory and 8 to 40 KB of SRAM and several peripherals. Here we are using Obstacle sensor, this will be interfacing with ADC. The GSM module and GPS will communicate using RS232 protocol with microcontroller.

III.CIRCUIT OPERATION

The project is designed on ARM7LPC2148, we use an ultra-sonic distance measurement sensor namely HC-SR04, this sensor will detect the object approaching it, in terms if distance. The output of this sensor will be fed to the micro controller, we will develop a code in such a way that whenever any object is approaching near to the sensor, then there should we a gradual increment in the intensity of the light, here we use an LED to show the change in the intensity of light, the intensity of the light will be varied through PWM technique. Which ARM7 provides us by default. The second task of this project is to capture the image of the object which shows its presence in front of another ultrasonic sensor which is used to detect unauthorized presence of a person, when it detects such condition, the output of the sensor is fed to the micro controller, the microcontroller in turn sends a command to the MATLAB software to capture a snap of the instance. The code developed in MATLAB receives the command, takes a snap of the instance and saves it in a defined path in the computer. Which then process the image and send to a destination address which can be a mail or a server.

BLOCKDIAGRAM:

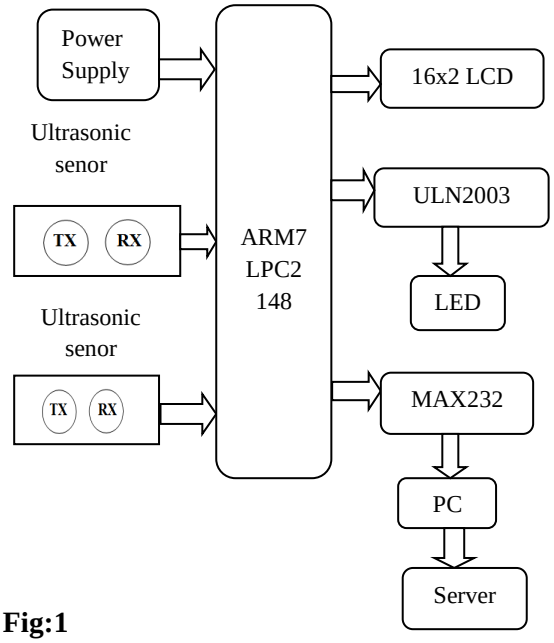

Fig:1

IV.HARDWARE COMPONENTS

Ultrasonic Sensor

Ultrasonic sensor (also act as transceivers when they both send and receive) work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor.

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Fig:2

Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. Further applications include, sonar, medi cal, ultrasonography, burglar alarms and testing. Syste ms typically use a transducer which generates sound waves in the ultrasonic range, above 18,000 hertz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed.

ARM-7 MICRO-CONTROLLER

The LPC2141/42/44/46/48 microcontrollers are based on a 16-bit/32-bit ARM7TDMI-s CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kb to 512 kb. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/42 /44/46/48 are ideal for applications where miniaturizat ion is a key requirement, such as access control and point-of-sale.

Serial communications interfaces ranging from a USB 2.0 full-speed device, multiple UARTS, SPI, SSP to i2c-bus and on-chip SRAM of 8 kb up to 40 kb, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive externalinterrupt pins make these microcontrollers suitable for industrial control and medical systems.

LCD (Liquid Crystal Display)

The Liquid Crystal Display (LCD) is a low power device (microwatts). Now a day in most applications LCDs are using rather using of LED displays because of its specifications like low power consumption, ability to display numbers and special characters which are difficult to display with other displaying circuits and easy to program. An LCD requires an external or internal light source. Temperature range of LCD is 0ºC to 60ºC and lifetime is an area of concern, because LCDs can chemically degrade these are manufactured with liquid crystal material (normally organic for LCDs) that will flow like a liquid but whose molecular structure has some properties normally associated with solids.LCDs are classified as

1. Dynamic-scattering LCDs and
2. Field-effect LCDs

Field-effect LCDs are normally used in such applications where source of energy is a prime factor (e.g., watches, portable instrumentation etc.). They absorb considerably less power than the light-scattering type. However, the cost for field-effect units is typically higher, and their height is limited to 2 inches. On the other hand, light-scattering units are available up to 8 inches in height. Field-effect LCD is used in the project for displaying the appropriate information.

ULN2003 (MOTOR DRIVER)

Motor drivers are essentially little current amplifiers; their function is to take a low-current control signal, and turn it into a proportionally higher-current signal that can drive a motor. Stepper motor also has a motor driver circuit to drive it.uln 2003 is one of the motor driver circuit.

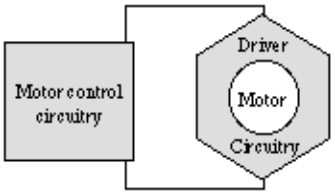

Fig:3

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The ULN2003 is a monolithic high voltage and high current Darlington transistor arrays. It consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diode for switching inductive loads.

The collector-current rating of a single Darlington pair is 500mA. The Darlington pairs may be paralleled for higher current capability. Applications include relay drivers, hammer drivers, lamp drivers, display drivers (LED gas discharge), line drivers, and logic buffers.

The ULN2003 has a 2.7k series base resistor for each Darlington pair for operation directly with TTL or 5V CMOS Devices.

LED

A light-emitting diode (LED)isa semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolent and infrared wavelength with very high brightness.

White LED

There are two primary ways of producing white light-emitting diodes (WLEDs), LEDs that generate high-intensity white light. One is to use individual LEDs that emit three primary colors red, green, and blue—and then mix all the colors to form white light. The other is to use a phosphor material to convert monochromatic light from a blue or UV LED to broad-spectrum white light, much in the same way a fluorescent light bulb works.

SERIAL COMMUNICATION

In order to connect micro controller to a modem or a pc to modem a serial port is used. Serial is a very common protocol for device communication that is standard on almost every PC. Most computers include two RS-232 based serial ports. Serial is also a common communication protocol that is used by many devices for instrumentation; numerous GPIB-compatible devices also come with an RS-232 port. Furthermore, serial communication can be used for data acquisition in conjunction with a remote sampling device.

MAX232

Max 232 is a communications device used mainly for serial commands to and from a flash ROM.The MAX232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits.

Fig:4

The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The drivers provide RS-232 voltage level outputs (approx. ± 7.5 V) from a single + 5 V supply via on-chip charge pumps and external capacitors. This makes it useful for implementing RS-232 in devices that otherwise do not need any voltages outside the 0 V to + 5 V range, as power supply design does not need to be made more complicated just for driving the RS-232 in this case.

The receivers reduce RS-232 inputs (which may be as high as ± 25 V), to standard 5 V TTL levels. These receivers have a typical threshold of 1.3 V, and a typical hysteresis of 0.5 V.

The later MAX232A is backwards compatible with the original MAX232 but may operate at higher baud rates and can use smaller external capacitors – 0.1 µF in place of the 1.0 µF capacitors used with the original device. The newer MAX3232 is also backwards compatible, but operates at a broader voltage range, from 3 to 5.5V. These connectors come in two forms: A male and a female connector.The female connector has holes that allow the pins on the male end to be inserted into the connector.

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Fig:5(a) **Fig:5(b)**

female "DB-9" male "DB-9"

The wiring of RS-232 devices involves first identify ying the actual pins that are being used.

SOFTWARE

In our project we are using MAT lab. In this we can develop the code in flash magic and simulate the code in Keil to get the desire outputs.

FTPSERVER

The File Transfer Protocol (FTP) is a standard network protocol used to transfer computer files from one host to another host over a TCP-based network, such as the Internet.

FTP is built on a client-server architecture and uses separate control and data connections between the client and the server. [1] FTP users may authenticate themselves with a clear-text sign-in protocol, normally in the form of a username and password, but can connect anonymously if the server is configured to allow it. For secure transmission that protects the username and password, and encrypts the content, FTP is often secured with SSL/TLS (FTPS). SSH File Transfer Protocol (SFTP)

Server is sometimes also used instead, but is technol ogically different. The first FTP client applica tions were command-line applications develop ped before operating systems had graphical user interfa ces, and are still shipped with most Windows, Unix, and Linux operating systems. [2][3] Many FTP clients and automation utilities have since been developed for desktops, servers, mobile devices, and hardware, and FTP has been incorporated into productivity applicati ons, such as Web page editors.

Login

FTP login utilizes a normal username and password scheme for granting access.The username is sent to the server using the USER command, and the password is sent using the PASS command.If the information provided by the client is accepted by the server, the server will send a greeting to the client and the session will commence If the server supports it, users may log in without providing login credentials, but the same server may authorize only limited access for such sessions.

PRACTICAL RESULT:

By observe the output of light intensity control and capture the image for burglarautomatically and send it to a mail which we are using file transfer protocol as a server to receive the mails and save the images for control intensity of light and capturing image we use ultrasonic sensors L,Cwhereas ‘L’ for light intensity control ‘C’ for capture the image for burglar.

Fig:6

Light Intensity control
When object near to HC-SRO4

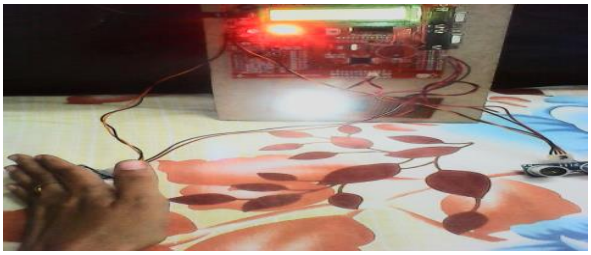

Fig:7

When object far to HC-SRO4

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Fig:8

Obstracle

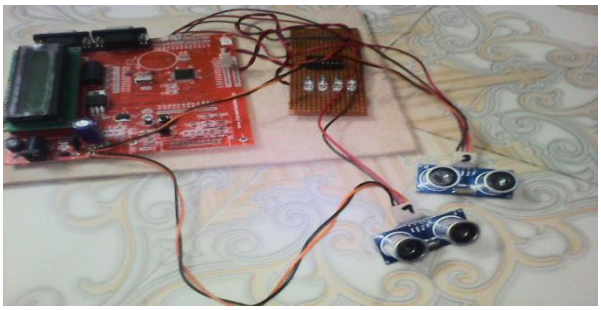

Fig:9

When the obstacle comes near to the another ultrasonic sensor which is indicate as ‘c’then it automatically captures the image and send it to a mail.

Fig:10

CONCLUSION:

When we give power supply to the circuit then 16x2 LCD will display D1, D2. TheD1, D2 are threshold values of ultrasonic sensors. When a burglar near to the ultrasonic sensor ‘L’ then the intensity of led will high with the help of uln2003.uln2003 is one of motor drive circuit their function is to take a low current signal turn it into high current signals. Similarly, burglar far to the ultrasonic sensor ‘L’ then the intensity of led will low. Another ultrasonic sensor ‘C’ is used for Capture the image send to pc with the help of max232 it can automatically uploaded the image to mail over through ftp server. initially we have to develop code in keil, dump the code in flash magic, then we can observe the output in the mat lab image processing. At the time of verifying the output we can the symbols as per instruction then we can get the message “uploaded to ftp”.

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