

DEVELOPMENT OF ADVANCED SMART AND SECURED SYSTEM

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ABSTRACT: A smart system is designed to control the lighting system, fans and security in the industries . We all know sometimes forget to switch off the lights and fans before leaving the room. This system can control 8 units of lights and 6 units of fans every day. Besides, our highly developed industry consist of lot of appliances which needs security and care. Our project focuses on total security with the help of fire alarm and a message alert of any invader. This project uses the Passive Infrared Sensor (PIR sensor) to detect the body heat and the movements of humans. The PIR sensor will give signal to hardware. The hardware of this project is PIC16F887A and RS232 communication module to interface with GSM Modem.

Keywords: PIR sensor, GSM, smart lab, RS232, smoke detector, security switch, load controller, AT , SMS.

I. INTRODUCTION

Multiple human tracking is desirable for many applications; surveillance, gait biometrics, robotics and intelligent space. A typical tracker consists of four components; object representation, localization, data-object-association, and motion filtering. In practice, the way to implement these components is application dependent and must trade off computational complexity with resource utilization. Recent advances in sensors, wireless networks, and decentralized information processing techniques have enabled low cost, low data throughput alternatives for multiple target tracking. The sensor network based target tracking is a sensor data aggregation problem: distributed sensors' readings are aggregated based on a coherent data model. In this work, pyroelectric infrared (PIR) sensors are selected for multiple human tracking. Compared with other types of tracking devices (such as video sensors), PIR sensors greatly reduce hardware cost , have high sensitivity to angular velocities ranges from 0.1 and 3 radian/s for a target distance of 2-10 m Each sensor node contains 8 sensors, whose field of view (FOV) is modulate with Fresnel lens arrays. The sensor and lens array pairs are arranged in a dual-column structure, suitable for detecting. The GSM network offers a wireless infrastructure which extends your reach to anywhere in the world there are several means to tap onto this infrastructure as a communication medium. A simple method is via Short Message System (SMS). With the

help of a data modem message can be send as an alert from the microcontroller to the user via GSM network.

II. PIC 16F877 MICROCONTROLLER

PIC 16F877 is a 40-pin 8-Bit CMOS FLASH Microcontroller from Microchip. The core architecture is high-performance RISC CPU with only 35 single word instructions. Since it follows the RISC architecture, all single cycle instructions take only one instruction cycle except for program branches which take two cycles. 16F877 comes with 3 operating speeds with 4, 8, or 20 MHz clock input. Since each instruction cycle takes four operating clock cycles, each instruction takes 0.2 s when 20MHz oscillator is used. It has two types of internal memories: program memory and data memory. Program memory is provided by 8K words (or 8K*14 bits) of FLASH Memory, and data memory has two sources. One type of data memory is a 368-byte RAM (random access memory) and the other is 256-byte EEPROM (Electrically erasable programmable ROM). The core feature includes interrupt capability up to 14 sources, power saving SLEEP mode, and single 5V In-Circuit Serial Programming (ICSP) capability. The sink/source current, which indicates a driving power from I/O port, is high with 25mA. Power consumption is less than 2mA in 5V operating condition.

The peripheral features include:

- (a) 3 time blocks:
 - Timer0 for 8-bit timer/counter;

Timer1 for 16-bit timer/counter;
 Timer2: 8-bit timer/counter with 8-bit period register, prescaler and postscaler.

(b) Two Capture, Compare, PWM modules for capturing, comparing 16-bit, and PWM generation with 10-bit resolution.

(c) 10-bit multi-channel (max 8) Analog-to-Digital converter module.

(d) Synchronous Serial Port (SSP) with SPI (Master Mode) and I²C(Master/Slave)

(e) Universal Synchronous Asynchronous Receiver Transmitter (USART/SCI) with 9-bit address detection

(f) Parallel Slave Port (PSP) 8-bits wide, with external RD, WR and CS controls

(g) I/O ports.

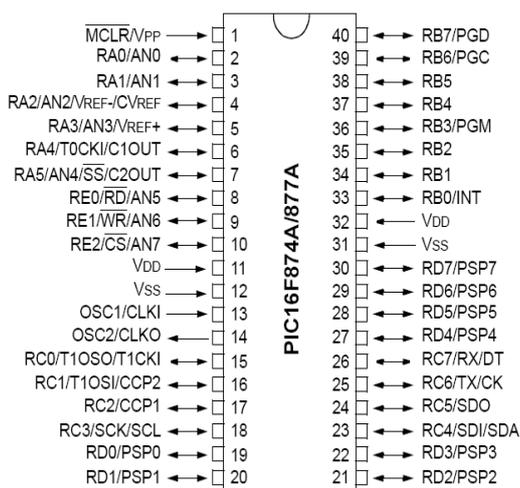


Fig 1 Pin configuration of PIC16F877A

III. ANALYSIS OF THE EXISTING SYSTEMS

Normally used motion detector gives disadvantages as IR sensors can detect only single moving person. IR sensors detect by body temperature of human ,if a person is short and does not comes in the spot then it will not detect. Normally used microcontroller 8051 does not have features like in-built RAM,ROM,A/D convertors. Most existing systems focuses only a single user. Security systems is not concerned in existing systems

IV. PROPOSED SYSTEM DESIGN

In this project, PIR replaces the IR sensor. This PIR sensor can detect multiple human motion it covers a whole room. Use of PIC microcontroller added the features of in-built memory A/D convertor. The GSM modem avails the facility of message alert as a part of security in absence of user. The system has internal battery back up which increases the security of the system in case cut off of the main supply. Hidden switch is available of the user to activate GSM based message alert security system.

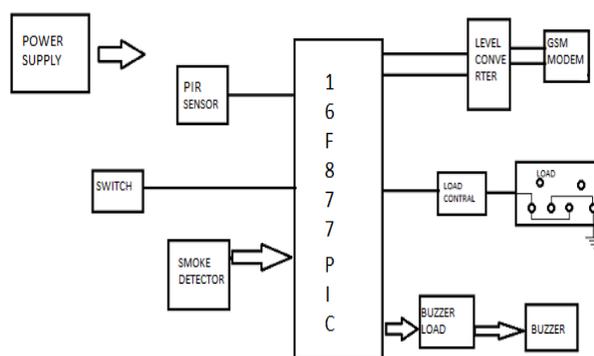


Fig 2 Block Diagram of the Proposed System

MAX232:

The MAX232 is an integrated circuit, first created by Maxim Integrated Products, that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

LCD:

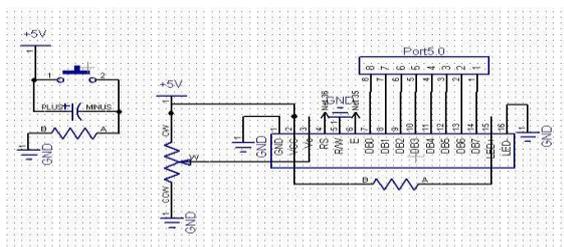


Fig 3 LCD Connection Diagram

It displays the information. It consists of 8 data bus line. Most LCD with 1 controller has 14 pins and LCD with 2 controller has 16 pins. To send commands we simply need to select the command register. Everything is same as we have done in the initialization routine. But we will summarize the

common steps and put them in a single subroutine. Following are the steps:

- Move data to LCD port
- select command register
- select write operation
- send enable signal
- wait for LCD to process the command

PIR SENSOR:

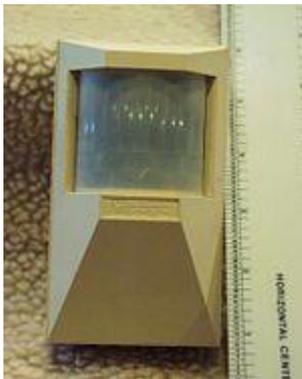


Fig 4 Component View of the PIR Sensor

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. All objects above absolute zero emit heat energy in the form of optical radiation (light). Usually this light is invisible to the human eye because body temperature radiates at infrared wavelengths, but it can be detected by electronic devices designed for such a purpose. The term *passive* in this instance refers to the fact that PIR devices do not generate or radiate any energy for detection purposes. They work entirely by detecting the energy given off by other objects

GSM MODEM:

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems

are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. The GSM Module is shipped with a 100-240V power supply to 5V power adapter, a RS232 Cable, and a CD containing the documentation. The GSM module talks to our application through a RS232 connection. The RS232 port is a standard DB9 connector. We can either connect it to our computer to test it or we may connect to our micro-controller.

BACKUP BATTERY:

A backup battery provides power to a system when the primary source of power is unavailable. Backup batteries range from small single cells to retain clock time and date in computers, up to large battery room facilities that power uninterruptible power supply systems for large data centers. Small backup batteries may be primary cells; rechargeable backup batteries are kept charged by the prime power supply

FIRE ALARM:

A backup batteries are almost always used in burglar alarms. The backup battery prevents the burglar from disabling the alarm by turning off power to the building. Additionally these batteries power the remote cellular phone systems that thwart phone line snipping as well.

SENDING A MESSAGE:

This section gives examples of the AT commands for sending and receiving SMS (Small Message Service) messages with the GM12. First we will discuss what an SMS is, and some details on how an SMS message is sent in the GSM network. The Short Message Service (SMS) allows a user to send up to 140 bytes of information from one mobile station (MS) to another, using the receiving MS phone number as the destination address.

CONCLUSIONS

Sensor (PIR) which can detect multiple human. It uses piezoelectric infrared sensor motion in a room. By sensing human motion it gives an information to the controller that a human motion has been detected and

automatically fans and lights to be switched on. This proposed system also saves power when no motion found the fans and lights gets off automatically. This system is very useful for office places, shopping mall , parking places ,defense etc. This project included modem for security purpose in the absence of any intruder if any unauthorized person enters in the room it will send a sms to the concern person about the entry. This security system is very useful for domestic purpose specially for home security makes this system even more efficient as PIC has many advantages like increased speed and some in-built features compared to a normal 8051 microcontroller.

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