

## GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES PYRO ELECTRIC INFRARED SENSOR BASED HOME SECURITY SYSTEM

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### ABSTRACT

This paper evaluates the development of a Low-cost security system using small PIR (Pyroelectric Infrared) sensor built around a microcontroller. The need for effective and reliable intrusion detection with an alarm system have become vital necessity because of the frequent and rampant cases of the burglary. Attack on home offices, factories, banks etc., are increase. With the advancements technology, motion can be detected by measuring change in speed or vector of an object in the field of view. the motion detector is not only used as intruder alarm but also used in many applications like home automation system, energy efficiency system, etc. this project is built using an embedded microcontroller system capable of detecting motion of an intruder in a restricted area and then triggering an alarm system, motion detector system, however pyroelectric infrared sensor detected the motion of the person using the person body heat. The pyroelectric infrared (pir) sensor which is the motion detector used in this project is attached to a microcontroller which activates the alarm system and any other attached output device to notify the house owner. The initial testing of the design shows that it worked as expected.

*Keywords: Embedded Microcontroller, Passive infrared sensor, Buzzer /Siren, DC motor and Motion Detector.*

### I. INTRODUCTION

Security and safety is one of the most talked of topics in almost every facet like surveillance, industrial applications, offices, and in general, in smart environments. To secure it against theft, crime, fire, etc. a powerful security system is required not only to detect but also pre-empt hazards. Conventional security systems use cameras and process large amounts of data to extract features with high cost and hence require significant infrastructures.

Presented a design using Wi-Fi and GSM based home security system to reduce the increasing rate of crime in most personal housing and office. The design is divided into three main parts which comprises the software, the output part and micro secure digital (SD) data storage card. It is based on the principle of infrared radiation generated by a human body heat. Embedded microcontroller is used in the design to process the signal which later sent to user's mobile phone via SMS.

In this work, the microcontroller based real time home security system using password protection scheme has been proposed. The main function of this security system is to detect the presence of human being and make the user alert about it whenever it is necessary, by sending text message to user's mobile phone-number, registered previously. In the primary stage, presence of any human being will be sensed by a Pyro electric (PIR) motion sensor and after that, the person will have to enter the right password through a keypad. The password protection provides a double-sided benefit to this system viz. any unknown person will have to prove his/her identity by entering the right password to the security system every entry will be intimated through sms alert to the owner.

In this real time protection has been performed using a GSM TTL module which sends and receives text messages between user's mobile phone and microcontroller. This security system has provided low cost and less complicated home security protection scheme by detecting any unauthorized entry to our home or any other place that needs to be secured. Motion detection surveillance technology has gained a lot of interests over the past few years. Based on the study and evaluation of current available different methods. The proposed system is quite efficient and convenient for home uses and offices.

## II. METHOD & MATERIAL

### 2.1 Existing system

Alarm based human motion detection is an embedded system which we are used to provide security. This is our proposed system. Instead of manual security if we use alarm based detection system for detecting human motions to provide security which reduces man power and is very cheap. As we know human body radiates heat in the form of Infrared radiations. When a person moving around this circuit, PIR sensor detects the change in the IR levels of surroundings and sends a signal to the microcontroller.

### 2.2 Proposed system

The system contains PIR sensors to detect obstacle, GSM Module for communicate with GSM Phone. The whole system is controlled by open-source microcontroller. The system collects all information from PIR sensors, process that information and sends call to corresponding GSM mobile phone number by using a GSM modem. If PIR sensors detect any obstacle in covered area then a signal send to microcontroller, controller activate GSM and SMS to the home owner mobile phone using the GSM Module.

### 2.3 Block diagram description

In this system PIR sensor used for sensing and then microcontroller used for controlling and then a GSM module which is used for calling purpose. When anybody comes in range of PIR sensor, then sensor sends a logic signal to microcontroller, then it will necessary action to take control and perform a given task. Here a calling and SMS task is given to microcontroller using GSM. The below figure shows the block diagram of proposed system.

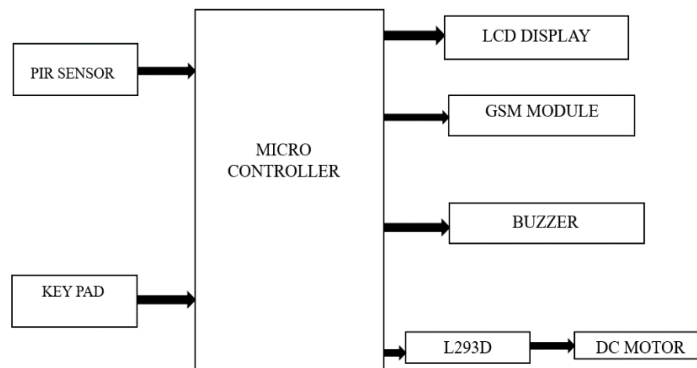


Fig 2.1: block diagram

### 2.4 Pir sensor:

PIR sensors are used to detect living being movement. PIR is a Passive Infrared sensor, which detect infrared rays. All living being with a temperature above absolute zero emits heat energy in the form of radiation. These radiations are infrared ray. Human eye cannot see these rays because these rays are radiated at infrared wavelength. When any living being comes in range of PIR sensor, it detects heat of that living being and generates an output. PIR sensor module does not send any rays for detection; its only detects heat (Infrared). Passive elements are those elements that don't generate their own voltages or energy. They just only measures things. So we can say that this sensor is a passive infrared sensor and it doesn't generate anything by itself. It is only capable to measure the radiations emitted by other objects around it. It measures those radiations and do some desired calculations.

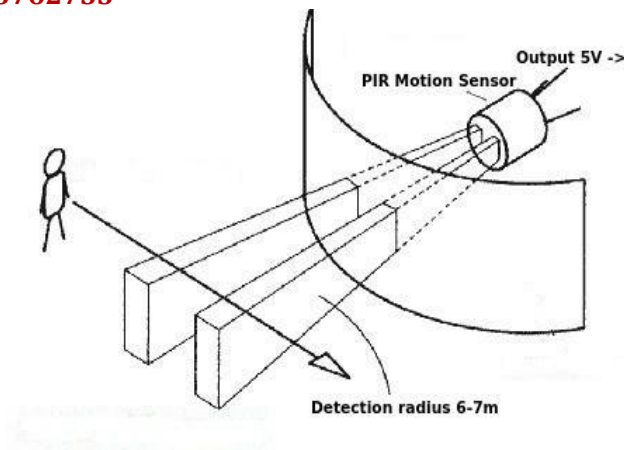


Fig 2.2: pir sensor

**2.5 Microcontroller:**

Microcontroller is a general purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU, memory and peripherals to make it as a mini computer. AT89C52 is the 40 pins, 8 bit Microcontroller manufactured by Atmel group. It is the flash type reprogrammable memory. Advantage of this flash memory is we can erase the program with in few minutes. It has 4kb on chip ROM and 128 bytes internal RAM and 32 I/O pin as arranged as port 0 to port 3 each has 8 bit bin .Port 0 contain 8 data line(D0-D7) as well as low order address line(A0-A7). Port 2 contain higher order address line (A8-A15). Port 3 contains special purpose register such as serial input receiver register SBUF, interrupt INT0,INT1 and timers T<sub>0</sub> , T<sub>1</sub> many of the pins have multi functions which can be used as general purpose I/O pins (or) Special purpose function can be decided by the programmer itself.

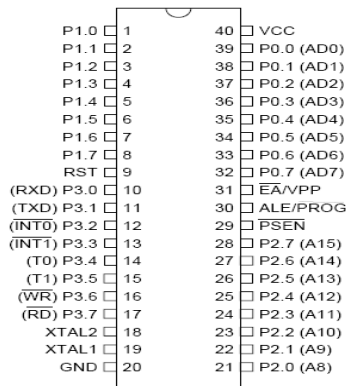


Fig 2.3: microcontroller

**2.6 Gsm module:**

A customized Global System for Mobile communication (GSM) module is designed for wireless radiation monitoring through Short Messaging Service (SMS). This module is able to receive serial data from radiation monitoring devices such as survey meter or area monitor and transmit the data as text SMS to a host server. It provides two-way communication for data transmission, status query, and configuration setup. The module hardware consists of GSM module, voltage level shifter, SIM circuit and Atmega328P microcontroller. Microcontroller provides control for sending, receiving and AT command processing to GSM module. The firmware is responsible to handle task related to communication between device and host server. It process all incoming SMS, extract, and store new configuration from Host, transmits alert/notification SMS when the radiation data reach/exceed threshold value, and transmits SMS data at every fixed interval according to configuration. Integration

of this module with radiation survey/monitoring device will create mobile and wireless radiation monitoring system with prompt emergency alert at high-level radiation.

### III. SYSTEM MODELLING

#### 3.1 Working principle:

The project mainly focuses on providing security when the user is away from home's mobile technology that can perform remote technology communication wherever they are. Through this facility messages can send quickly, accurately and at a low cost. Mobile phone integrated security systems, where the information send by a security system to user mobile phone in the form of call. C programming language is used in making this system, the program was applied to create a security system works automatically, which can make a way to communicate with user mobile phone when there is a security breach in the house. Modular in design use to make easy expandable for add more sensors to the core system microcontroller platform.

The system contains PIR sensors to detect obstacle, GSM Module for communicate with GSM Phone. The whole system is controlled by microcontroller. The system collects all information from PIR sensors, process that information and sends call to corresponding GSM mobile phone number by using a GSM modem. If PIR sensors detect any obstacle in covered area then a signal send to microcontroller, controller activate GSM and make a call to the home owner mobile phone using the GSM Module. The system organized in several units like microcontroller, interfacing, GSM module and PIR sensors.

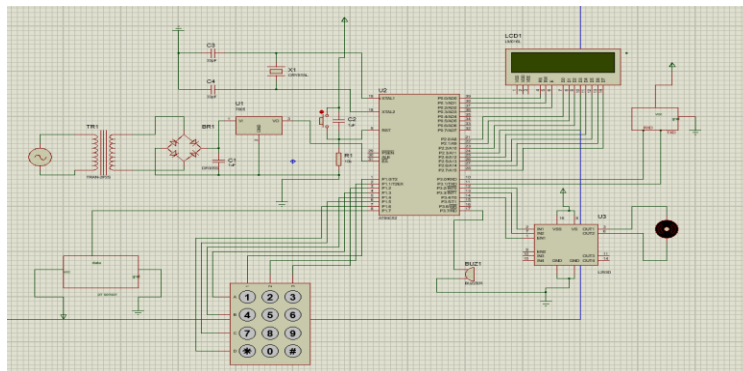


Fig 3.1: schematic diagram

#### 3.2 Software requirement:

- KEIL Micro vision IDE for Programming.
- Nuvoton ICP-ISP for program loading
- Proteus Professional for Schematic Designing

#### Keil C programmer:

Keil is a cross compiler. So first we have to understand the concept of compilers and cross compilers. After then we shall learn how to work with keil.

#### Compiler:

Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. I.E the programs written in one of the HLL like 'C' will compile the code to run on the system for a particular processor like x86 (underlying microprocessor in the computer).

For example compilers for Dos platform is different from the Compilers for Unix platform.

So if one wants to define a compiler then compiler is a program that translates source code into object code.

The compiler derives its name from the way it works, looking at the entire piece of source code and collecting and reorganizing the instruction. See there is a bit little difference between compiler and an interpreter. Interpreter just interprets whole program at a time while compiler analyzes and execute each line of source code in succession, without looking at the entire program.

The advantage of interpreters is that they can execute a program immediately. Secondly programs produced by compilers run much faster than the same programs executed by an interpreter. However compilers require some time before an executable program emerges.

Now as compilers translate source code into object code, which is unique for each type of computer, many compilers are available for the same language.

### 3.4 Functionality of Keil:

- The Keil C51 C Compiler for the 8051 microcontroller is the most popular 8051 C compiler in the world.
- It provides more features than any other 8051 C compiler available today.
- Nine basic data types, including 32-bit IEEE floating-point.
- Flexible variable allocation with bit, data, bdata, idata, xdata, and pdata memory types.
- Interrupt functions may be written in C.
- Full use of the 8051 register banks.
- Complete symbol and type information for source-level debugging.

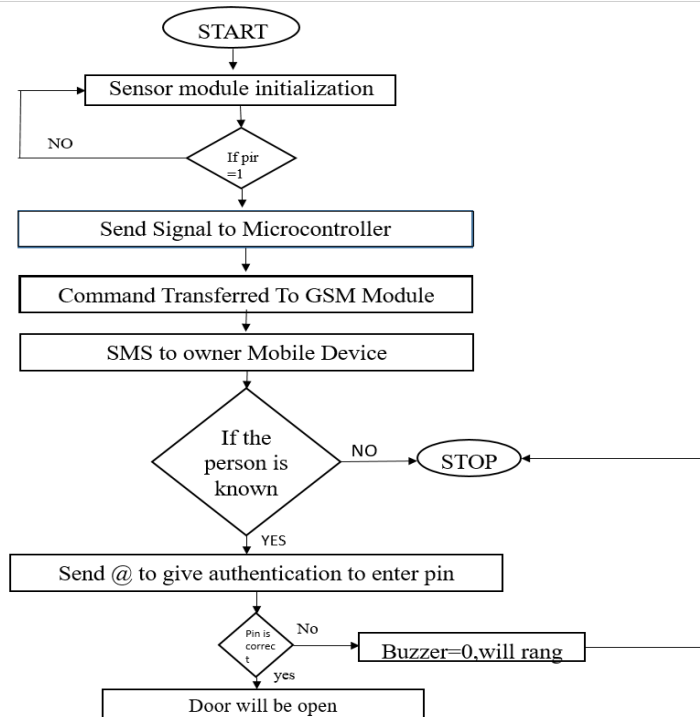
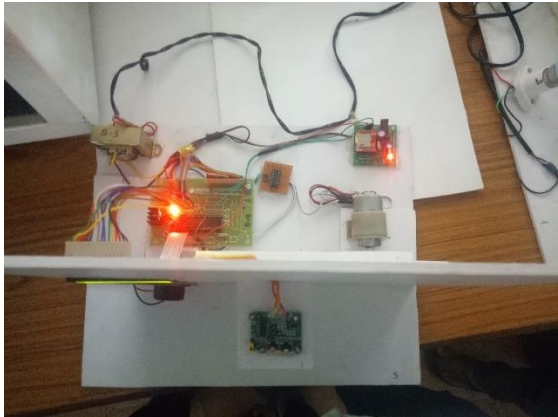


Fig 3.2: flow chart

## IV. RESULT & DISCUSSION

Initially switch on the supply whenever the person enter into our premises the “PIR” sensor sense person based on human temperature. If anyone into enter into the premises the sensor sends signal to microcontroller after that

microcontroller send a message to owner mobile i.e., “somebody enter into home please authentication access”. If the owner the person then give the authentication by sending a message i.e., “@”. If the owner did not know the person he would not gave the authentication then the door will be remain close. If the person get access to enter the pin then type correct pin to enter the home. If the pin is in correct then buzzer will rang.



**Fig 4.1: Output of the project**

## V. CONCLUSION

The Home security system feature become draws much attention in the future. People getting more concerned to protect their house from unauthorized people. This system can monitor a house by use of sensors that integrated with a microcontroller and a GSM unit. A calling mechanism is used to alert users via mobile phone when a possible intrusion occurs.

Today almost every one using mobile phone so by use this system user will not have to carry additional device to monitor their house. This system is design using modularity to become a flexible system that can be add more sensors without change the whole system, only add some sensors to increase systems functionality. So this system is a modular home security system by using call function to communicate between system and user.

The project model can be used in places such as banks, office. Theft tricks have becoming now possible to control it, which different depending on the location and type of things. Modern devices entered in all areas, became easy to narrow the opportunities for robber in several different ways without cost of considerable material. Microcontroller has been used for design a security and reliability system for the home.

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