A WIRELESS BASED HOME ANTI-ROBBERY AND SAFETY SYSTEM USING GSM

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Abstract— Now-a-days, the Occurrence of Robbery events has enormously increased. Hence, the Necessity for using Home anti-robbery systems has also increased. Today the Advancement in technology has paved way for improvised Anti-robbery systems which ensure complete protection. In this paper, an Anti-robbery system has been designed such that it gives immediate notification to the owner, neighbors and anti-robbery services like police station or ambulance at the moment, the Catastrophic event occurs.

Keywords— GSM (Global System for Mobile), SMS (Short Message service), Microcontrollers, Sensors

1. INTRODUCTION

Nowadays, Robbery events are drastically increasing. As we know, Home theft has become a universal problem. To solve this problem, most of the home owners have started using theft protection systems which is appreciable. A Basic wireless home anti-robbery system is implemented using a mobile communication protocol along with which an alarm is provided. These types of anti-robbery systems are less effective because in the absence of the owner, the alarm will be of no use.

In such situations, Homeland-robbery systems using GSM technology are effective. This GSM based home anti-robbery system is an advanced anti-robbery system. When trespassing or theft is detected, the System enables an alarm signal and immediately an SMS is sent to the House owner’s mobile phone. This allows the user to update himself about the situations at home during his absence. The system is subdivided into three categories and it was designed using Micro C language. Serial communication is used for data communication between the GSM modem and PIC16F877A microcontroller. In this system, the Vibration sensors are used to sense Intrusion (theft) and an output signal is generated which is received by the PIC microcontroller. The PIC acts as an electronic brain that controls and accesses all the functionalities and interfaced circuits attached to the system. It sends an alert SMS to the mobile phone through the GSM modem immediately. The GSM modem sends the SMS to the owner’s mobile phone as soon as it receives the signal from the PIC microcontroller.

In this way, the users can protect their homes from catastrophic events. This system sends an alert only to the owner which is not sufficient.

In this paper, we have tried to implement a Wireless based Home anti-robbery system using GSM with certain improvisations for enhanced efficiency. In this system, the GSM module is programmed such that the alert SMS is sent not only to the owner of the house but also to his neighbors as well as the Police station.

Along with this, a Home safety system has been added up which ensures fire safety. It is used to detect leakage of LPG gas, Fire brigade etc., and sends alert messages to the owner, Police station, neighbors and also to the Fire station and the Ambulance.

2. LITERATURE SURVEY

The Design of this project (Microcontroller Based Anti-robbery system with intruder Position Display) was initiated as a result of trespassing of unauthorized persons into a restricted area. Efforts were made to track down a person at a particular time when he tries to breach into a private area.

[1] The developed GSM based anti-robbery system provides improved response to the sensors and immediately sends notifications when it detects fire or elevated temperatures above the desired level. The time taken by the system to deliver the message depends on the coverage area of the mobile network used. If the mobile phone is present within the range of the system, then the SMS is delivered within a matter of seconds.

[2] Hence, the sole purpose of this innovation is to design a flawless anti-robbery system which reacts immediately, at the moment the unexpected event occurs. This purpose is accomplished via the use of some modules and a controller which activates a GSM module to alert the owner and the predetermined contacts, at the time of break in. This system is cost effective as it does not contain expensive sensors to detect emergencies and it is also easier to implement as the required installation space is considerably less.

[3] By Using 3G and ARM9 Technology, a Home anti-robbery system which provides a high level of anti-robbery has been developed using the S3C2410 hardware. By using this third generation communication medium, it captures the images and sends it to the specified mobile numbers instead of anti-robbery alarms, fire alarms, gas leak alarm systems etc.,

[4] A microprocessor based anti-robbery system for gate controlin an estate is depicted in this paper. The job of a gate security guards performed using this system as it provides efficient gateaccess and estate control. The software and hardware developments of this system are provided in a deliberate manner.

3. EXISTING METHOD

There are number of aspects which are to be considered while designing a smart home system. A smart home system...
should provide a user-friendly interface and should be precise. A variety of smart systems have been considered which uses different mediums such as Bluetooth, internet, short message service (SMS), RF ID, Wi-Fi, etc.

In literature [2], the Anti-robbery system uses GSM technology to notify the owner about the disaster. The proposed system aims to secure the Home from trespassers and Fire. In the above cases, the device sends alert SMSs to the contacts which are pre-assigned in the system. The system is made up of a number of components such as sensors, GSM-GPS Module (sim548c), Atmega644p microcontroller, relays to control the device and buzzers to provide alarm signals.

In literature [3], the system consists of a numerous sensors to detect obstacles, heat and smoke. The whole system completely relies on the sensors used and are interfaced using a PIC microcontroller 16F76. It receives info from the sensors and sends SMS to a corresponding contacts by using a GSM modem. If an intersection is detected by the IR sensor then the controller will send messages to the home owner and to the Police Station simultaneously. In the same way for fire interruption a SMS will be sent to the fire brigade and another to the home owner.

All the proposed research papers are based on smart home automation and anti-robbery. In this paper, the major concept is to notify the owner and in a few papers, the messages are sent also to the police station. These are the major implementation concepts analyzed during the survey.

4. PROPOSED SYSTEM

The System contains Sensors to detect vibrations, smoke, gas and motion. The Whole system is controlled by a PIC 16F877A Microcontroller. It gets the information from the sensors and sends alert messages to the owner, police station and neighbors via GSM module. If any leakage of gas and smoke is detected, it also sends message or voice call to the specified emergency numbers.

**FLOW CHART**

1. PIC

The Microcontroller used here is PIC16F877A. It has efficient features which makes it suitable for a wide range of applications. It consists of I/O ports, 3 timers, ROM, RAM, Flash memory and an inbuilt ADC. PIC channel 10 bit inbuilt ADC which converts the analog values into 10 bit digital data. PIC is programmed to convert 10 bit data into 8 bit data and to transmit the data to a transistor driver. Microcontroller 16F877A has 40 pins of which 32 pins are parallel ports. One port includes 8 pins, so 32 pins forms 4 parallel ports; each of them are recognized as port 0, port 1, port 2 and port 3 respectively. The numbers of each pin of these parallel ports starts from 0 to 7, the first pin of port 0 is named P0.0 and the last pin of port 3 is named P3.7.

**FEATURES:**

- Only 35 single word instructions to learn.
- All instructions are single cycle, except for program Branches which are two cycle.
- Operating speed: 20MHz clock input, 200 ns instruction cycle.
- Up to 8k x 14 words of FLASH program memory, up to 368 x 8 bytes of Data memory(RAM). Wide operating voltage range: 2.0V to 5.5V
- 10-bit, up to 8-channel Analog-to-Digital Convertor (A/D)
- Brownout Reset (BOR)
- Analog Comparator module with:
GSM
GSM (Global system for mobile communication) is a cellular network. GSM networks operate in four different frequency ranges. Most GSM networks operate in 900 MHz or 1800 MHz frequency bands. The transmission power in the handset is limited to a maximum of 2 watts. GSM 850/900/300 and 1 watt in 1800/1900. The longest distance of GSM specification supported for practical use is 35 Km (22 mi). In this paper we use a GSM modem to receive and send alerts.

LCD DISPLAY
LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is a very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven-segment and other multisegment LEDs. The reasons being: LCDs are economical; easily programmable. They have no limitations of displaying special & even custom characters, animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD, each character is displayed in 5x7 pixel matrix. This LCD has two registers namely, Command and Data.

4. SERIAL COMMUNICATION–RS232
A popular way to transfer commands and data between a personal computer and a microcontroller is the use of standard interface, like the one described by protocols RS232 (older) or USB (newer). This chapter is devoted to communication conforming to RS232 protocol, the hardware for such interface is provided onboard. The microcontroller includes up-to six hardware modules to deal with RS232 signals. Some of the modules additionally implement other communication protocols, like I2C, CAN, SPI; module named UART4 will be used in this experiment. Its detailed description can be found in RM0090, chapter 26. The voltage level translator is added on the test board standard chip MAX3232. The Signals TX and RX are available at connector P580, pins 3 and 2 respectively.

5. GAS AND SMOKE SENSOR
A gas detector is a device that detects the presence of gases within a specified area, often as a part of a safety system. This type of equipment is used to detect a gas leak and is interfaced with a control system so that a process can be automatically shut down. A gas detector can be used to trigger an alarm to the operators in the area where the leakage is recognized, giving them an opportunity to evade from the disaster. These types of devices are important because there are a variety of gases that might be harmful to humans and the surroundings.

6. INFRA RED SENSOR
An Infrared sensor commonly known as IR sensor is used to detect the intrusion of objects, without any
An Infrared sensor often emits an electromagnetic beam (infrared, for instance) and looks out for changes in the field which acts as a reflected signal. The detected material is often termed as the IR sensor’s target. The basic concept is to transmit infrared radiations which is then reflected back by the interrupted object. For detecting the reflected radiation, another Infrared LED is used as a receiver, which is exactly similar to the previous one. This is an electrical property of Light Emitting Diodes (LEDs) which in fact that an LED produces a trigger voltage across its leads, when it is subjected to light. This works with a much lower output current.

7. TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin. This is because there are no requirements to subtract a large constant voltage from its output to obtain a convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a full −55 to +150°C temperature range.

6. RESULTS

The Simulation outputs have been depicted as follows:

This diagrammatic representation (Fig 9) implies the output of the virtual terminal present in the transmitter side. Here, the SMS with the disaster alert and the address of the location is generated and transmitted.

Fig 8: SIMULATION DESIGN

Fig 9: TRANSMITTER OUTPUT

Fig 10: RECEIVER OUTPUT
The diagrammatic representation (Fig 10) implies the output of the virtual terminal along the receiver side. The Zig-bee module receives the alert from the transmitter and activates the buzzer alarm.

The hardware output have been depicted as follows

Fig 11: HARDWARE DESIGN

![HARDWARE DESIGN](image1)

Then, the GSM module sends the alert SMS to the specified contacts in a predetermined manner. This is the output description for the proposed Home anti-robbery system.

6. CONCLUSION

GSM provides information about the disaster to the civilians in a predetermined manner. The Zig-bee module is useful in short range message transmission from one home to the nearby homes. The number of sensors used are precisely arranged and they make up a complete anti-theft mechanism which is efficient in every way. This system has improvised features so as to provide better anti-robbery and ensured safety conditions. This anti-robbery system is favorable for homes in private townships which possess a perfectly aligned infrastructure and is recommended for colony of individual homes.

7. FUTURE WORKS

The number of nodes can be increased up to 250 numbers along with which a number of exquisite features such as face recognition, Biometry etc., can be added up which provides a 100% theft proof anti-robbery system.

REFERENCE


