Infrared Security System

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***Abstract*- Most of security system uses light or micro switches, magnetic sensor to detect the signal. Here is a new type of security system that's uses infrared rays to detect the signal. This signal is visible signals. Therefore once we install the circuit we need not requires any setting except to watch the power supply is ok.We have designed an electronic security system which can detect presence of people or obstacles. Whenever the infrared beam is broken or interrupted there will be an automatic alarm indicating that there is someone or something in the entrance. We aimed to design an electronic circuit using Infrared Ray. To build this circuit we used several components likes, Resistor, Comparator LM393N, Voltage Regulator (7805), Diode, Capacitor, Infrared Sensor ,Buzzer etc. Infrared sensor is the main part of this circuit. This security system based on infrared ray's transmission and reception. This circuit is very interesting and can be used for various purpose.**

I. INTRODUCTION

Due to increasing number of crime and burglary, the need of security system is very essential. The security system that monitors the area throughout the time and reacts effective to the treat is in need. We have lots of security systems in the market for both indoor and outdoor applications such as ultrasonic detectors, CCTV, microwave detectors, photoelectric detectors, infrared detectors etc. However one or the other systems have the limitations of being expensive, more electrical power consumption, more memory space utilization of the recording system and complex circuitry, etc. A solution to overcome these problems could be by using a sensor of low cost which has the ability to detect the intruders as they come within the sensor's detection range and generates an output. This output can be used for further signal processing or activating other devices like alarm system, lighting system, recording system and similar devices. This could at least save some power consumptions as some components get actuated only when there are intruders in the sensors detection range. Passive Infrared Sensor is a low cost, low power and reliable sensor. Therefore it was felt that a PIR sensor based security system consisting of the sensor, a lighting system and a recording system (webcam and the software for saving the video) could overcome few or all of the above stated problems. The sensor can detect the presence. An infrared security alarm system is based on detection of an intrusion cause by interruption of an infra-red (which is invisible to human being) light beam being emitted by and infra-red LED and falling on match IR sensor. Both transmitter and receiver portions separately operated on 5v supply. The transmitter and receiver's circuits can be mounted in an aligned position on two sides of door to check intrusion or even on the two facing walls of inside of locker to give you an alarm whenever an unauthorized person attempt to mischief. The circuit has both audio as well as visible indication can be remotely located away from the locations of gadget also. The IR based system is very much advance and works very much accurately. This type of device are designed and marketed by different multi- nationals companies.

In this system we will build transmitter and receiver circuits using an IR-LED. The circuit is based on obstacle detection when a person or things comes in between transmitter and receiver. The alarm gets triggered and beeps continuously till the time circuit is reset.

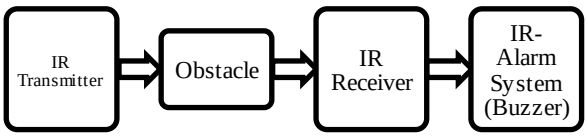
II.RELATED WORK

According to the market research, the common parameters or characteristics of home security system are 24 hours monitoring of the intruder, ease of use, reliability, efficient, fast and precise notification system. Today numbers of home security systems are available in market. Motion detectors are mainly used in security systems [4]. It is typically positioned near exterior doorways or windows of a building to monitor the area around it. Since motion detectors are so flexible and have so many uses, it offers feelings

of protection and security for the average homeowner as well as commercial organizations [4]. An electronic motion detector is a device used to detect any physical movement in a given area and transforms motion into an electric signal. It consist of sensor that electrically connected to other devices such as security system, lighting, audio alarms, and other applications. Motion sensors are used in a wide variety of applications and as a result, many different types of motion sensors are available including the infrared sensor. Infrared sensors are widely known in the arts of intrusion detection and in fire or smoke detection. It is a device that often used in automatic light switches and security systems to turn on a light or to activate some other form of alarm or warning indicator when a person enters a monitored area [4]. The infrared sensors have basically two forms: active and passive. [4] An active infrared detector includes a radiation source and an infrared sensor which is sensitive to interruptions in the radiation sensed from the source. [4] These detectors are used as intrusion detectors by providing a path of radiation from the source to the sensor in a place where the path is likely to be interrupted by an intruder. In paper [3], a design which contains a home network including a GPRS/GSM gateway and three kinds of wireless security sensor nodes is presented. This system has a user interface and it can respond quickly to alarm incidents. In paper [4], a new method of moving object detection by combination of pixel illumination with its chrome in YUV color space is implemented. The algorithm of maintenance with 3 key values is discussed in this paper. In case of swaying objects, it is very robust and effective way of false alarms.

III.SYSTEM DEVELOPMENT

In this chapter the block diagram of the project and design aspects of independent module are considered. Block diagram is shown in fig.(a)



1. IR- Transmitter transmits the rays to the IR receiver.
2. IR-Receiver receives that rays. Where receiver is photodiode.
3. Any obstacle is occurring between transmitter and receiver then possible obstacle is detected.
4. Once the obstacle detected then buzzer will beeped and LED will glow.

1. IR-Transmitter :

The transmitter is a LED, also known as IR transmitter, is a special purpose LED that transmits infrared rays in the range of 760 nm wavelength. Such LEDs are usually made of gallium arsenide or aluminum gallium arsenide. They, along with IR receivers, are commonly used as sensors. The appearance is same as a common LED. Since the human eye cannot see the infrared radiations, it is not possible for a person to identify whether the IR LED is working or not, unlike a common LED. To overcome this problem, the camera on a cell phones can be used. The camera can show us the IR rays being emanated from the IR LED in a circuit.

2. Receiver :

An infra-red receiver or IR-receiver, is a hardware that's sends information from and infra-red remote control to the another device by receiving and decoding signals. In general receiver output a code to uniquely identifies the infra-red signal that it received. This code is then used in order to covert the signals from remote control into a format that can be understood by other device. It is the part of device that receives infra-red commands from remote control. Because infra-red is light, it requires line-of-sight visibility for the best possible operation, but can however still reflected by items such as glass and walls.

3. Obstacle :

Something that blocks you so that movement, going forward , or action is prevented or made more difficult. In this way as obstacle is come between transmitter and receiver in the form of any physical quantity. It cut that IR-rays which are not forward to the receiver side and operation is not completed.

4. Buzzer :

A buzzer or beeper is an audio signalling device. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such

as a mouse click or keystroke. When any obstacle is come between transmitter and receiver then this buzzer will beeped.

IV. IMPLEMENTATION

The result of this circuit depends on the continuity of the infrared beam. If there is a continuous beam towards the receiver there will be no alarm. The interruption of the beam will result in an intruder alarm.

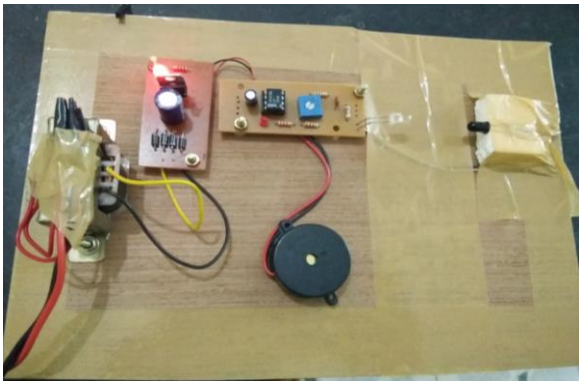


Fig.(b) Image of Circuit

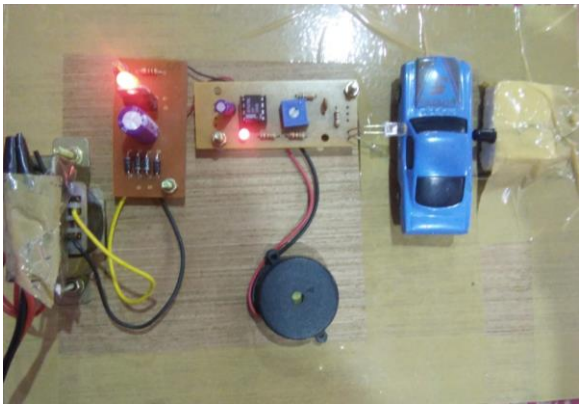


Fig. (c) Output of Circuit

V. SYSTEM REQUIRMENTS

Selection of software:

- Express PCB

Selection of hardware:

- Transformer
- Power Supply
- IC 7805
- Buzzer
- LED
- Photodiode
- IR
- IC 393N

VI. CONCLUSION

The study scope is to create a counting system which is combination of device and visual basic program. This circuit required fixed 5V supply. The comparator IC-393N will compare input signal and signal between IR-transmitter and photodiode. The system will light red LED as a indicator to represent when any obstacle is occur between transmitter and receiver. Warning condition will beep the buzzer till obstacle is present between them.

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