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Android based Advance Anti-Theft Security System

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Abstract: Security is a complicated system in our day-to-day life. Everyone wants to be as more secure as possible. We know our home or shop is protected provides us peace of mind. Theft has become major issue now a day's. So we would like to implement this project, to secure home or shops. At that time security is most important for homes and shops. These places are not secure in our absence. For make these places secure many peoples keep security guards. But security guard cannot monitor surrounding area continuously and they cannot provide that more security, as there are some limitations on working of human beings. Also many people prefer electronic security systems. These systems have advantages & disadvantages. Now a days many peoples also prefer CCTV cameras for security or surveillance, but CCTV can only record and store the pictures that can be useful after theft has occurred. But we can overcome this disadvantage by using advanced electronics technologies such as Sensors, Microcontrollers, GSM, and Android Application etc. In this project we are introduce new concept such electronic system for home and shop security.

Keywords: ***GSM Model, PIR Sensor, IR Sensor, Camera, Android, Arduino Controller***

I. INTRODUCTION

Now a day's theft has become major issue everywhere, everyone wants security at their homes and shops. Knowing our premise is secured provides us peace of mind in both times when we are away from home or shop and when we are at home [3]. Now days many times we hear news about house robbery or theft in some houses, bungalows, flat's. These robberies or thefts occurs when nobody is in house or in some cases we find that robbery take place even if people are in their houses. In such case if we are intimated about theft then we inform to our neighbors, then they create some noise or take some appropriate action so that theft can be avoided. Other problem is that, sometimes key of our home is lost. If we don't change lock and if these keys get found by thieves then it can cause robbery. We know that duplicate keys can be created easily. These are the disadvantages of traditional locking system that is lock and key. Also we see that everywhere peoples make use of CCTV camera for security purpose, but the CCTV cameras are capable of only recording and storing the data [5].

Now days GSM based electronic security systems are available, but this system can only inform to owner about the theft, it can't take and store the image of the thief. Hence to overcome this disadvantage of existing system we are designing an advanced electronic security system which can detect the presence of intruder, informs to the owner about the intruder and takes picture of that intruder. We are using the PIR sensors and IR sensors which can detect the presence of intruder, when any human is detected by the PIR or IR sensors this sensors will change its output. This output is given to Arduino controller, which is the main building block of the system. Depending on the output of the sensors Arduino will perform actions which are given in the program by the programmer. That is, it will send the AT commands to GSM module to make a call to a predefined number given by the owner of shop or home. Using Android application installed in has mobile phone. We can see live video at remote place.

II. SYSTEM ARCHITECTURE

The above fig.1.shows the system architecture of Android based advance antitheft security system. It contains two types of sensors PIR and IR sensors. These two sensors are used to detect the presence of human intruder in the room. When the sensor senses the presence of intruder it gives signal to the Arduino controller. When Arduino receives this signal it will turn on buzzer, lights & makes call through GSM modem.

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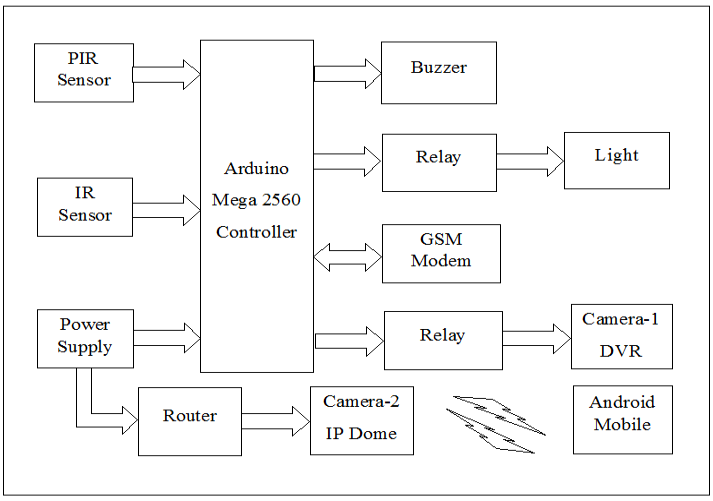

Fig.1. System architecture of Android based advance Anti-Theft Security System.

A. PIR Sensor

PIR is a Pyroelectric Infrared Sensor or Passive IR sensor. It is made up of Pyroelectric sensors which detects the thermal radiation falls on it. Every living body emits some radiations, and if the body is hotter, the more radiations are emitted [1-3]. PIR sensors typically include two IR-sensitive elements with opposite polarization, which are housed in a hermetically sealed metal with a window made of IR-transmissive material. Both slots detect the same amount of IR radiation when sensor is idle. If warm body i.e. human being or animal comes in the sensing area of PIR sensor that result in a positive differential change in output of PIR sensor. When the body leaves the sensing area, the sensor generates a negative differential voltage. These change pulses shows the something is detected. Lens is used to shape the field of view of sensor. The lens used is inexpensive and lightweight plastic material. To cover larger area lense is split into multiple sections. Along with Pyroelectric sensor, Micro Power PIR Motion Detector IC is used. This chip takes the output from sensor and does some processing on this signal and gives a digital output pulse. PIR sensor output is shown in fig.2. When human enters in the field of view of sensor, it detects IR radiation and suddenly changes its output state. This change in output of PIR sensor triggers the controller. The range of PIR Sensor is approximately 6 meters i.e. 20 feet, and angle of 120 degree [5].

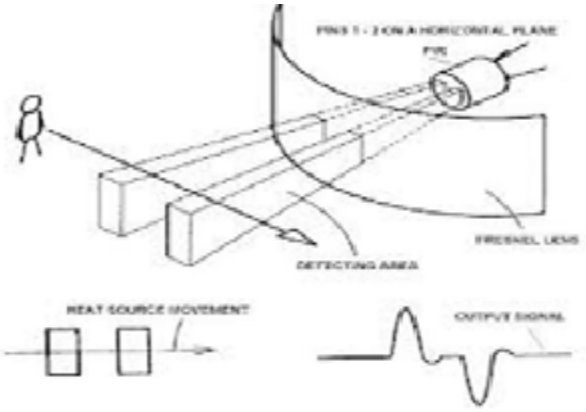

Fig. 2 PIR Sensor Schematic output

B. IR Sensor

The IR sensor used for human detection. IR sensor transmit infrared signal, this infrared signal struck on the surface of an object which comes in front of it & reflects back which is received at the infrared receiver. Infrared sensor consists of infrared source and infrared detector. Infrared source is generally an IR LED or LASER diode. Infrared detector includes photodiodes or

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phototransistors. The energy emitted by the IR LED is reflects back from an object and falls on the IR detector. When object is detected by IR sensor it produces LOW output, and in absence of object IR sensors output is HIGH. This output can be directly connected to Arduino controller. Below figure shows the working principle of IR sensor.

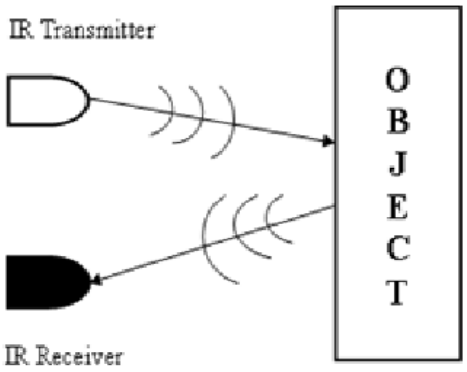

Fig. 3 Working Principle of IR Sensor.

C. Arduino Controller

Arduino is an open source electronics board or minicomputer. Arduino is designed to make electronic more accessible to artists, hobbyists and anyone interested in creating interactive objects or environments [3]. The first Arduino was introduced in 2005, which is aimed to provide an inexpensive and easy way to professionals, to create devices, or different attractive projects. Arduino boards are in preassembled form. For programming Arduino board, Arduino integrated development environment (IDE) is used, which supports for C and C++ programming languages. An Arduino board consists of an Atmel 8, 16, 32 bit AVR controller. We are using the Arduino Mega 2560 controller in this project. If supply is less than 7V the board may become unstable and if supply is more than 12V, then voltage regulator may overheat and damage the board. The recommended range is 7 to 12V. Arduino Mega 2560 has an automatic reset facility [8].

D. GSM Modem

The long form of GSM is Global System for Mobile communication. Most GSM uses frequency band of 900 MHz or 1800 MHz [6]. This GSM modem acts just like a mobile phone. The modem uses RS232 standard for communication. The modem can be connected to serial port of PC or to any controller. GSM modem is used to send and receive SMS or to make/receive voice calls. It can also be used as GPRS modem to use internet service. When Arduino receives signal from sensors it send AT commands to GSM modem to make a call to a predefined number stored in program.

E. Light & Buzzer

A buzzer is an audio indication device, which may be mechanical, electromechanical, or piezoelectric. Typically buzzer is used as alarm. When PIR or IR sensor senses the presence of intruder it sends signal to Arduino controller, then Arduino controller turns on buzzer and lights.

F. Camera-1

Camera1 is used to capture the image of intruder. When sensor sense the presence of intruder the Arduino sends command to camera1 to capture the image of that intruder and store it on SD card. User can then see that image by simply connecting the SD card to computer [3].

G. Camera-2

Camera2 is used to the live video streaming of intruder. When owner is out of this place then he easily see the status of this system that is live video streaming.

H. Router

Router is used for providing internet connection to the camera. We are using TP-Link router. The video recorded by the camera is transmitted over network through router.

I. Android Mobile

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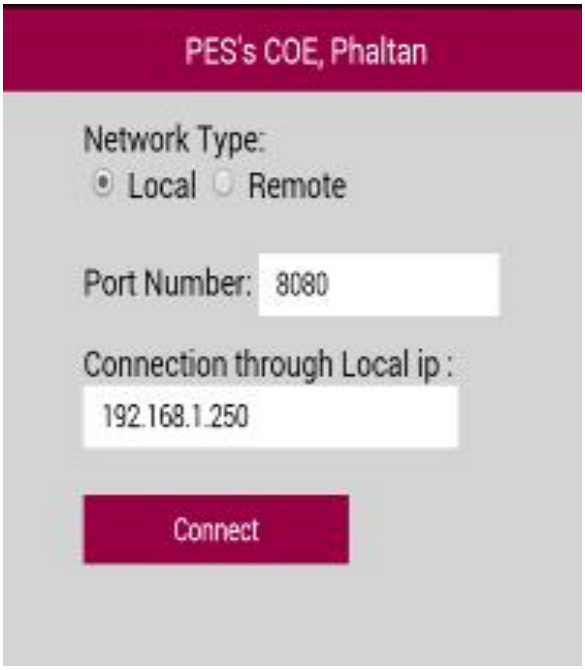
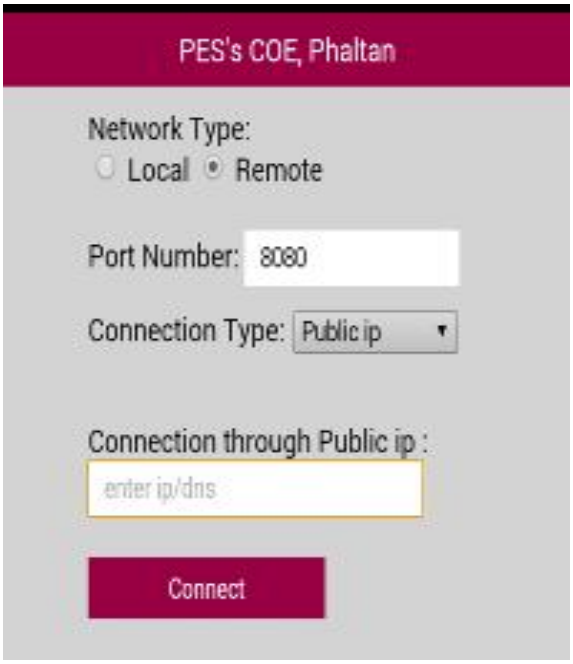
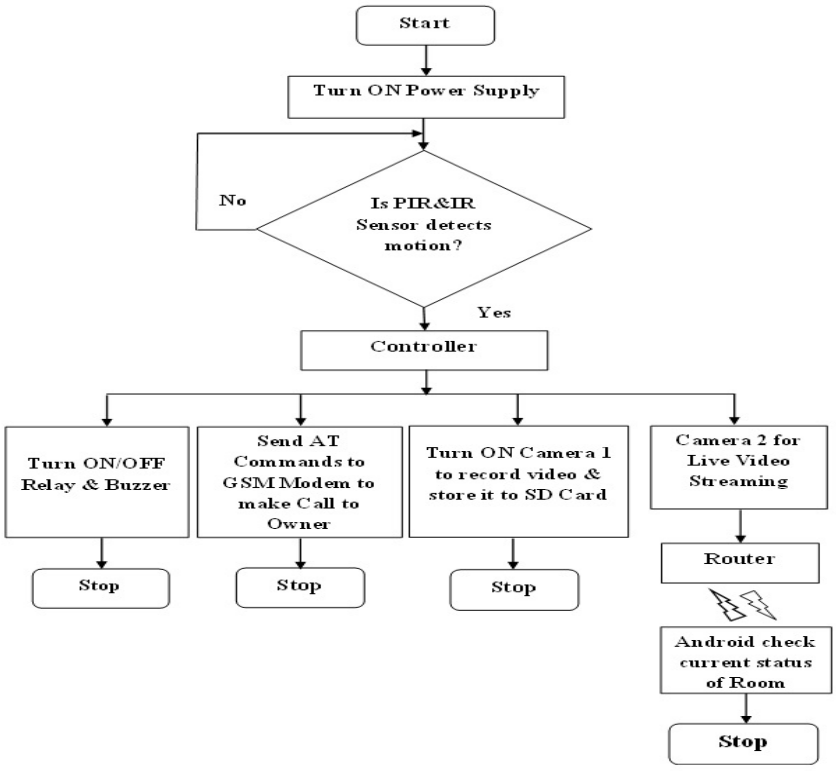
An android app is software application running on android platform. Android is a smartphone operating system. Android mobile is used for the operating the EYE vision app. This app have the different functions for showing the live video.





III. FLOWCHART



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IV. SOFTWARE

The whole system is depend on the Arduino controller. Arduino controller is programmed using Arduino Integrated Development Environment (IDE), Programming languages used are C or C++. Program is compiled & burned using Arduino Integrated Development Environment (IDE). It contains a text editor for writing code, a text console, a toolbar etc. Program written in Arduino Software (IDE) is called sketch. The extension used for Arduino sketches is in. The editor has features for cutting or pasting and for searching or replacing text. The console is used to display text output by the Arduino Software (IDE), including error messages and other information. The toolbar contains buttons to verify and upload programs, create, open, and save sketches, and open the serial monitor. We have used the Arduino IDE version 1.6.7.

V. FUTURE SCOPE

We can compare this image with stored data to detect the human face and if it is a human, then only we make a call to the owner. We can introduce one feature that system can also call to the police helpline.

VI. RESULT

Fig. Result when system is idle before human detection.

Fig. Result after human detection

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Fig. Incoming call to the owner through the Arduino and GSM modem

VI. CONCLUSION

Now a day's peoples makes use of CCTV cameras for security of their home or shop but it have disadvantages as it can't inform to owner about theft, also GSM based electronics system are there but in that we can't take the picture of theft. Hence to overcome this disadvantage of existing systems we are implementing this project. In this project we are implementing an Android based advanced security system to avoid theft. This system is cost effective and can be used anywhere where security is necessary.

VII. ACKNOWLEDGMENT

Today on completion of this project report, the persons we need to thank the most who have helped us throughout the making of this report and without whose help it would not have seen the light of the day.

Primarily, we submit our gratitude and sincere thanks to our guide and head of department Prof. A. A. Ranaware, for their constant motivation and support during the course of the work in the last six month. We truly appreciate and value their esteemed guidance and encouragement from the beginning to the end of this work.

We would like to thank our principal Dr. M. K. Phadatare who encouraged us and created a healthy environment for all of us to learn in best possible way.

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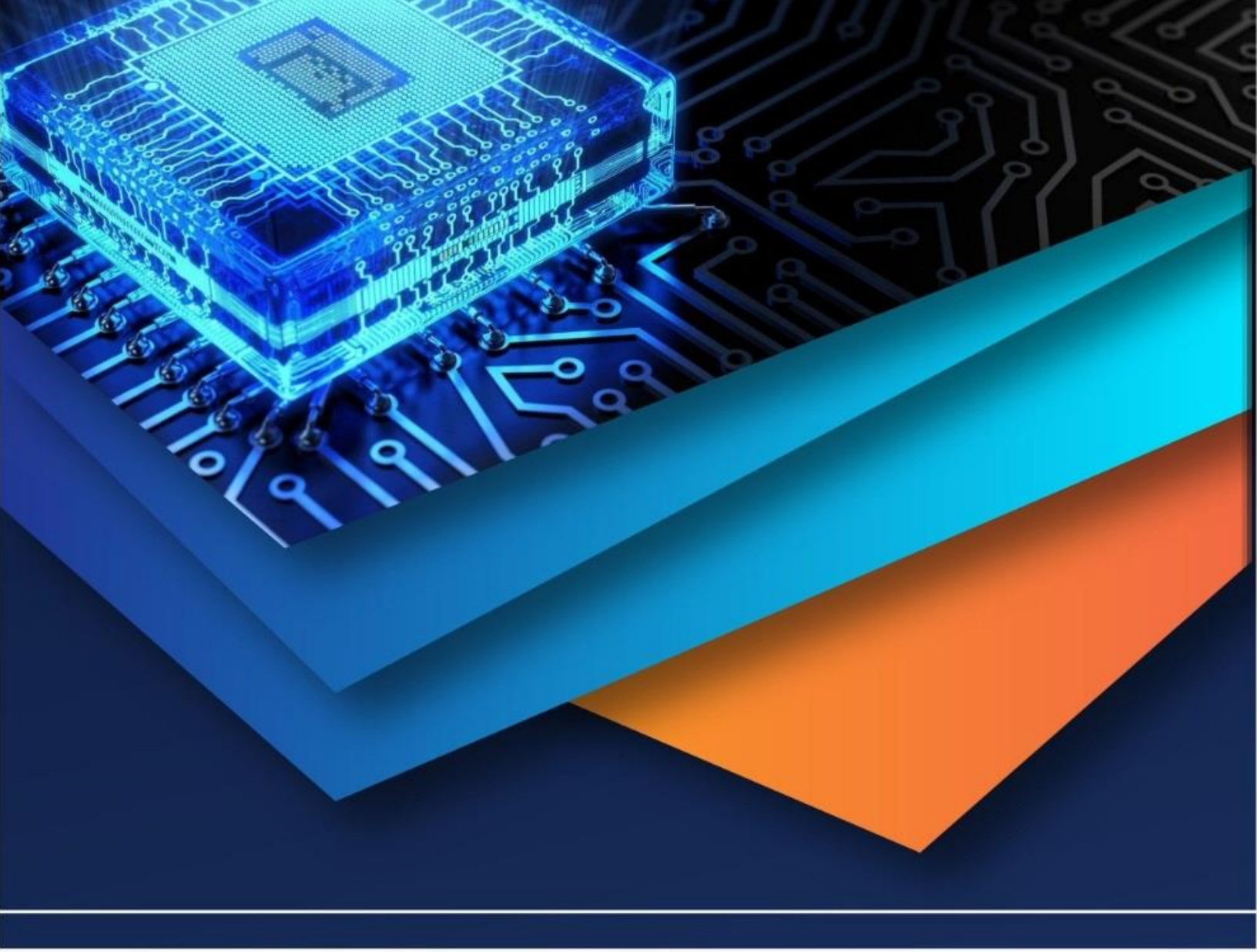

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