

# Intelligent Security System for Remote Monitoring A Case Study

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**Abstract**— In older days the protection systems are used, the system contains the major part of the theft detecting and identifying system to identify when the where the theft has been happened. LDR sensor is used to polling the signals, when the interrupt occur at LDR Sensor then it will send a signal to controller as well as GSM. The owner can have the ON\OFF control of the overall system by using mobile phone. The main objective of this projects is going to make a product based project to reduce the cost. This case study via.

**Index Terms**— LDR Sensor, GSM Module, ARUDINO Controller.

## I. INTRODUCTION

Security has been an important issue in the smart home applications. Conventional security systems keep homeowners, and their property, safe from intruders. A smart home security system, however, offers many more benefits. A smart home or building is a home or building, usually a new one that is equipped with special structured wiring to enable occupants to remotely control or program an array of automated home electronic devices by entering single command. For example, a homeowner on vacation can use a Touchtone phone to arm a home security system, control temperature gauges, switch appliances on or off, control lighting, program a home theatre or entertainment system, and perform many other tasks.

The WSN data collecting node module is connected with Piezoelectric Infrared Detector, Temperature Sensor, Smoke Detector and Gas Sensor separately. When the PIR finds that some people intrudes into the house or when the temperature sensor detects too high indoor temperature or when the gas sensor detects leakage of gas, the data collecting node will send encoded alarm signal to the WSN center node through the wireless sensor network established in home. Home security has been a concern of worldwide. As the technology is emerging every second, abundant home based security systems have been developed and implemented to keep their welfare safe. Home security system is an essential mean of protecting our home from illegal invasion. A conventional home security system consists of a Closed Circuit Television,

CCTV and burglar alarm. CCTV captures video in 24 hour to

identify what goes on around the house and in the house as well as get a hold of the evidence if there is a house breaking around the captured areas. Burglar alarm acts as the tool to alert the house owners and their neighbors. In additional, it may also chase away the burglar as the system may emit a high frequency sound wave. Nevertheless, the memory consumption is considerably large as the camera keeps recording non-stop. The power consumption is considered as a concern of installing a security system. In this project, a multilevel home security system that sends alert messages to the house owner and police station has also been designed, developed and validated.

## II. SYSTEM ANALYSIS AND DESIGN

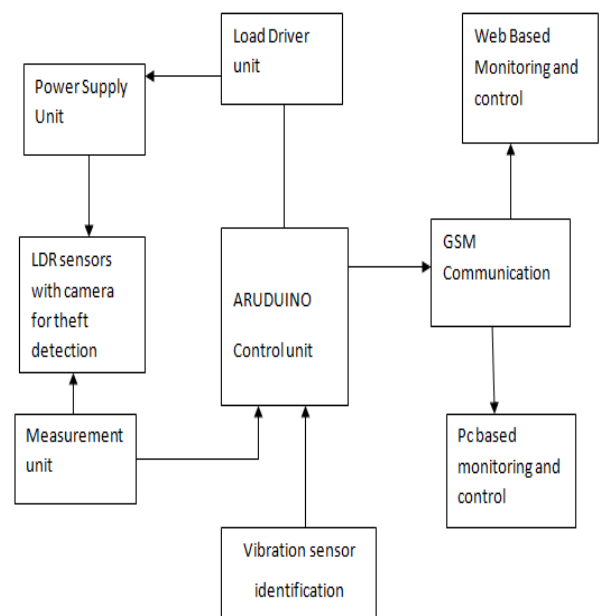


Fig. 1 Block Diagram

The board is pre-programmed in such a way that it sends a message to the account holder and concerned officials through the GSM modem that is interfaced serially. This indicates that the locker is open. The LDR circuit that is attached to the inner side of the locker, immediately detects any slight glimmer of light entering from outside. The remaining circuit (Arduino and GSM) comes outside the

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locker and is invisible to the burglar as it lies behind the locker case.

TABLE 1. Comparison Table As Per The Standard Data Sheet Specifications

Aspects	Existing system	Proposed system
Sensitivity	Sensors sensitivity is not as high as IR.	High sensitivity using epitaxial Pb(Zr,Ti)O <sub>3</sub> films
Response time	0.1 to 0.8 sec. Other sensors.	240ms (90% response)
Power source	Requires more power	Very less power using min 6vdc to max 24vdc
Operating temperature	Most sensors work at room temperature	Can withstand temperatures between –20 to 500 deg.C
Space and Cost	Cost of other sensors is more and high space required to activate circuit	Less cost and take space 65 H-50 W-35mm D only

### III. DESCRIPTION

The commonly used processors by the delegates of this field are FPGA, ARM, and microcontrollers. However, most of the present day theft control schemes are relying on face recognition and TDMA. Although this provides power efficiency, this requires algorithms using image processing techniques. This has greatly increased the complexity and cost of implementation. Hence in view of an economical, compact system for security, this design is put forward. In this method, the LDR detects a change in the light intensity when the bank locker is open and it powers the Arduino board when high light intensity is present.

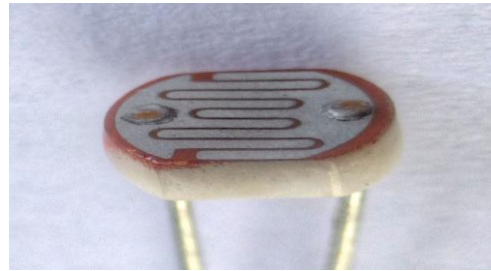
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The microcontroller pulls the SMS received by phone, decodes it, recognizes the Mobile no. and then switches on the relays attached to its port to control the appliances. After successful operation, controller sends back the acknowledgement to the user's mobile through SMS.

#### A. Arduino Controller

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital Input/output pins (of which 6 can be used as PWM outputs), 6 analogue inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to

Support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. It consumes very low energy as 3.3v.



B. LDR Sensor

Fig. 2 LDR Sensor

A photoresistor or light-dependent resistor (LDR) or photocell is a light-controlled variable resistor. The resistance of a photo resistor decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. A photo resistor can be applied in light-sensitive detector circuits, and light- and dark-activated switching circuits. A photo resistor is made of a high resistance semiconductor. In the dark, a photo resistor can have a resistance as high as a few mega ohms (MΩ), while in the light, a photo resistor can have a resistance as low as a few hundred ohms. If incident light on a photo resistor exceeds a certain frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electrons (and their hole partners) conduct electricity, thereby lowering resistance. The resistance range and sensitivity of a photo resistor can substantially differ among dissimilar devices. Moreover, unique photo resistors may react substantially differently to photons within certain wavelength bands.

#### C. Vibration Sensor

Accelerometers are transducers for measuring the dynamic acceleration of a physical device. The most common accelerometer measures acceleration only along a single axis. This type is often used to measure mechanical vibration levels. The second type is the tri-axial accelerometer. This accelerometer is used to determine the type of vibration or the direction of acceleration. Accelerometers designed to measure vibration are based on the piezoelectric effect. In a piezoelectric accelerometer, a mass applies force to a crystal creating a high-impedance charge, which results in a voltage across the crystal. Piezoelectric or charge mode accelerometers require an external amplifier to amplify the charge and to provide an impedance buffer.

#### D. Power Supply

A power supply (sometimes known as a power supply unit or PSU) is a device or system that supplies electrical or other types of energy to an output load or group of loads. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

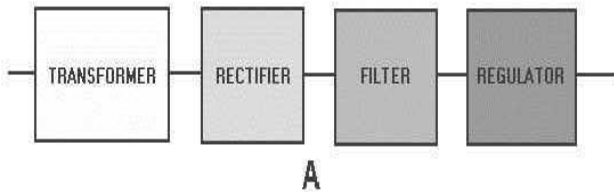


Fig. 3 Power Supply

#### E. GSM Module

In the project, we use a mobile phone to transmit GPS data stored in the Butterfly AVR board to a remote receiver module. This mobile phone works on Global System for Mobile communication (GSM) standards. The European Telecommunications Standards Institute (ETSI) has been the committee driving the GSM technology. The Short Messaging Service (SMS) is used to send text messages from the local transmitter to the remote receiver. The SMS is a feature from the evolution of the GSM standard over a few years into General Packet Radio Service (GPRS). This was developed to increase the data rate from the original 9600 bits per second up to 40 kilobits per second. The main components of a GSM network are discussed below briefly.

#### F. Operation

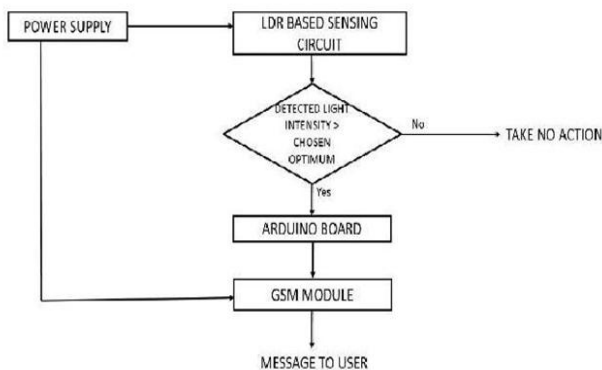


Fig. 4 Flow Chart

In this project, three sensors are used. The first sensor is placed at the front door and the second sensor is placed at the windows and the third sensor is placed at the door of the locker room. If the thief crosses the first sensor, the sensor detects the person and sends the information to the owner's mobile. Then the second sensor detects and shares the information with the police station. At last, the third sensor detects the person and takes the snap of that person and shares that information with the house owner and the police station.

#### IV. SIMULATION RESULTS

The Arduino Integrated Development Environment (IDE) is a cross-platform application written in Java, and is derived from the IDE for the processing programming language and

wiring projects. It is designed to introduce programming to artists unfamiliar with software development. It includes a code editor with features such as index highlighting, brace matching and automatic indentation. It is also capable of compiling and uploading programs to the board with a single click. Arduino programs are written in C or C++. The Arduino IDE comes with a software library called 'Wiring' from the original wiring project, which makes many input/output operations much easier. User only need to define two functions to make a runnable cyclic executive program. As the Arduino platform uses Atmel microcontrollers, Atmel's development environment, AVR studio or the newer Atmel studio may also be used for the development of software for Arduino.

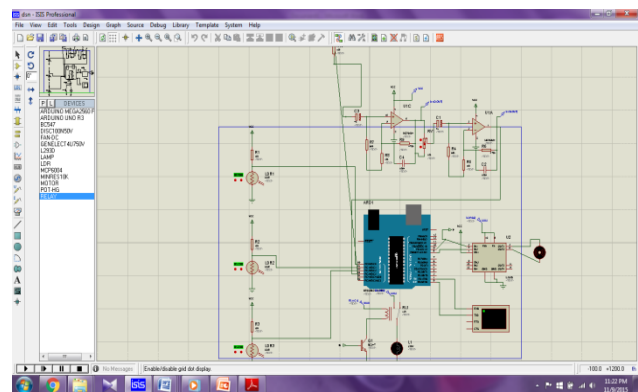


Fig. 5 Proteus Simulation

#### V. CONCLUSION

Theft control and security systems being a growing necessity in the present day scenario, this paper finds practical utility in real world situations. The feasibility of this proposed system is verified. The experiments and tests conducted have produced positive responses. This system is inexpensive and compact in size, thus overcoming many practical constraints. The maintenance and operational costs are also low. LDR is a widely available optical sensor. The use of GSM technology assures to provide information to the owner as long as the person is connected to any GSM network and thus overcomes geographical limitations.

#### FUTURE WORKS

There are several ways in which the method proposed can be improvised at a greater length by using the modern security methods. For instance a high resolution camera can be used to take pictures of the person who has attempted a theft. Also data communications and networking is an upcoming field that can be exploited to achieve better performance in this area. For example, instead of GSM technology, a computer network (PC based) can be established to achieve efficient communication. Cybernetics and computer networks can be also used in order to quickly give information to the concerned authorities.

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