



## SMART SECURITY SYSTEM FOR RURAL AREAS



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### Abstract

*The people leaves in rural areas will need security in many aspects. All security applications will be operated with the most advanced technology services in embedded and GSM. This system will be useful for home and rural security in an area of the village. In this paper we had smart security surveillance that can send information to the authorized person about metal detected if any at the entrance of the village. This smart security was done with ARM7 LPC2148 processor, PIR Sensor, metal detector for allowing them into the area by authorized and unauthorized with buzzer. In this paper the PIR sensor will detect the Person and it will check for any metal with the person who would like to enter into the secured zone. The system will send the information about the status of the metal and allow them if there is no metal by unauthorized. If metal is detected with the person then the system indicates with the buzzer primarily and then it will send the information to the authorized person that the person will have some unsecured objects please check once and will not allow into the secured zone.*

**Keywords :** ARM7LPC2148, Security in rural areas, surveillance, metal detector

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### I. Introduction

Across the world many people would like to live in rural areas within few years. Living in rural areas will have many advantages like the air is clean and less traffic in the place we are living. Privacy will also be good. Although there will be many advantages to live in rural there are some disadvantages also there. Security is one of the aspects. The crime rates and robberies will be high if the house is independent in the rural areas comparatively urban areas. The security should have to improve a lot. The number of police stations and police people will be less in rural areas. The people who are living in rural areas should have to focus on security about monitoring and controlling the thefts or reduce the crime rate and exit systems. Appointing security persons for rural areas is very difficult because the area need to cover is more but the manpower will be less. Monthly maintenance cost will also high. Here in my paper am adopting the technology to reduce cost and providing the security

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to the rural places. The security system should have continuous monitoring from anywhere in the world. The entire area should be embedded with communication interface from one node to another. IOT is a most advanced technology that is used in most of the electronic devices to monitor or to operate. IOT connected with wireless sensor networks that can reduce the human effort in many aspects [I]. Metal detectors were included to identify the harmful metal, bombs and other metallic objects if any.

This is mostly done on the grounds that these days in our busy calendar every single individual at home can't focus without anyone else work. Here everything requires is robotized and that outcomes in rearranging their work lessen their worry of people [II]. Arranging the metal detector per individual home is costly and may not be affordable by everyone. So we were arranged a single metal detector at the entry position of the secured zone. The site controller at that point permits the opportune individual to enter the spot [III]. The paper clarifies the present innovation; incorporate the recurrence ranges utilized and principles required. This paper is an ARM7 based security framework utilizing PIR sensor [V], metal detector, buzzer and communication interface is GSM [VI]. Right now, at whatever point human interruption is identified before secured entryway then framework send security caution to client/proprietor of the zone and enlisted individuals through message.

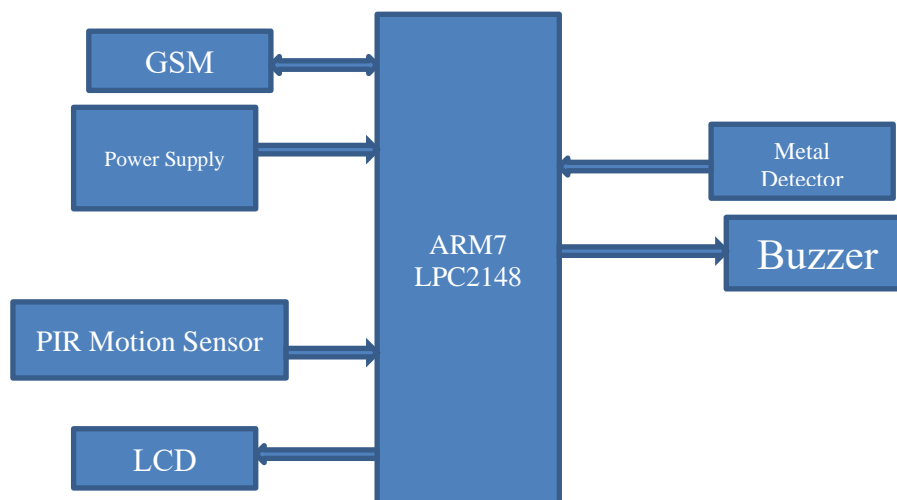
## **II. Existing System**

The present system is made with a micro controller with PIR sensor and LCD. In this the registered person can able to see the information about someone will be waiting at door by getting information through buzzer. He/she need to get the confirmation from the person by calling them about confirmation to authorize. Its taking time as well as we doesn't have any confirmation about what they are doing at our home or office [V, VI, VII, VIII, IX]. The present system will be used only for the purpose of giving access to authorize. This could also be done based on telephonic conversation made between owner of the house and services section process. Automation process will not be there.

## **III. Proposed System**

The system that we were designed a system by using LPC2148 ARM7 processor. The PIR sensor that was used to identify the person. Metal detector was used to detect the metals any with the person who would like to enter. This will be done after PIR activated. If the person does not have any metals then the system sends authorized and unauthorized. If person detected with metal then a caution message alert buzzer will be on and GSM used in our system will send an SMS to authorized person.

### Proposed System Block Diagram

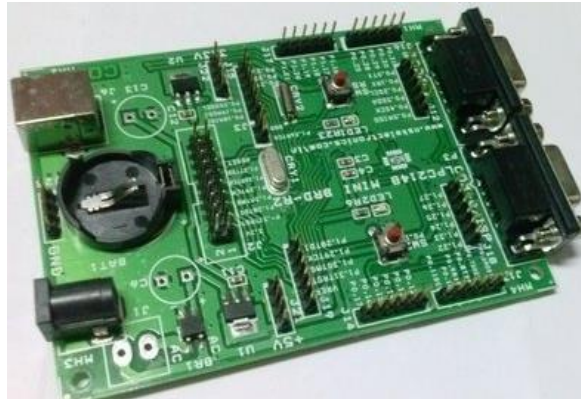


**Fig. 1:** Block Diagram of the Proposed System

### IV. Hardware Tools

#### ARM7 LPC 2148

ARM will be known as advanced RISC (reduced instruction set computer) machine. It is 32 bit architecture with several applications that were included. Based on ARM architecture different organizations were licensed to manufacture the ARM architecture based SOC products. LPC 2148 is in this category only and it was manufactured by NXP (founded by Phillips). LPC2148 has many built in features with more reliable and efficient applications. LPC2148 is a 16bit or 32 bit operations can be performed. The main features of LPC2148 are it is an ARM7 family based 1 or 32 bit Micro controller with LQFP package of 64 pins. It has built in ISP (In system Programmer) for programming or on chip boot loader. It has 40KB RAM and 512KB ROM with up to 60MHZ crystal oscillator for high speed operation. It has fourteen 10 bit ADCs with very less conversion time of 2.44 micro seconds for each channel. It supports with various communication interfaces like UART, I2C, SPI and USB. Here in my project LPC2148 is a key role because it could able to process the data collected from various sensors like PIR sensor which can capture movement of a person, Metal detector which could able detect all metals and communicates through GSM connected to LPC2148 through UART port. We were used set of commands to operate the Motors which are acting as door for security purpose. We could able close the door and alert the security person by switching on the buzzer.



**Fig. 2:** LPC2148 processor

#### **PIR Motion Sensor:**

Passive Infrared Radiation (PIR) sensor detects the change in infrared radiation of warm blooded moving object in its detection range. According to the change in infrared radiation, there will be a change in the voltages generated which was amplified and send the information to LPC2148. When an intruder comes in the detection range of the PIR sensor, it actuates the data to LCD. Once the intruder moves out of detection range of the sensor gets turn OFF. It is made with pyro electric sensors. It is a low level of radiation. PIR will have pyro electric with supporting circuit of resistors and capacitors. It used BISS0001 micro power motion detector. This chip takes the output of sensor and processes it and provides the digital output. It needs a power supply of 5v.



**Fig. 3:** PIR sensor used

### **Metal Detector**

The metal detector works on the basic principle of electromagnetic induction. It consists of one or more inductor coils used to interact with metallic objects or elements on the ground. A pulse of current is applied with the coil which will detect the magnetic field connected to blue type.



**Fig. 4:** Metal Detector

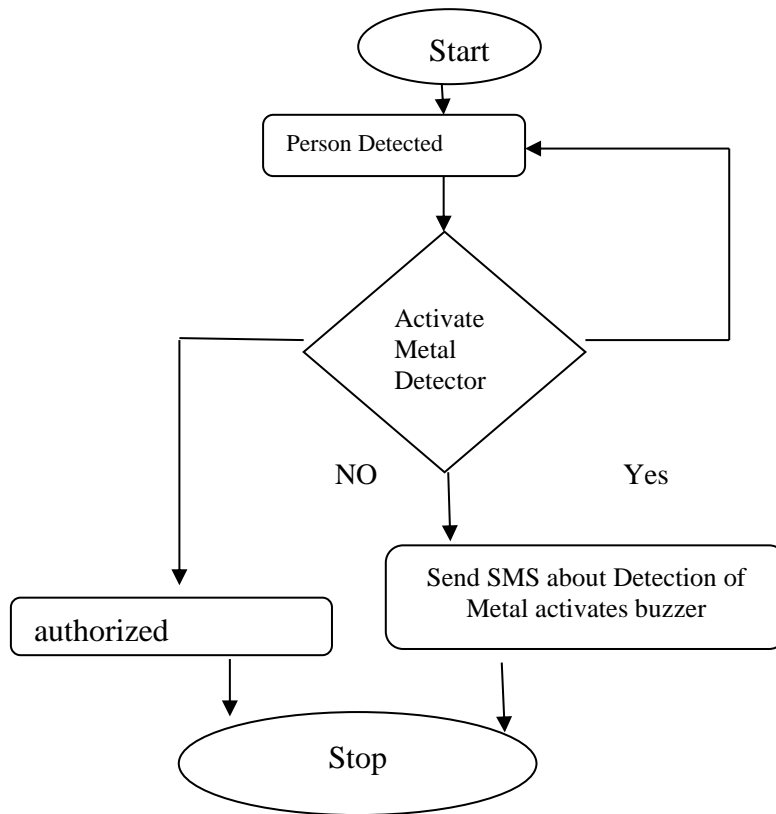
### **GSM**

GSM consist of SIM800 which is a Quad-band GSM with a solution of embedded applications operated at 850/900/1800/1900 MHZ frequency range. It can transmit the SMS in our application about the detection of metal. GSM works with digital system using TDMA (Time Division Multiple Access). It has an ability to transmit with a data rate of 64kbps to 124Mbps.



**Fig. 5:** GSM modem used

## V. Working Flow of the System



**Fig. 6:** Working Flow model of the designed system

## VI. Software Tools:

### Keil U Vision 4:

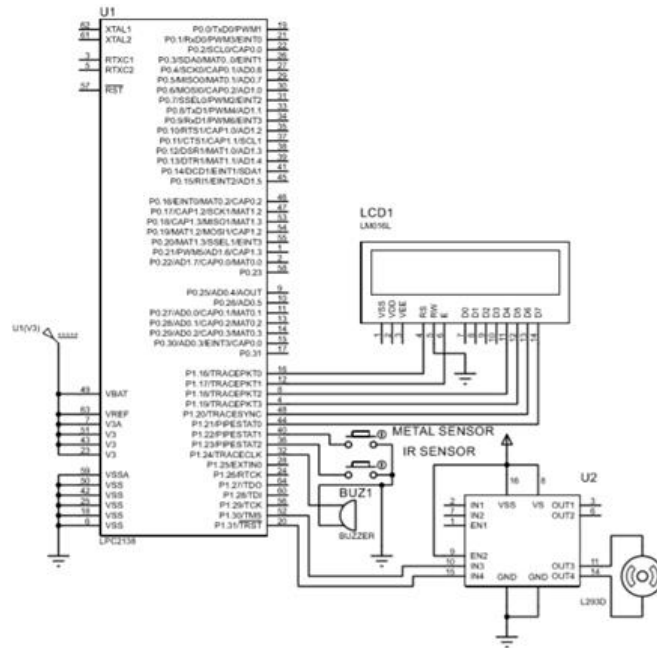
For programming we are using the embedded c language which is universally used. Embedded c is a broadly utilized universally useful, abnormal state programming dialect. Keil micro vision IDE combines with project management and run time environment to code edit and debug. Keil IDE is also used to high level language to machine level language i.e., hexa decimal code.

### Flash Magic:

Flash Magic is a PC tool for programming flash based microcontrollers from NXP using a serial or Ethernet protocol while in the target hardware.

## VII. Results & Discussions

In the proposed system, we are giving access through unique secured authentication to access the door which can reduce the thefts and also provides the high security.



**Fig. 7:** Schematic Diagram



**Fig. 8:** Working model output

### **VIII. Conclusion**

Security is fundamental criteria in all kind of applications. This project is aimed at improving the level of security for smart villages. As the system that is defined with metal detector with authentication through SMS will provide more secured access to entire people in a safe zone which may be at any place. The work displayed shows the underlying period of an installed auto that will be noticeable in not so distant future.

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