ABSTRACT
The paper contains remedies of restrictions of wireless surveillance system. I am going to use Passive Infra Red (PIR) sensor for motion detection. The development in the communication systems and the networking has given rise to the wireless networks. Besides all the comforts of the life wireless networks poses serious security threats. The main reason is the signals are spread in the air and it is convenient for the hackers to catch wireless signals. Wireless networks require very tight security so that the unauthorized users cannot exploit the information. Unit identification algorithm and random frequency algorithm have been designed to make the wireless surveillance consistent.

KEY WORDS: Surveillance, random frequency, unit identification, PIR

INTRODUCTION
In wireless surveillance system monitoring of some restricted area can be done by using video surveillance with CCTV camera or using sensor for motion detection. Passive Infrared sensor and ultrasonic sensor can be used for the purpose. I am using PIR sensor for motion detection. Suppose one multistoried building is under surveillance. The building having more than one area under monitoring using different PIR sensors. Now as in the wireless system signal is available in air, so one can know the frequency and can be in the system. Now being in the system, he can disable the surveillance system and can make theft or damage something under protection. Solution of the problem is to use random frequency algorithm. In random frequency algorithm the frequency of the system changes frequently so it becomes difficult for the unknown person to know the frequency.

As, more than one PIR sensors are controlled from a single server room, unit identification algorithm is used. Unit identification algorithm is used to identify the detected PIR sensor among the all available sensors to make fast rescue operation.

PIR-based motion detector

![Fig 1 PIR sensor as a motion detector connected with controller circuit](image)

Cylindrical facet lens is there in front of PIR sensor. Each facet (rectangle) is a Fresnel lens. In a PIR-based motion detector, the PIR sensor is typically mounted on a printed circuit board which also contains the necessary electronics required to interpret the signals from the chip. The complete circuit is contained in a housing which is then mounted in a location where the sensor can view the area to be monitored. Infrared energy is able to reach the sensor through the window because the plastic used is transparent to infrared radiation (but only translucent to visible light). This plastic sheet prevents the introduction of dust and insects which could obscure the sensor's field of view.

A person entering the monitored area is detected when the infrared energy emitted from the intruder's body is focused by a Fresnel lens or a mirror segment and overlaps a section on the chip which had previously been looking at some much cooler part of the protected area. That portion of the chip is now much warmer than when the intruder wasn't there. As the intruder moves, so does the hot spot on the surface of the chip. This moving hot spot causes the electronics connected to the chip to de-energize the relay, operating its contacts, thereby activating the detection input on the alarm control panel.

PIR based system

![PIR sensor with Unit identification Algorithm](image)

In first step of algorithm decide IDs (identification number) for PIR sensor and central control unit. ID of PIR is 17 and ID of control unit is 51. RFM 23 is a wireless module. It has 128 registers. PIR sensor detects intruder and sends data to the central control unit. So now it acts as a transmitter. Load its ID in Tx Header register.

As, it receives control signals from central control unit only, so give ID of central control unit to the Check Header register of RFM 23.

Now if certain device sends signal to PIR then its ID will be matched with the check header and if matches...
then only PIR receives data from that sensor otherwise will ignore that device.

Using Unit identification algorithm central control unit can identify particular sensor among large number of sensors. The algorithm makes the PIR sensor to receive signals from central control unit only.

**Random frequency algorithm**

1. Select standard frequency ($F_s$) using Registers 73h to 7Ah of RFM 23.
2. Set timer for say 1msec.
3. $X = \text{count} \% 16$
4. Data frequency ($F_d$) = $F_s - X$

First decide standard frequency at which signal is given from central control unit to sensor.

Set timer for 1ms sec. and initialize counter. Now when some intruder enters to the restricted area PIR sensor will detect it. Take reading of counter. Take modulo of it with 16. The result is then subtracted from Standard frequency ($F_s$) to get data frequency ($F_d$). PIR sends data to the central room using data frequency. The $F_d$ changes this way and it is so random that even the user can not know the present frequency of communication.

**CONCLUSION**

The wireless surveillance system can be designed using PIR sensor. The protection against wireless hacking can be obtained by random frequency algorithm. To avoid interference of signals at receiver side of PIR and central control unit can be avoided using unit identification algorithm. As fast detection is made possible due to unit identification algorithm it become easier to do fast rescue operation. Using some encryption method like AES or DES, the system can be made for reliable.

**REFERENCES**

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