**Smart CCTV Security System**

**Synopsis:**

CCTV is installed at many areas for security purpose due to high crime rates but there are chances that the camera itself may be tampered or stolen. The very purpose of installing CCTV is lost then. Assuming an office or Laboratory environment where each employee is provided with a TAG(RFID), unauthorized entry of intruders is also detected here. Video data acquisition of each authorized employee is recorded for few seconds on an Android handset so that during dubious situations the recorded video of each employee can be observed.

This project involves development of a microcontroller based module that has many interfaces, to form a robust CCTV security system. This module also provides security against intruders.

The Module developed in this project has below interfaces with the microcontroller RL78x from Renesas:

* RFID Sensors - to read RFID tags provided to each employee.
* GSM unit – to send emergency/alert messages.
* Emergency Switch – electronic device designed to assist in alerting somebody in emergency situations where a threat to persons or property exists.
* PIR sensor – to detect human movement.
* LCD – displays the status information.
* The Renesas Electronics RL78 - is a 16-bit CPU core with a [CISC](http://en.wikipedia.org/wiki/Complex_instruction_set_computing) architecture for embedded [microcontrollers](http://en.wikipedia.org/wiki/Microcontroller) with abundant features.
* Android handset: is used here as a video recorder and communicates with the Microcontroller using GSM interface. Android is a Linux-based mobile phone operating system developed by Google. Android is unique because Google is actively developing the platform but giving it away for free to hardware manufactures and android based mobile-handset users. It is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools necessary to begin developing applications on the Android platform using Java programming language.

**Working:**

Here RFID tag is provided to each authorized employee. The valid RFID tag numbers are stored in the microcontroller.

To module is supposed to be embedded to the Gate/Door at the entrance of the office/Lab.

For demonstration purpose Android handset is used to act as CCTV and as an individual handset to get alert mails during emergency.

1. The employee displays the RFID tag in front of the module. The RFID sensor present in the module senses this and passes the data on to the microcontroller.
2. If the RFID number is matched with that in the database then the system clears the entrance to the employee by displaying the same on LCD.
3. The Camera records each employee’s activity for say 5secs.
4. Meanwhile PIR sensor keeps sensing for anyone who will be present near the camera.A person without RFID tag will be considered as an intruder and SMS alert will be sent via GSM unit to the Android Handset. It is considered that that person may tamper or take away CCTV.
5. In case if any employee exhibits dubious activities then the Android handset can be requested to play the recorded videos of the employee - stored based on his RFID tag number.
6. An emergency switch is interfaced to the microcontroller which can be used to send an alarm.