PRESENCE OF ACTIVE MOBILE PHONES AND HIDDEN CAMERA DETECTION

K.Parvateesam , G.A. ArunKumar

ABSTRACT - **The main scope of project is to sense the presence of an activated mobile phone and camera from a distance of one-and-a-half meters to prevent the use of same in the examination halls. Certain places where uses of mobile phones are not allowed like exam hall, temple, offices and theaters, in those places to detect and restrict the use of mobile phones this proposed system is very helpful. This system can detect any active cell phone i.e. when someone is trying to make a call or receive a call, sending a message or receiving a message. In the above mentioned conditions a buzzer will sound, in the presence of an active cell phone in the radius of one and half meters. In our day to day life the usage of mobile phones has been increased in restricted area such as exam venues, places of important meeting, offices, conference halls, prison etc. and the hidden wireless camera in trial rooms and hotels, public toilets. The radio frequency signals are transmitted from wireless camera and mobile phone during the video transmission, incoming call and outgoing call, text messages from one gadget to another. The detector will detect the transmitted signal and then it is gives as input to Arduino microcontroller. As soon as the Arduino microcontroller receives the signal, it will turn ON the beep alarm and the information will be displayed on the LCD display .This system will be used to detect the mobile phones and the wireless hidden camera present in a room by the radio frequency signals which are transmitted by them.**
Index Terms— **Arduino, RF Detection, Camera, Mobile, LCD**

I.INTRODUCTION

In recent years, there has been increasing issues relating to the use of mobile phones and camera in restricted areas. The mobile phone provides many ways for a student to cheat in an examination hall. The mobile phones are strictly prohibited inside the examination rooms. One of the existing approaches is to ensure the students are free of mobile phones in examination hall is by manual inspection in the entrance. Manual inspection cannot fully reveal the students having mobile phones all the time. These devices will ensures the connectivity between a student sitting inside the hall and outsiders have been considerably increased a burden to invigilators to ensure that malpractices are not committed during exams. A student may constantly communicate with other students outside the examination hall via Email and text messages. They can exchange information such as question and answer through whatsapp, Email attachments etc. By using a mobile camera a student can take the snap shot of the question paper and send to other students for help. Sometimes there are more possibilities for leaking the question papers. Nowadays mobile has internet connectivity so that a student can post questions in online and gets quick response and in addition they can search for answers in search engines. The storage capacity in the mobile offers students to store lecture notes, books and other unauthorized materials that are related

to the exam. Many applications installed in mobile phone allow a student to commit cheating, application such a scientific calculator, dictionary etc. as the technology keeps on advancing, the students also get access to those technologies to commit cheating. The hidden wireless cameras, eaves dropping microphones etc which are used in an illegal way in areas like trial rooms, hotels, and in places of important meetings. So there is need for the detection of signals which are emitted from the hidden wireless camera, microphones, mobile phone. Here we try to prohibit the unauthorized use of mobile phones by using a detector, that sense the presence of an activate mobile phone signals radiated by them and also the camera which radiates RF signal. Efforts have been put in place to tackle this issue but they all have their own shortcomings. The circuit can detect the signals during video or audio transmission from hidden camera and microphones also incoming calls and outgoing calls, messages and video transmission from mobile phone. The detector detects the RF signal and the signal information is indicated by using a beep alarm and displayed in LCD module. The alarm continues until the RF signal transmission get off. The transmission frequency range of the mobile phone signal is about 0.9 to 3 GHz and the wavelength of about 3.3 to 10cm. so there is a need to design a circuit that detects GHz frequency signals. The rapid growth of cell phones in the 21st century to till now has raised many problems. In addition, public reaction was growing against the disturbance of cell phones introduced in daily life. We designed a simple engineering project, namely hidden active cell phone detector. The pocket sized cell phone detector can detect the hidden active cell phone. So this project is used to neglect the use of cell phones in exam halls, private rooms, defence establishments, hospitals, military camp, petrol pumps and also very useful for sensing the use of mobile phone for spying and other correlated activities. This circuit can detect calls, SMS, video transmission even when the cell phone is hidden in silent mode. The prompt bug detects radio frequency transmission signal (RF) from a cell phone, it generates a beep sound alarm.

II.HARDWARE DESIGN

The main purpose of the overall system is to detect the RF bugs present in a room. The circuit detects the RF signal and the RF signal radiated from hidden camera is detected and it is displayed with the help of LCD module. The system consists of RF signal detector, ATmega 8 microcontroller, LCD module and buzzer alarm. The basic principle of mobile detector is the idea of using disc capacitor to detect the cell phone signal with the frequency range 0.9 to 3GHz within 10 meter radius. The capacitor and the lead acts as a loop antenna, which is capable of receiving the

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transmitting signal from the activated mobile phone and the wireless camera which is transmitting the live video in a room. The signal is received by the RF detector by mutual induction between the capacitor and lead. The signal is given as an input to the ATMEGA 8 Microcontroller, there the signal is rectified and then it is sent for further process. The signal received is an analog signal. The analog signal is converted into the digital signal using Analog to Digital converter, this A/D converter is induced in the microcontroller. It is programmed by using Arduino software.
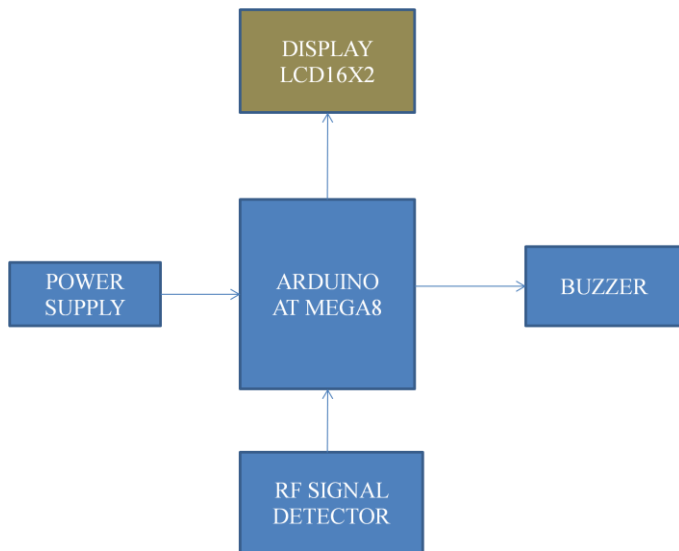

Fig: Block Diagram Of Presence Of Active Mobile Phone And Hidden Camera Detector

The system consists of RF signal detector, ATmega 328 microcontroller, LCD module, and buzzer alarm. The basic principle of mobile detector is the idea of using disc capacitor to detect the cell phone signal with the frequency range 0.9 to 3GHz within 1.5 meter radius. The capacitor and the lead acts as a loop antenna, which is capable of receiving the transmitting signal from the activated mobile phone and the wireless camera which is transmitting the live video in a room.

The signal is received by the RF detector by mutual induction between the capacitor and lead. The signal is given as an input to the ARDUINO Microcontroller, there the signal is rectified and then it is sent for further process. The signal received is an analog signal. The analog signal is converted into the digital signal using Analog to Digital converter, this A/D converter is induced in the microcontroller. It is programmed by using Arduino software.

The RF detector detects the RF signal and sends to microcontroller to transmission signal into digital signal. And the microcontroller sends the information to the LCD. Here the circuit uses disc capacitor 0.22µF, in order to capture the RF signal transmitted from wireless hidden camera and mobile phones. The lead is fixed in order to get desired frequency. The disc capacitor along with the lead acts as a loop antenna to capture the RF signal from RF bugs hidden in a room. Op-amp IC CA3130 is used for current to voltage conversion with capacitor C3 which is connect in between inverting and non inverting inputs of the op-amp.

The P channel MOSFET transistors present in the input to provide very high input impedance, very low current

and high speed performance IC-555 timer is a highly stable controller which is capable of producing accurate timing pulses. And the monostable operation the time delay is controlled by the external resistor and one capacitor. With an a stable operation the frequency and duty cycle are controlled by two external resistors and one capacitor. Capacitor C3 creates a field and stores energy. Then transfer the stored energy into current which is input to the IC1 and convert into voltage. Capacitor C4 with the resistor R1, keeps the non-inverting input stable for high state output. Capacitor C4 discharges and the feedback resistor R3 will make the inverting input high for high output. Capacitor C5 (45pF) strobe and null of IC1 for the phase compensation and the gain control to get better frequency response. When the capacitor C3 detects the RF signal, the output of the IC1 becomes low and high alternately. The frequency of the signal is indicated by LED1. This signal will trigger the IC555 timer through capacitor C7. Capacitor C6 maintains bias voltage of the transistor T1 for fast switching action. The components R6 and C9 produce very short time delay. The microcontroller gets the input RF signal and performs the operation programmed in it. It sends the information to LCD module and it is displayed as "DEVICE DETECTED" and alarm sounds until it stops receiving the RF signal.
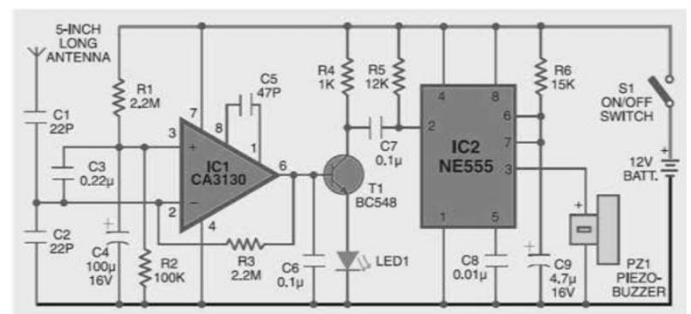

Fig : RF Signal Detector

The transmission frequency of cell phones ranges from 0.9Hz -3GHz with a 3.3cm -10cm wavelength. RF signals can be collected from the cell phone along with the disk capacitor and the leads which acts as a small gigahertz loop antenna. When the cell phone is triggered, it transfers the signal in sine wave form which permits through the space. The circuit diagram of the hidden active cell phone detector is built with operational amplifier, monostable multivibrator and piezo buzzer.
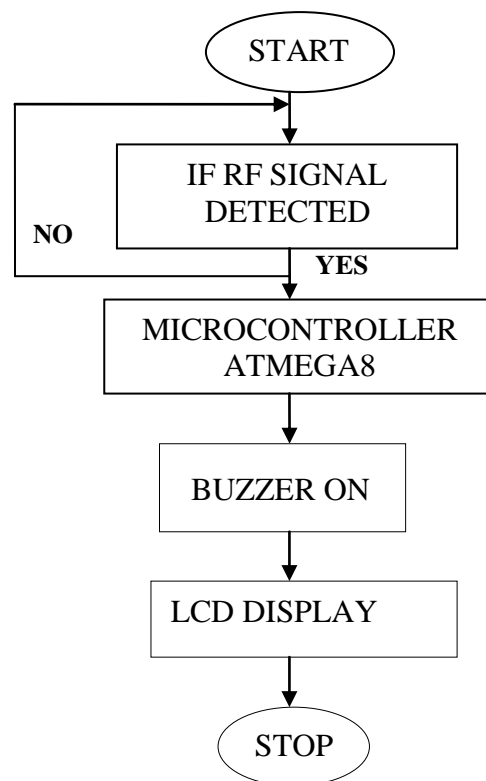
III.SOFTWARE IMPLEMENTATION

*Arduino Software :*Make sure you have the right item selected in the **Tools > Board** menu. If you have an Arduino Uno, you'll need to choose it. Also, newer Arduino Duemilanove boards come with an ATmega328, while older ones have an ATmega168. To check, read the text on the microcontroller (the larger chip) on your Arduino board. For more information on the board menu items, see the guide to the Arduino environment. Then, check that the proper port is selected in the **Tools > Serial Port** menu (if your port doesn't appear, try restarting the IDE with the board connected to the computer). On the Mac, the serial port should be something like /dev/tty.usbmodem621 (for the Uno or Mega 2560) or /dev/tty.usbserial-A02f8e (for older, FTDI-based boards). On

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Linux, it should be /dev/ttyACM0 or similar (for the Uno or Mega 2560) or /dev/ttyUSB0 or similar (for older boards). On Windows, it will be a COM port but you'll need to check in the Device Manager (under Ports) to see which one. If you don't seem to have a serial port for your Arduino board, see the following information about drivers. *Drivers :* Drivers provide a way for software on your computer (i.e. the Arduino software) to talk to hardware you connect to your computer (the Arduino board). In the case of Arduino, the drivers work by providing a virtual serial port (or virtual COM port). The Arduino Uno and Mega 2560 use standard drivers (USB CDC) provided by the operating system to communicate with the ATmega8U2 on the board. Other Arduino boards use FTDI drivers to communicate with the FTDI chip on the board (or in the USB-serial convertor). The easiest way to check if the drivers for your board are installed correctly is by opening the **Tools > Serial Port** menu in the Arduino software with the Arduino board connected to your computer. Additional menu items should appear relative to when you open the menu without the Arduino connected to your computer. Note that it shouldn't matter what name the Arduino board's serial port gets assigned as long as that's the one you pick from the menu. On Windows 7 (particularly the 64-bit version), you might need to go into the Device Manager and update the drivers for the Uno or Mega 2560. Just right click on the device (the board should be connected to your computer), and point Windows at the appropriate .inf file again. The .inf is in the drivers/ directory of the Arduino software (not in the FTDI USB Drivers sub-directory of it). If you get this error when installing the Uno or Mega 2560 drivers on Windows XP: "The system cannot find the file specified", you might try this suggestion (about adding a "RunOnce" key to "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion"). On Linux, the Uno and Mega 2560 show up as devices of the form /dev/ttyACM0. These are not supported by the standard version of the RXTX library that the Arduino software uses for serial communication. The Arduino software download for Linux includes a version of the RXTX library patched to also search for these /dev/ttyACM* devices. There's also an Ubuntu package (for 11.04) which includes support for these devices. If, however, you're using the RXTX package from your distribution, you may need to symlink from /dev/ttyACM0 to /dev/ttyUSB0 (for example) so that the serial port appears in the Arduino software. *Access to the Serial Port :* On Windows, if the software is slow to start or crashes on launch, or the Tools menu is slow to open, you may need to disable Bluetooth serial ports or other networked COM ports in the Device Manager. The Arduino software scans all the serial (COM) ports on your computer when it starts and when you open the Tools menu, and these networked ports can sometimes cause large delays or crashes. Check that you're not running any programs that scan all serial ports, like USB Cellular Wifi Dongle software (e.g. from Sprint or Verizon), PDA sync applications, Bluetooth-USB drivers (e.g. BlueSoleil), virtual daemon tools, etc. Make sure you don't have firewall software that blocks access to the serial port (e.g. ZoneAlarm). You may need to quit Processing, PD, vvvv, etc. if you're using them to read data over the USB or serial connection to the Arduino board. On Linux, you might try running the Arduino software as root, at least temporarily to see if fixes the upload. *Physical Connection :* First make sure your board is on (the green LED is on) and connected to the computer. The Arduino Uno and Mega 2560 may have trouble connecting to a Mac through a USB hub. If nothing appears in your "Tools > Serial Port" menu, try plugging the board directly to your computer and restarting the Arduino IDE. Disconnect digital pins 0 and 1 while uploading as they are shared with serial communication with the computer (they can connected and used after the code has been uploaded). Try uploading with nothing connected to the board (apart from the USB cable, of course). Make sure the board isn't touching anything metallic or conductive. Try a different USB cable; sometimes they don't work. *Auto-Reset :* If you have a board that doesn't support auto-reset, be sure that you are resetting the board a couple of seconds before uploading. (The Arduino Diecimila, Duemilanove, and Nano support auto-reset as do the LilyPad, Pro, and Pro Mini with 6-pin programming headers). However, note that some Diecimila were accidently burned with the wrong boot loader and may require you to physically press the reset button before uploading; see this question below. However, on some computers, you may need to press the reset button on the board after you hit the upload button in the Arduino environment. Try different intervals of time between the two, up to 10 seconds or more. If you get this error: `[VP 1] Device is not responding correctly.` try uploading again (i.e. reset the board and press the download button a second time). *Bootloader :* Make sure there's a boot loader burned on your Arduino board. To check, reset the board. The built-in L LED (which is connected to pin 13) should blink. If it doesn't, there may not be a boot loader on your board.

Flow Chart:

```
                    ┌──────────┐
                    │  START   │
                    └────┬─────┘
         ┌───────────────┤
         │          ┌─────▼──────┐
         │          │ IF RF SIGNAL│
   NO    │          │  DETECTED   │
         └──────────┤            │
                    └─────┬──────┘
                       YES │
                    ┌──────▼──────┐
                    │MICROCONTROLLER│
                    │  ATMEGA8     │
                    └──────┬──────┘
                    ┌──────▼──────┐
                    │  BUZZER ON  │
                    └──────┬──────┘
                    ┌──────▼──────┐
                    │ LCD DISPLAY │
                    └──────┬──────┘
                    ┌──────▼──────┐
                    │    STOP     │
                    └─────────────┘
```

Algorithm:
STEP1: Start.
STEP2: If RF signal detected then go to step4.
STEP3: If no RF signal detected go to step1.
STEP4: Buzzer ON.

STEP5: Show LCD display.
STEP6: Stop.

IV.RESULT

This paper detects RF signal which are emitted from the mobile phones and the hidden wireless camera when they are ON. This will continuously monitors the RF level with in a room. If the RF signal level increases   a BUZZER will turn on and sounds until the signal level reduces and the LCD display displays "DEVICE DETECTED".
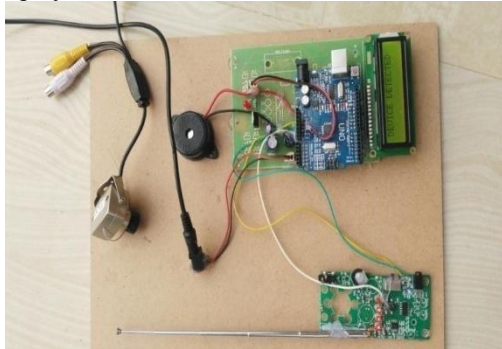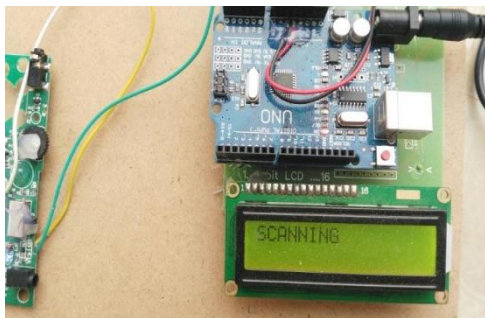

Fig: Hardware Prototype

Fig: LCD Display Showing Scanning

Fig: LCD Display Showing Device Detected

V.CONCLUSION& FUTURE SCOPE

Conclusion:

Our design detects RF signal which are emitted from the mobile phones and the hidden wireless camera during incoming and outgoing calls, messages and direct video transmission from one device to another with the alert system. This will continuously monitors the RF level with in a room. If the RF signal level increases a warning alert through buzzer is implemented along with message is displayed through the LCD display as RF signal is detected or Device Detected. Mobile technology and wireless camera gains new data capabilities rapidly. Features like direct transmission of video from small wireless camera to other devices. A mobile phone uses many different transmission protocols, which dictates how cellular phones communicate with towers. Many institutions depend on keeping information secured an to build fortresses imploring methods to check every one. It requires a lot of manpower. This detector sense the signal with 10 meter radius to prevent the malpractices in restricted areas.

Future scope:

Trying to increase the detecting range by using the preamplifier stage using JFET or MOSFET transistor used in an interface between the capacitor and IC. Being able to detect the Bluetooth transfer. Current system only detects the 2G/3G transmission signals and can improve the detecting range for upcoming 4G and 5G transmission signals. To determine the exact position of mobile phone and camera hidden in a room by using GPS module.

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K. Parvateesam: Presently working as Assistant Professor in Aditya College of Engineering & Technology. He has 6 years of teaching experience. He received M. Tech Degree from Sri Vasavi Engineering College. He has membership as Associate member in IETE.

G. A. Arun kumar: Presently working as Assistant Professor in Aditya College of Engineering & Technology. He has 6 years of teaching experience. He received M. Tech Degree from BVC Engineering College. He has membership as Associate member in IETE.