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Smart Security Device for Women Safety

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Abstract: ***The most grim fact in today's world is the rising number of atrocities against women. UN Women supported survey in Delhi shows 95 per cent of women and girls feel unsafe in public spaces. Various studies reveal that one among three of all women and girls experience physical or sexual violence in their lifetime. With the advancement of technology many systems have evolved that serve as an aide to women in dangerous situations. Although there exists many security systems an advanced smart system is a necessity. This paper proposes a smart security device to help women to be safe during times of utmost danger. The device comprises of an Arduino Mega board, various sensors to monitor the body parameter variations, GPS and GSM modules and a high voltage shock circuit. When the device notices an abnormal variations in the body parameters a distress message with location coordinates is sent to registered contacts also the electric shock circuit gets activated and sends shocks to the offender giving a space for the victim to escape.***

Keywords: Women safety, Arduino micro-controller, High voltage electric shock circuit, Resistive touch sensor, MEMS accelerometer.

I. INTRODUCTION

The safety of women is declining day by day and hence a smart security device to ensure women safety is the need of the hour. Even though there exists many mobile apps or some security devices for keeping women safe most of them are obsolete and doesn't serve the purpose. The motive behind this paper is to design a reliable and accurate device that helps women in danger without much human intervention. In situations of danger the victim may not have enough time to activate the device. The proposed smart system senses the variations in the body parameters by making use of the heartbeat sensor, resistive touch sensor, accelerometer and sound sensor and when either three of them crosses a preset threshold value it soon take actions accordingly as designed and thereby rescuing the victim from further dangers.

II. RELATED WORKS

VithU app is an initiative taken by Channel V for the emergency cases. With only 2 clicks of the power button, anybody facing danger can send out an SOS message to their guardian. "Smart girls security system" [1], consists of Arduino Board, screaming alarm and pressure sensors. When the threshold of the pressure sensor crosses, the device will be activated automatically. The screaming alarm unit will be activated and send sirens asking help. This system can give a lot of false positives as it relies on only the pressure sensor to take further actions. "Prototype of an intelligent system based on RFID and GPS technologies for women safety" [2], has a system that works with the RFID technology to get the information and communication done through GSM and the location tracked through GPS. This system is also less reliable as it has limitations in terms of cost and signals can be interfered. The main drawback in most of the existing systems is that they fail to function if the initial action is not triggered by the victim which is most probably next to impossible in critical situations. In other cases where the system detects abnormalities and take necessary decisions, it is seen that the existing devices can send out a large number of false alarms as they rely on only a single or very few sensors to sense danger. As a solution to these drawbacks this paper proposes a system that is reliable, accurate and self triggered.

III. PROPOSED SYSTEM

The proposed system consists of an Arduino controller as the main functional unit which receives various sensor signals to detect any abnormal situation. The sensors used in this system are heartbeat sensor, MEMS accelerometer, sound sensor and resistive touch sensor. It also uses GSM and GPS modules to track the location and send SMS to the registered mobile numbers. The system also consists of a High voltage electric shock unit that comes handy to give an electric shock to the offender and let the victim escape from the scenario. The architecture is shown in Figure 1.

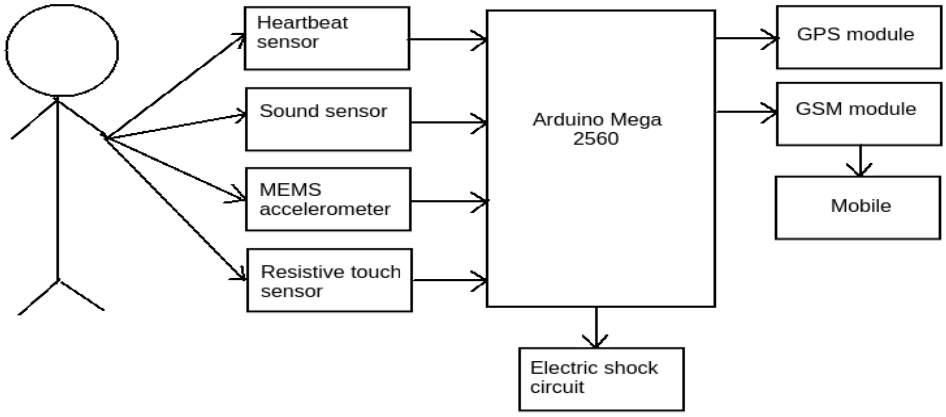

Figure 1: Architecture of the proposed system

In the proposed system heartbeat sensor, sound sensor, MEMS accelerometer and resistive touch sensor captures the corresponding body parameters of the user. In normal conditions the values of these sensor output values fall within a particular range, a threshold value is programmed and set in the Arduino board for each of these sensor output values. A deviation in the preset threshold indicates abnormal condition, that is, it may be an indicator that the user is in danger. In order to confirm that we monitor the values of all the sensors together. If three out of four values cross the threshold then it is concluded that the user is in danger. In that case, the GPS module captures the current geographical location coordinates and an SOS message is sent to the registered contacts using the GSM module with a 10s delay. In addition to this the high voltage electric shock circuit also gets activated which can be used by the victim to counterattack the offender and escape from the scenario. The major plus point of the electric shock unit is that it won't let the victim feel helpless even if the message fails to get sent due to problems in the network.

IV. HARDWARE DESCRIPTION

1) *Arduino MEGA 2560:* The Arduino Mega 2560 is a micro controller board based on the ATmega2560[3]. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UART s (hardware serial ports), 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 micro controller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for the Uno and the former boards Duemilanove or Diecimila. The Mega 2560 board can be programmed with the Arduino Software IDE. The ATmega2560 on the Mega 2560 comes preprogrammed with a boot loader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol. The boot loader can be bypassed to program the micro-controller through the ICSP (In-Circuit Serial Programming) header using Arduino ISP or similar.
2) *Heartbeat Sensor:* Pulse Sensor is a well-designed plug-and-play heart-rate sensor for Arduino. It can be connected to Arduino, or plugged into a breadboard. The front of the sensor is the pretty side with the Heart logo. This is the side that makes contact with the skin. The back of the sensor is where the rest of the parts are mounted.

Figure 2: Heart beat sensor

3) *Sound Sensor:* The Sound Detection Sensor (Fig 2) is a small board that combines a microphone and some processing circuitry, it has the ability to detect different sizes of sound. This sensor can be used to for a variety of uses from industrial to simple hobby. The Sound Detection sensor module has a built-in capacitive microphone which is highly sensitive to sound. Sound waves cause the thin film of the electret to vibrate and then the capacitance changes, thus producing the corresponding changed voltage, so it can detect the sound intensity[4]

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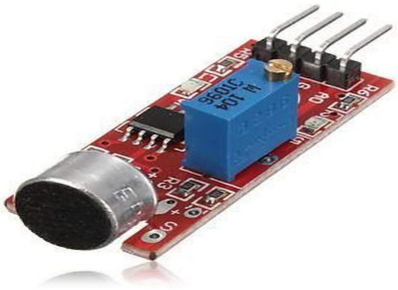

Figure 3: Sound sensor

4) *MEMS Accelerometer:* An accelerometer is an electromechanical device that measures both static and dynamic accelerations. The development of MEMS technology has revolutionized the original accelerometer applications, making them smaller, lower power and more accurate. MEMS accelerometers today may be found not only in industrial and mobile applications, but also in safety critical aeronautical instruments, tactical guidance systems.
5) *Resistive Touch Sensor:* Touch sensors are also called as tactile sensors and are sensitive to touch, force or pressure. They are one of the simplest and useful sensors. The working of a touch sensor is similar to that of a simple switch. When there is contact with the surface of the touch sensor, the circuit is closed inside the sensor and there is a flow of current. When the contact is released, the circuit is opened and no current flows. Resistive touch sensors are used for a longer time than capacitive solutions as they are simple control circuits. A resistive touch sensor does not depend on the electrical property of capacitance. Hence, resistive touch sensors can accommodate non – conducting materials like stylus and glove wrapped finger. In contrast to capacitive touch sensors which measure the capacitance, resistive touch sensors sense the pressure on the surface.

Figure 4: Resistive touch sensor

6) *GPS Module*: GPS receivers are generally used in smart phones, fleet management system, military etc. for tracking or finding location. It is a satellite-based system that uses satellites and ground stations to measure and compute its position on Earth. GPS receiver module gives output in standard NMEA string format. It provides output serially on Tx pin with default 9600 Baud rate. This NMEA string output from GPS receiver contains different parameters separated by commas like longitude, latitude, altitude, time etc. Each string starts with '$' and ends with carriage return/line feed sequence.
7) *GSM Module:* SIM800L GSM module is used in this project. It is a miniature GSM modem, which can be integrated into a great number of IoT projects. It can be used to accomplish almost anything a normal cell phone can; SMS text messages, make or receive phone calls, connecting to internet through GPRS and more. There is an LED on the top right side of the SIM800L Cellular Module which indicates the status of your cellular network. It'll blink at various rates to show what state it is in.
8) *Electric Shock Circuit:* It is designed using high voltage transformer, blocking oscillator coil, resistor, thyristor, diode, transistor, capacitor and AA battery. The internal circuits of electric shock device includes an oscillator, resonant circuit (a power inverter), and step-up transformer to achieve an alternating high-voltage discharge. It may be powered by one or more batteries [5].

V. IMPLEMENTATION

In the proposed system four events are continuously monitored, i.e, any changes in the heart beat of the user, any screaming sounds, any stressful touch, sudden movement and there corresponding value limits are programmed and set in the Arduino microcontroller. When 3 out of 4 of these events crosses the threshold limit, the GSM module sends an alert message to the registered mobile numbers along with which the location coordinates of the current location of the victim, monitored by the GPS module is attached, with a delay of 10s. It is necessary to note that the GSM module needs to be in a location with proper network coverage for sending the SMS. In case of unavailability of network the alerting with message part will fail and the safety device will end up in no use at all. So in order to avoid such a mistake an additional feature of electric shock unit is included in this device. The electric shock unit is also activated when the threshold is crossed and the victim can attack the offender and instantly escape from the situation. Figure 4 explains the working of the proposed system.

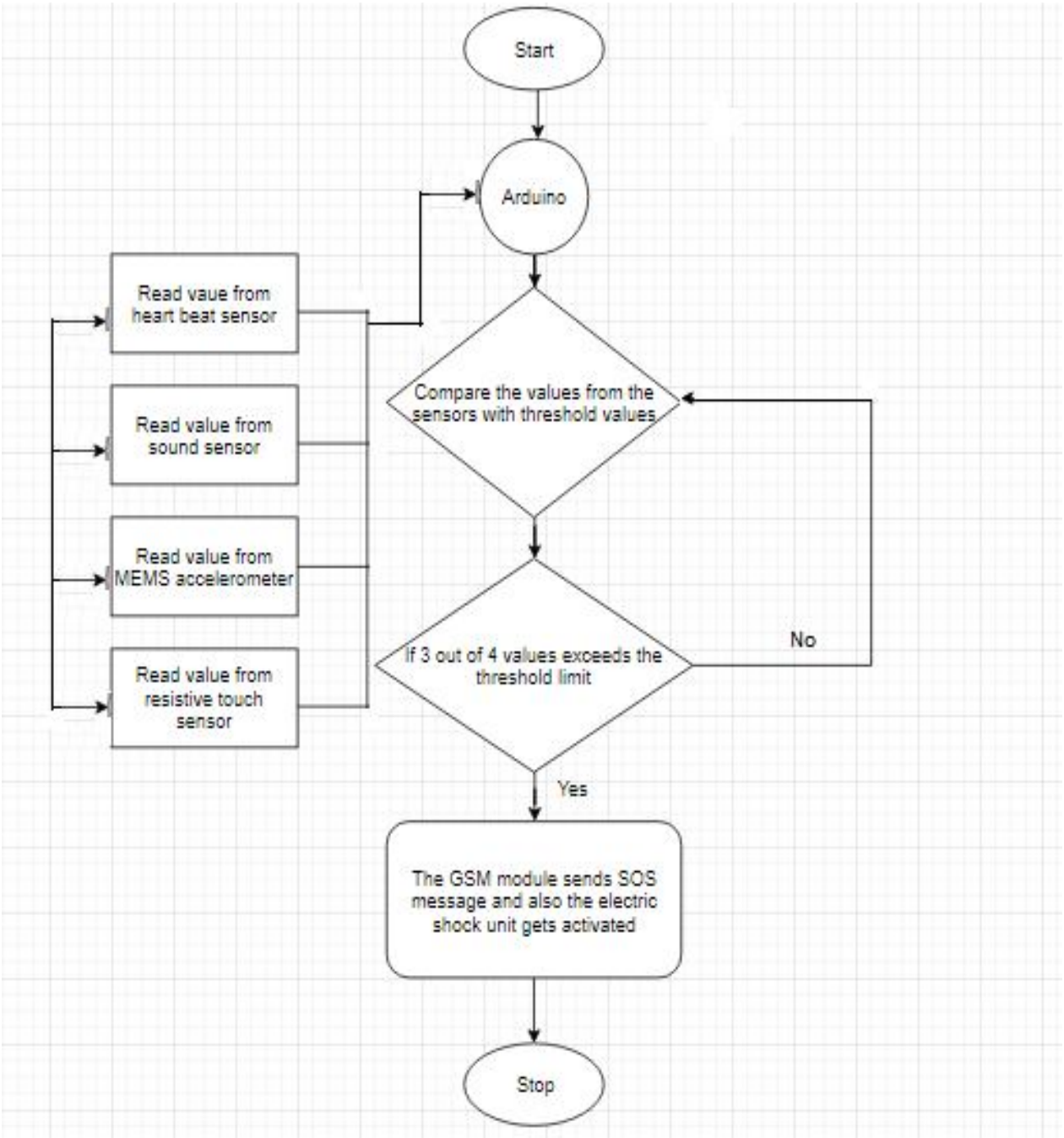

Figure 5: Flow chart of the proposed system

VI. RESULTS

The prototype of the proposed system and the alert SMS screenshot are shown in the figures below.

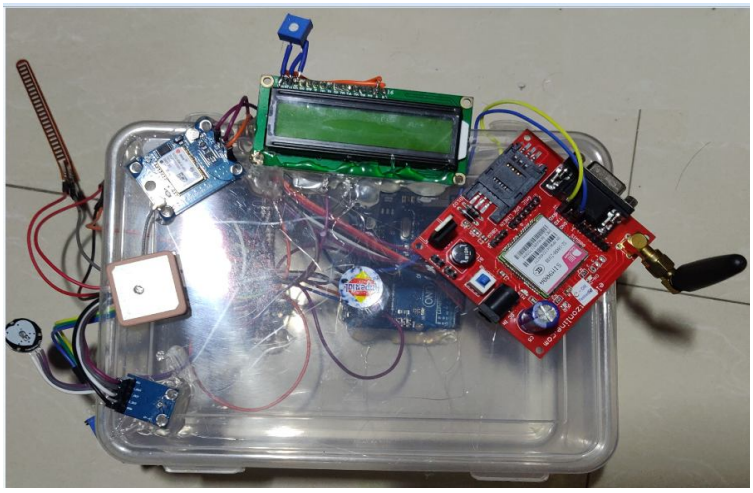

Figure 6: The prototype of the proposed system.

Figure 7: Alert message sent to the registered number

VII. CONCLUSION

The paper proposes an effective, reliable and self triggered device to ensure women safety. This smart security device will help women to face dangerous life threatening situations with ease. The system will empower women so that she will never have to feel helpless in situations of danger. In the future the system can be further integrated to any wearable form and can be modified to use as a self defense mechanism for anyone who wears it.

VIII. ACKNOWLEDGMENTS

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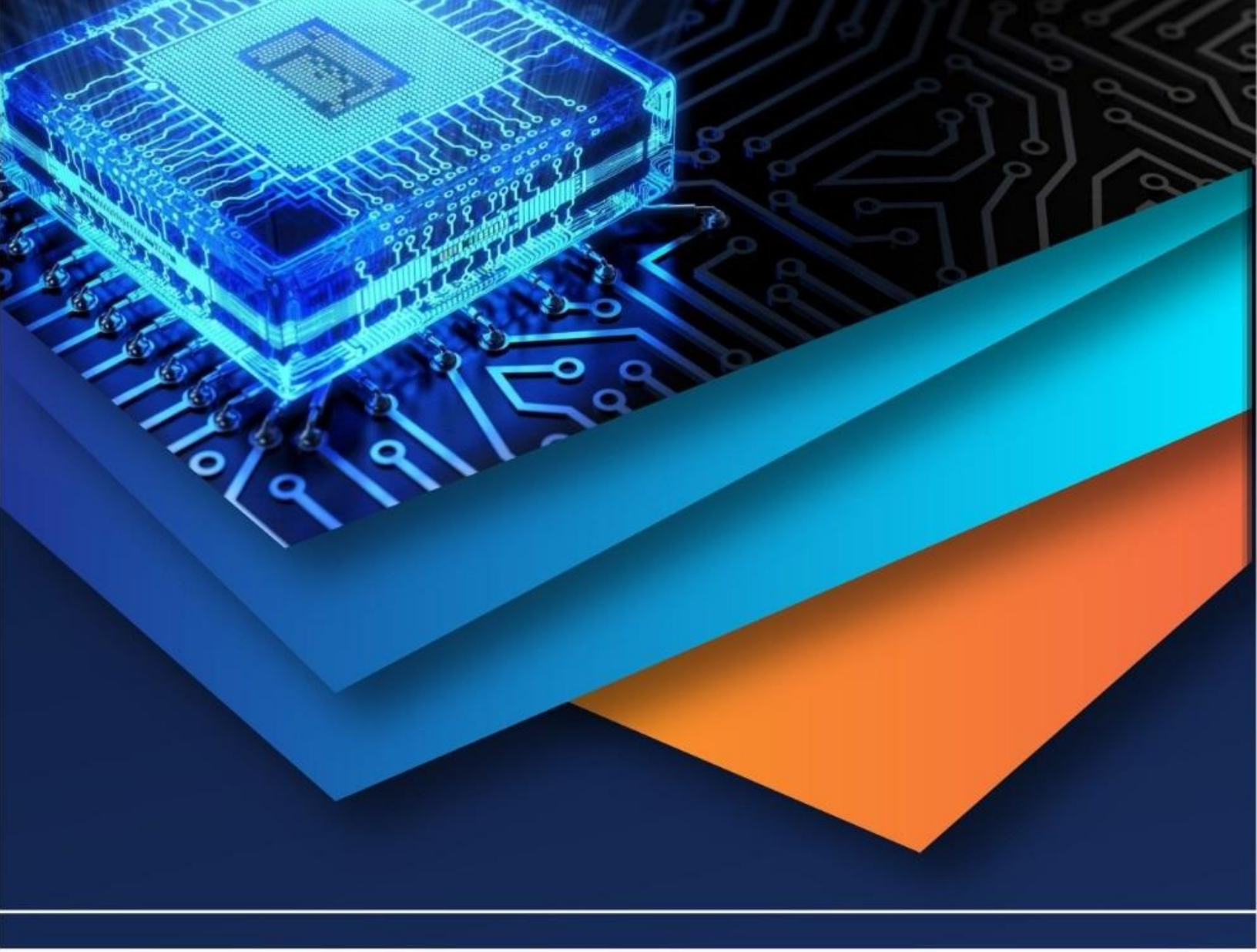
REFERENCES

[1] B.Chougula, "*Smart girls security system*," International Journal of Application or Innovation in Engineering & Management, Volume 3, Issue 4, April 2014.
[2] Shaik Mazhar Hussain, Shaikh Azeemuddin Nizamuddin, Rolito Asuncion, Chandrashekar Ramaiah, Ajay Vikram Singh "*Prototype of an Intelligent System based on RFID and GPS Technologies for Women Safety*" 5th International Conference on Reliability, Infocom Technologies and Optimization(ICRITO) (Trends and Future Directions), Sep. 7-9, 2016.
[3] https://store.arduino.cc/usa/mega-2560-r3
[4] http://osoyoo.com/2017/07/26/arduino-lesson-sound-detection-sensor/
[5] Deval , Tanuj Maglani , Imran Khan "*Smart Glove for Women Security*" International Journal for Research in Applied Science & Engineering Technology (IJRASET) Volume 6 Issue III, March 2018



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