Smart Personal Security: A Design Approach

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ABSTRACT
Recently personal security has become a sensitive issue. Small kids, ladies, as well as aged people need to have their secure against kidnapping, rape, chain snatching respectively. There are different areas & scopes of security. Recent social incidents gave us motivation to develop personal security system. Kids, aged people & ladies mostly not able to fight to criminal for self security. Sometime government security may not give on time support.. Most of the time, citizens are very much reluctant to help any victim of such incidents. Hence smart personal Security system gives us reliable solution to overcome such problem. For developing smart system two factors has been considered i.e. prevention of incident & cure of incident. Best Efforts are taken to have defense for user by this smart system, as well as alarming communication. Pulse rate sensor, pressure switches, & manual switches contribution has been considered. For alarming, defensive situation.

Keywords
PRS:Pulse rate sensor,VCS:voice code sensor application, WSN: Wireless Sensor network. LBS: Location based service, MS: manual switch, PM :preventive mechanism

1. INTRODUCTION
Communication of alarming situation & prevention of incident has achieved by GPS, GSM technology, and defensive system respectively. This is the aim of our system. as a result the design is separated into two parts.

1) message of the offense throughout wireless

2) Prevention of the crime.

Liquid spray pump system, shocking system with automation & alarm has been used for defense. Pulse rate sensor, pressure switches, & manual switches contribution has been considered for alarming, defensive situation, as well as communication.The text message will be send to the added data based people at destination for instant help to the user. user will have freedom to add choice people's data base number. Family member, doctor & police will have immediate indication to help user in disaster situation. Fear situation of user will be studied by different bio sensors. Biosensors are capable of measuring significant physiological Parameters like heart rate, blood pressure, body and skin Temperature, oxygen saturation, respiration rate,electrocardiogram[2].Special jacket or wearable garment that is able to continuously check electrocardiogram (ECG) waves and heart Rate [7]. Android Development tool (ADT) is a plug-in use to enhance and boost the performance of Eclipse IDE [1].It provides faster and easier way of creation and debugging of Android application[1].

2. SYSTEM OVERVIEW
Following block diagram shows the system overview.

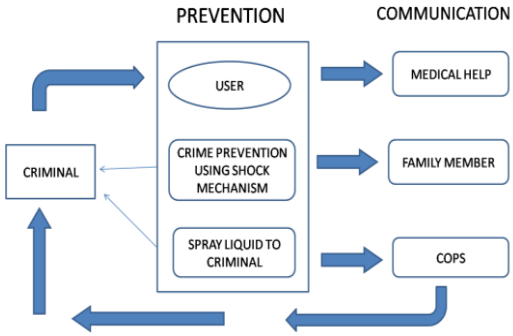


Figure 1: System Block Diagram

3. ARCHITECTURE
Following block diagram shows the architecture of smart system.

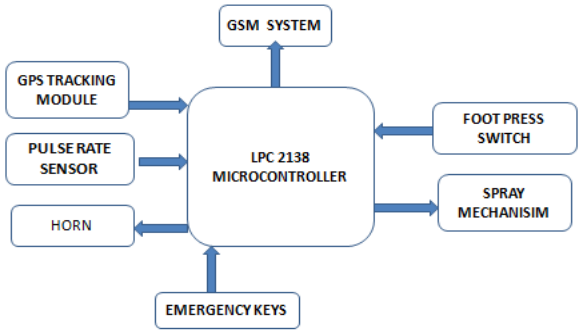


Figure 2: System architecture

4. WEARABLE LOCATION

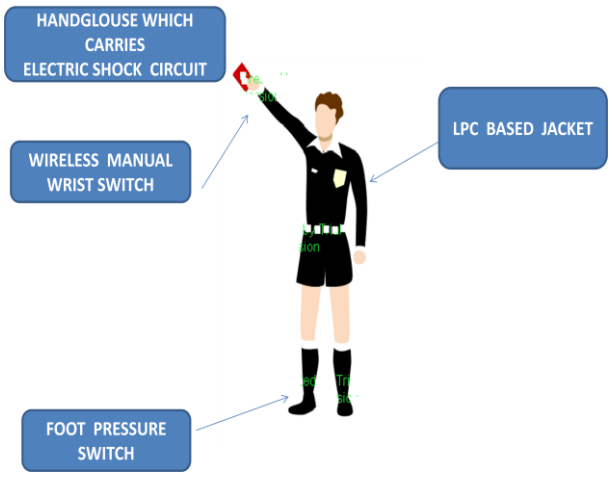


Figure 1: Wearable location of smart system

5. SYSTEM DESIGN

5.1 GPS Receiver

The use of GSM and GPS technologies allows the System to track objects and provides the most up-to-Date information about ongoing trips [14]. A GPS receiver must be locked on to the signal of at Least three satellites to calculate a 2D position (latitude and longitude) and track movement [9].

An interfacing of GPS Receiver (GTPA003 MODEL, as per figure -4) has shown in figure -5.

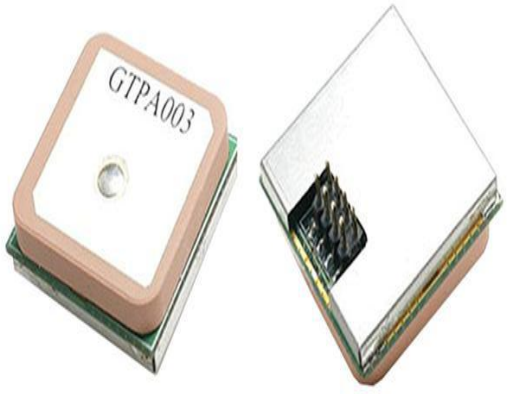


Figure 4 : GPS receiver(GTPA003)

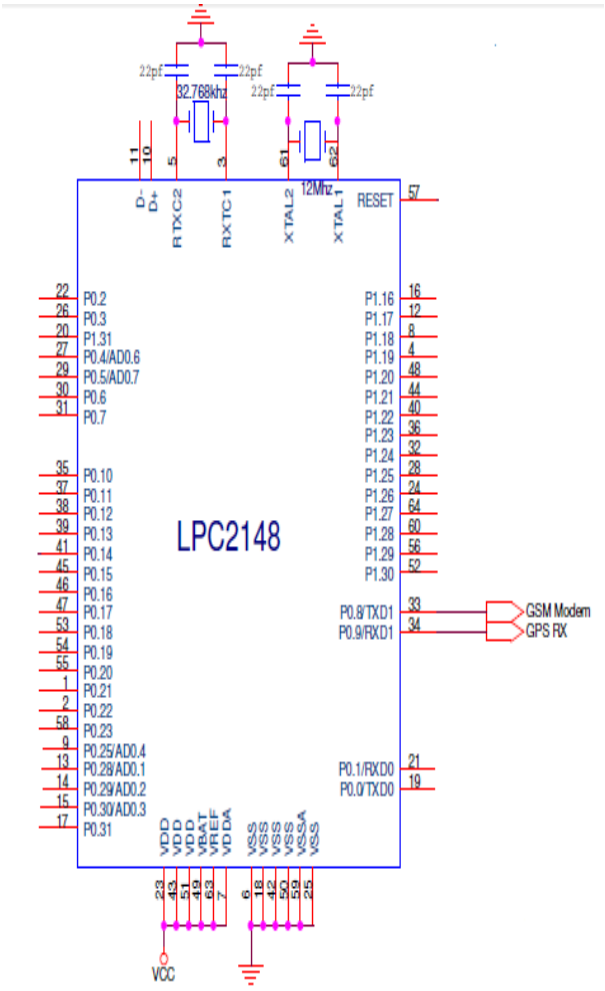


Figure 5: interfacing of GSM & GPS

5.2 GSM Communication

A GSM modem is a wireless modem that works with a GSM wireless network [10].It operates at either the 900MHz or 1800MHz frequency band [10]. It supports voice calls and data transfer speeds of up to 9.6kbits/s [10]. It is very compact in size and effortless to use as bung in component. The Modem is coming with 5V TTL crossing point which allows you to join straight to 5V microcontroller/Arduino. The baud speed is configurable from 9600-115200 through AT command. The GSM/GPRS TTL Modem is having inner TCP/IP stack to allow you to join with internet via GPRS. It is appropriate for SMS as well as data transmit submission in M2M interface. You could do with only two cable (Tx,Rx) excluding Power deliver to interface with microcontroller/Arduino. The build in switch Power deliver allow you to join wide range free power supply. Using this modem, you can send SMS, statistics and read SMS through trouble-free AT rule. SIM300can be integrated with a wide range of applications [11]. SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz [11].An interfacing of GSM has shown in figure -7.

Figure 6 : GSM Modem

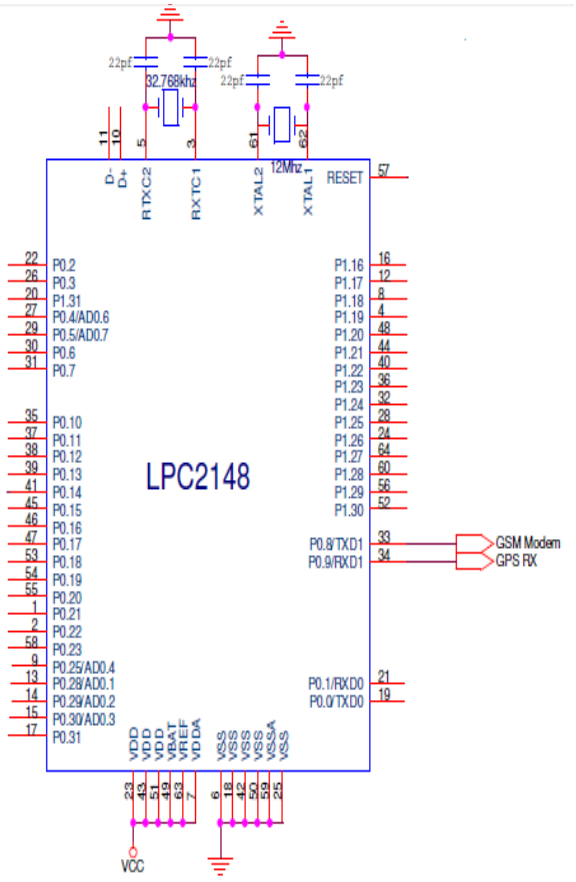


Figure 7: Interfacing OF GSM

5.3 ARM 7 Micro Controllers

Micro Controller LPC 2148 / ARM 7 plays important role to have anticipation and message of that thing. beat speed feeler horn, urgent situation keys, GSM, GPS system are communicate with micro controller. Condition of beat speed feller of the user, individual will be compared with the pre saved code & as per decision of result, detection further communication will happen or additional duty will be accepted out by micro controller as per main concern.

An interfacing of whole system has shown in figure -8.

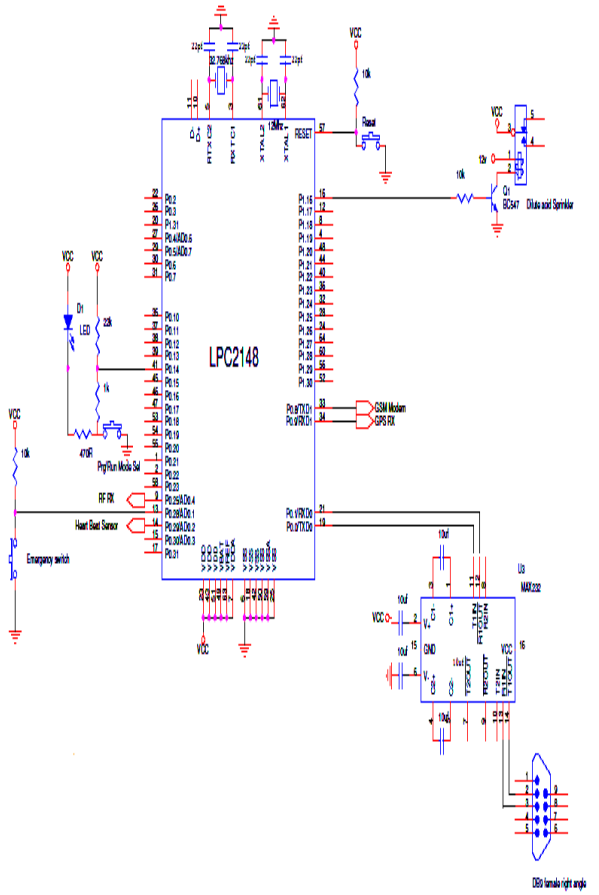


Figure 8: interfacing of system

5.4 Beat speed Sensor

Preventive measures are actuated automatically by using beat speed sensor with the help of microcontroller.

Defensive apparatus like spray mechanism & shocking mechanism will be mechanically bowed on to get relief from scandalous. Controller will have subsequently main concern to course of action statistics through protocol of GPS & GSM model. Controller's takes data from bit speed feeler. & act as per status of pulse. Special bio signals like ECG, blood pressure, respiration rate, heart sounds has been considered to use appropriate sensors [2]. The types of sensors used include impedance pneumographic, inductive plethysmographic, piezoresistive[8], piezoelectric and textile-based capacitive sensors[8],Ordinary circumstances beat speed of individual being invariable but whenever there is a psychosomatic incident such as cheerfulness, depression, stimulation, alarm etc. that condition won't produce invariable beat speed of the heart. In that condition gesture evaluation will be carried out by micro controller, hence if there is a challenging circumstances, Uncomforted circumstances for the individual at that time t beat speed feeler plays significant role to have advance progression of that system. Interfacing of pulse rate sensor has shown in figure -10.

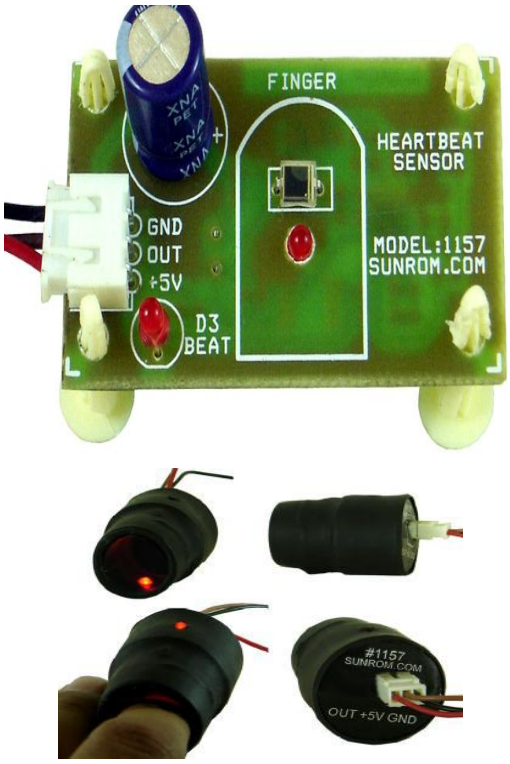


Figure 9: pulse rate sensor

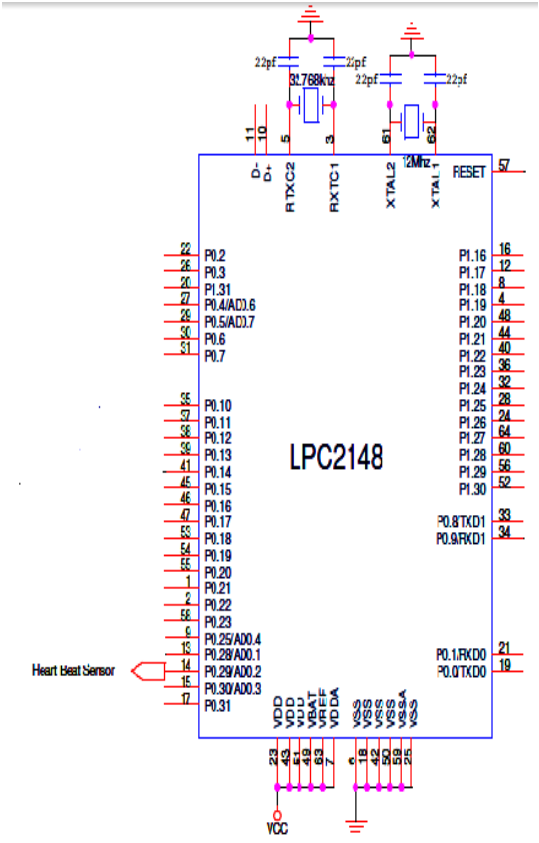


Figure 10: pulse rate sensor

5.5 Preventive Mechanisims

5.5.1 Alarm: whenever there is a problematical situation user can force down disaster input toggle by which alarm Will turn on robotically & if addict is not capable to push toggle in that condition heart bit speed status will be accountable to switch on the alarm.Screaming Alarm (APR9600) device offers true on-volatile storage, single-chip voice recording and playback capability for 40 to 60 seconds[17].

Figure 11: alarm

5.5.2 Liquid scatter Pipe: for self defense purpose automatic hazardous liquid spray pipe will bombard Fluid &User will get relief. An interfacing of Liquid scatter Pipe has shown in figure -13.

Figure 12: spray pipe

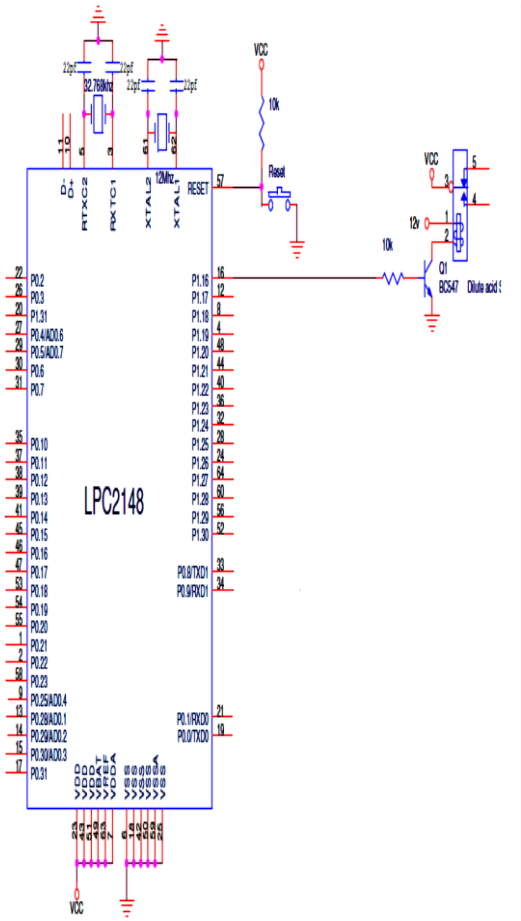


figure 13: spray pipe interfacing

5.5.3 Shock Mechanism:

The electric shock circuit has been used to generate.

Shock with switch action.[3][5].

Figure 14 shows the circuit of shock mechanism.

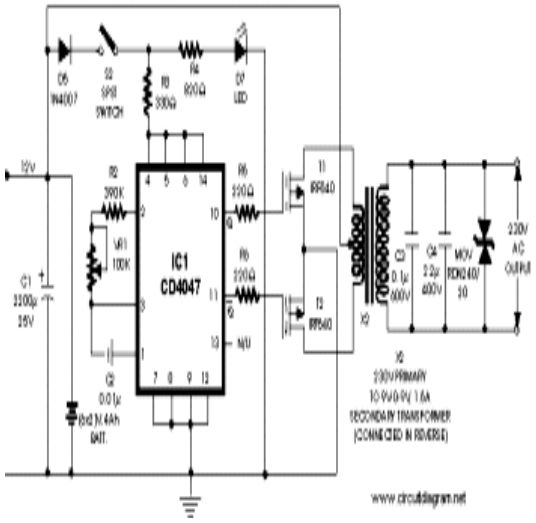


Figure 14: shock circuit

5.6 Emergency Switches

Emergency physical input has been used to avoid the offense.A key has been distinct for crucial transportation of incident to themicro controller and the peripheral. But some occasion urgentsituation key action through manually will have malfunction,in that incident the sufferer individual may not able to activatethose physical keys. In that case beat sensor, voice code sensor,bottom compress switch is accountable to reduce failure of manualkeys. Physical keys will be accountable for alarm bellor horn communication, GSM, GPS based announcement andfor protective action. An interfacing of switch has shown in figure -15.

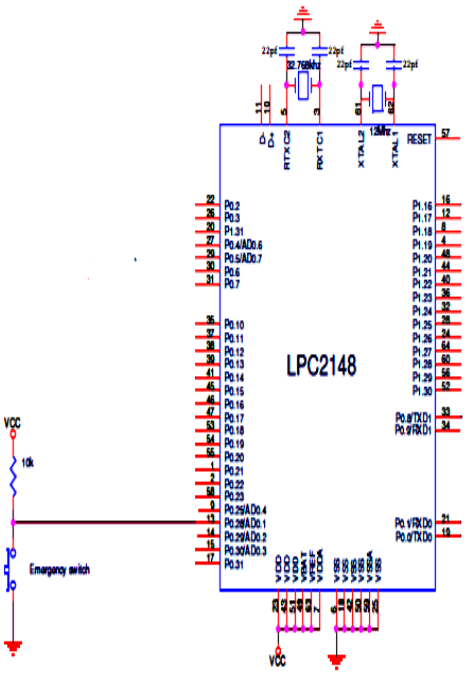


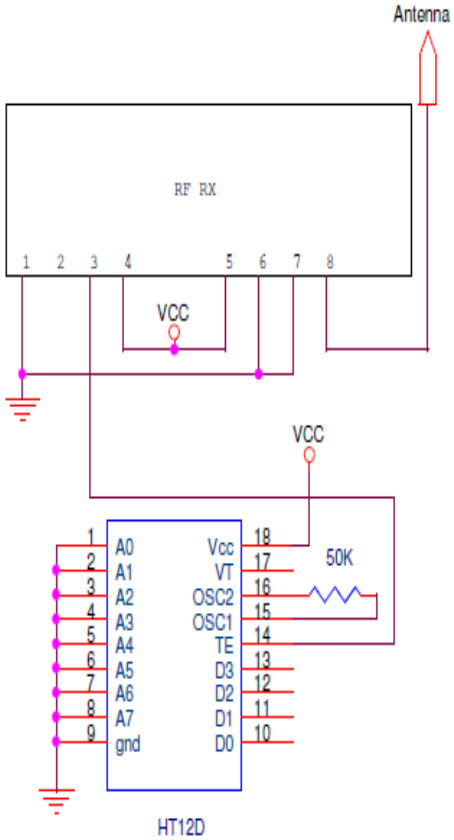
Figure 15: emergency switches

5.7 RF Transmitter and Receiver

This is an ASK Hybrid transmitter receiver module at 433 MHz The transmitter Module employs a crystal-stabilized .oscillator,Ensuring accurate frequency control for best range performance. There is no Requirement of external RF components except Antenna. An interfacing of RF transmitter & receiver has shown in figure16 & 17. RF Transmitter Features:

- Frequency Range: 433.92 MHz
- Supply Voltage: 3~12V
- Output Power : 4~16dBm
- Circuit Shape: Saw
- RF Receiver Features:
- Receiver Frequency: 433.92 MHz
- Typical sensitivity: -105dBm

Figure 16:RF transreceiver hardware



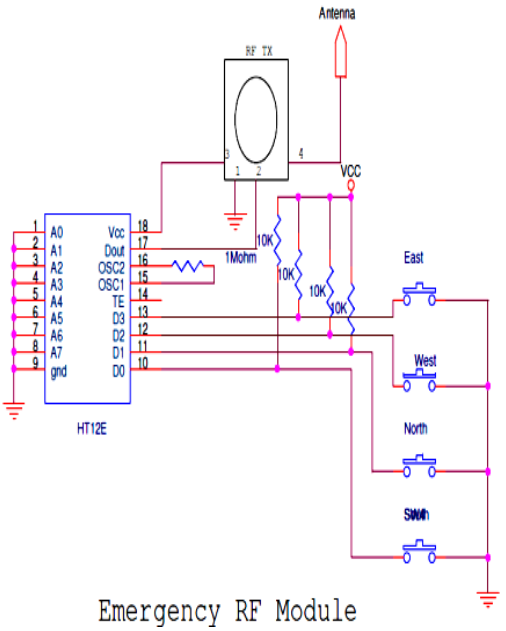


Figure17: interfacing of RF receiver

6. HARDWARE AND SOFTWARE

a)Transmitter Side: Micro Controller Based scheme (refer figure-8), with beat speed sensor, alarm bell,

b) Foot press Switch.

c) Spray model (reference figure -12 &13)

d) Shock mechanism (reference figure -14)

e) Beneficiary Side: LCD display, PC, Mobile etc.

7. FLOW CHART

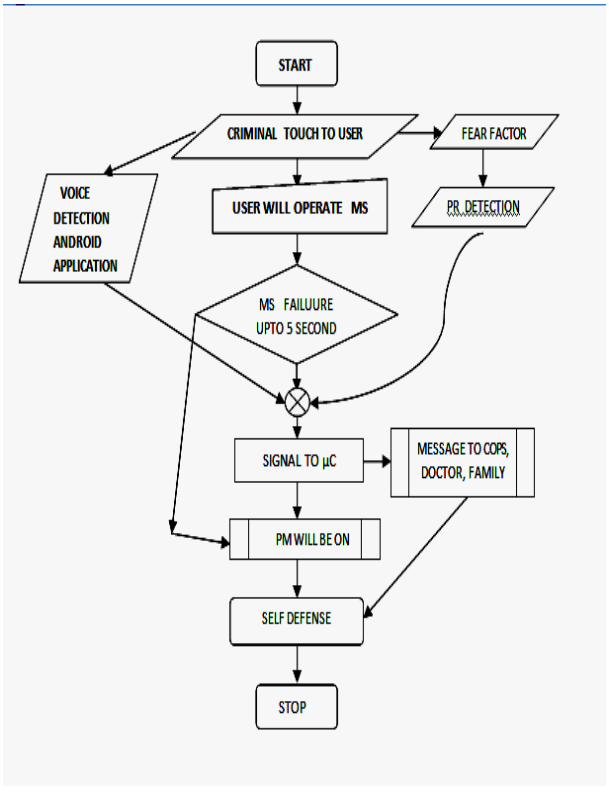


Figure 18 : flow chart

8. RESULTS

8.1 Prevention of Incident

1) The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the light must pass through finger and detected at other end. Now, when the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reached the detector. With each heart pulse the detector signal varies. This variation is converted to electrical pulse. This signal is amplified and triggered through an amplifier which outputs +5Vlogic level signal. The output signal is also indicated on top by a LED which Blinks on each heart beat. Following figure Shows signal of heart beat and sensor signal output graph.

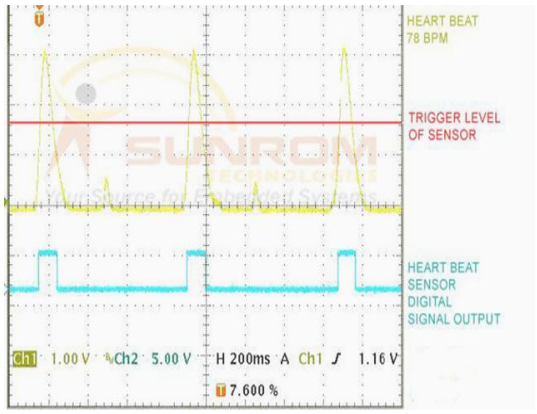


Figure19: Pulse rate sensor output

2) Shock circuit will turn on when user hit punches to defend against Criminal. It is pressure switch based circuit. as per switch action Internal circuits have created pulses to internal MOSFETS.MOSFET activates the internal transformer & creates heavy shock at the output side. While designing these circuits two cares have been considered.

a) User should not be victim shock.

b) Criminal should have scalable shock.

3) Liquid spray pumps get on when required & emits hazardous liquid. Reliability & exactness of this circuit is depending on

Following parameter.

a) Type of hazardous liquid.

b) Location of spray pipe

c) Speed of liquid

d) Spraying angle

e) Pulse rate sensors signal

f) Manual keys

8.2 Communication of Incident

1) Alarm covers the area.

2) By using wireless system message user system Can send alert message to the concern people. for communication purpose pre saved message sentencecould be sent. Along with most important information i.e. location information of user could be sent.i.e .latitude 1874.2244 & longitude7440.9089. With this information immediately actual location name will identify.

9. CONCLUSION

Supportive device with smart system has been used to coverself attack .There are highest chances to reduced crime by thissystem. Hijack, slaughter etc crimes can be reduced with thissystem. Hazardous Liquid Spray & shock preventive tools areused for anticipation Of event , alarm bell hint with the helpof this security system; these methods will be supportive toavert the hostility. Message through GPS & GSM technologyis the additional part to have help to the individual. For immediate action against the criminal, In prospect acceptable process video information can be used .fear or anger of user has to be considered by using Camera application in future which will generate the message to the control room and an alarm will activate. The system can perform the real time monitoring of desired area and detect the violence with a good accuracy [3].Facial expression is one of the most powerful, natural, andImmediate means for human beings to communicate their Emotions and intentions [6]. in future matlab applicationcan be consider for video information. The various facial behaviorsand motions can be parameterized based on muscleactions [6].Multistate facial component have been develop to spot & track changes in facial reading [6]. Those who are in unapproachable area for their defense against scandalous,atmospheric problems like earthquake, flood troubles, deeprainy spell, deep fog spell etc refuge system is the Supportive tool.

10. ACKNOWLEDGMENT

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