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# Smart Wearable Sensor Device for Women Safety

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**ABSTRACT**: Everyday, eachwoman, youngergirls, moms and girls from all walks of existence aresufferingto be secure andguardthemselves fromthe roving gaze of the horribly insensitive guys whomolest, attack and violate the distinction of girls onaneverydaybasis.Thestreets,publictransport,public locations especially have turn out to be thekingdom of the hunters. Due to those atrocities thatgirls are subjected to withinside the present scenario,a smart protection wearable tool for girls primarilybased totally on Internet of Things is proposed. It iscarried out in the form of a smart watch and containsofArduino,buzzer,sensors,buttonandadigitaldigicamtopromptttheservices.Thistoolisextraordinarilyportableand maybeactivatedviawayofmeansofthesuffereronbeingassaulted via way of means of the pressing of a buttonsoonecanfetchhercurrentlocationwithimage.Thelocationcanbedispatchedtopredefinedemergency contact numbers or police through smartphoneofthesuffereraccordinglystoppingusingextra hardware devices/modules and making the toolcompact.Inthisproject,asmarttoolforgirl'sprotectionwhichautomatestheemergencyalertdeviceviawayofmeansoftheuseofpressuresensor, pulse-rate sensor and temperature sensor todetect a probable atrocity automatically usingoutlierdetection is also proposed. We have used internet ofthings-primarily based totally tool with a view toassist to constantly display values of various sensors and GPS tool, GSM used in the version is used tosend alert messages to guardians, family and policestation. Camera is used to take photo of the crookwhich may be used as a chunk of proof in the court.Inthisproject,weareabletodisplaythesmartwatch and display its usability and effectiveness inoffering a low-cost, practical, and usable device forstoppingbodilyattackandattacks,aswellassupportingelderlyusers.

**KEYWORDS:** Pressure sensor, Temperaturesensor, Pulse-rate sensor, camera, GSM, GPS,Internet of Things (IoT), Smart Device, WomenSafety.

## I. INTRODUCTION

Womenare a vital part of every economy andare primarily responsible for shaping the future ofthecountry.Despitethis,theystillfacemanycrimesthatgounreportedbecauseofsociety'shypocritical mindset. People who report assaults tosocietyfacevariouskindsofhumiliationandmistreatment. Only one out of four cases lead toconvictionsinIndia

Tosolvethisissue,itiscrucialtotaketheproper precaution. A wearable device based on IOTtechnologyisbeingproposedinthisstudyforwomen'ssafety.Thedeviceisabletoautomatically detect such problems and inform thepersonwhoneedstobeinformed.Byprovidingassistance in times of need, it not only helpswomenescape critical situations butalso ensuresthatjusticeisrenderedtothem.

## II. LITERATURESURVEY

The studies of S.A More [1] discusses the usage oftemperaturesensorsandpulseratesensorstoroutinely come across a threat of a probable state ofaffairsandnotifyowncircleofrelativesandbuddiesth eusage of amobileapplication.

[2]discussestheusageofimageprocessingto detectanypossibilityofdangerandproposesvarioussolutionstoprotect herself.

In[3]theauthorsevolved atoolwhichhiredPIC16F876AmicrocontrollerandaSIM808module, which has GPS, GSM and GPRS aid whichmight be used to inform the buddies and own circleofrelativeswhiletheemergencybuttonispressed.

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In[4]asystembasedonthefacialfeaturesisde veloped.Ifthefacialfeaturesarethreat-primarily based totally expression then a report isfiled.

[5]GSMandGPSareusedtoconstructasecure device. In this system, the message is dispatched topre-savedcell numbers whichencompass the bodypostureofthesuffererinconjunctionwithherlocat ion.

In[6] impartial triggeringof androidsoftware andarm tool takes vicinity with the assist of synchronizedBluetoothconnection.Theaudioandvid eowhichhavebeenrecordedaredispatchedtothetelecal lsmartphonenumberswhichmightbepre-setwithinside the software in conjunction with the areawithinsidetheshapeofa nameandadditionallyamessagetoalertthem.

In [7], an android app is advanced which offers theplace of the girl in risk via way of means of givingfaketelecallsmartphonecalls,videoforwarding ,placeandfirst-aidinformation.

In[8],bodyvibrations,heartrateandbodytem peraturearesensedtheusageofsensorsviaway of means of the assist of a dependable protection toolwhich includes ATMEGA8 controller with Arduinodeviceandadvancedsensors.

In [9], 3 sensors particularly heartbeat, temperatureand accelerometer are used. These sensors are used tohit upon if there are any anomalies and a message toalert the pricey ones is dispatched the use of GPS andGSMmodule.

In [10] Another such answer is a one touch alarmmachine designed to seem like a watch. The GSM andGPSmoduleinsidethetoolisusedtosendtheperson `s place to pre-set SOS contacts when triggered by pressingabutton.Thistoolcanbeaestheticallyunappea lingtothepersonandisprobably observedthroughtheattacker.

## III. EXISTING SYSTEM

In the existing device, there may be no way toscreen the crimes happening towards women.
TherearefewplacesinwhichCCTVcamerasarelocate d and recordings are archived. These camerasare only usedafter the whole thing has occurred.The most effective manner they are able to ask forassistanceistosendamessageusingtheircellphones . In that critical moment, it's miles very tough to get hold in their phones. Even if they do, makingorsendingacallistough.
Thedrawbackofexistingdeviceis,nownolonger very reliable, want manual effort, and veryexpensive.

## IV. PROPOSED SYSTEM

Ourproposed systemisa wearableforwomen whichcontainspressuresensor,temperaturesensora ndpulse-ratesensoralong withacamera andbuzzerinit.

*A)* BlockDiagram

The square diagram of the framework in Fig.1showsallthepartsexpectedforthegadget.Toident ifynaturallyanyoutrage,threesensorsforexample pressure, temperature, beat rate sensors areutilized. The pressure sensor is utilized to recognizeif any pressure is being applied to the lady past asatisfactory limit. The temperature sensor is utilizedto recognize any deviation in the temperature.
Thebeatratesensorisutilizedtorecognizeirregularities inthebeatpaceofthelady.Theperusingfromthesethree sensorsiscombinedlyusedtorecognizeanybasiccircu mstance.Thegadget additionally gives a press button to the ladytosqueezewhenshefeelshazardous.Wheneveran yofthetwopreviouslymentionedoccasionhappens, the ringer is initiated to alert individualsaround her that the lady is in perilous circumstanceand afterward the area of the lady is distinguishedutilizing the GPS module and GSM is utilized tosend the message to the family members. Camera isused to take picture of the location and the criminalwhich canbeusedasevidence.

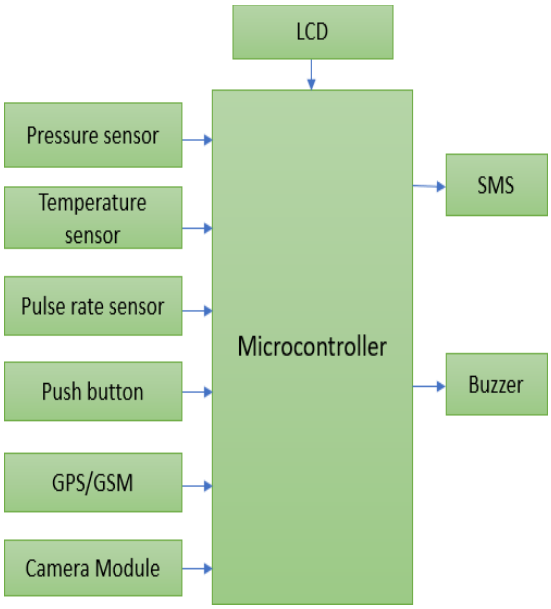


Fig.1.Blockdiagramofproposedsystem.

*B)* Components

Theprototypeusesthefollowingcomponents:

*1)* PressureSensor:

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This is a power delicate resistor (see Fig.2)witharound,0.5width,detectingregion.Depe ndingonhowmuchtensionisapplied, thepowertouchyresistorwillfluctuateagreeing.Obs truction fluctuates conversely with the powerapplied.

*2)* Pulse-rateSensor:

This is a force sensitive resistor (See Fig.3).ThiswithGSMandGPStocomeacrossaprobabl eatrocityandnotifyherfamilyandowncircleofrelative sbyamessagecontainingherlocationwithimage.Also offerabuttonatthewearabletomanuallyhavetheability toshipanotificationifthesufferershouldreactsensoris wellsuitedwithArduino.Itallowsingettingdependabl epulsereadingsfast.Pulse-rateSensoriswellsuitedwitha5Vor 3VArduino.

Fig.2.Pressuresensor Fig. 3.Pulseratesensor

*3)* TemperatureSensor:

NTCThermistortemperaturesensormodule(see Fig. 4.)is little estimated, minimal expensesensorwhichisexceptionallydelicatetosurrou ndingtemperature.Thissensorhelpsindetecting the temperature of general climate.Therecognitionscope of temperatureis between20 -80degreeCelsius.

*4)* PushButton:

Theinstrumentofthepress button is thattwofocusesarecontactedwhenthebuttonis squeezed whichinitiatesthealertsystem (seeFig.5.)

Fig.4.Temperaturesensor.

Fig.5.Pushbutton

5)GPS-GSMmodule:

The area of the individual in Realtime is gottenutilizing SIM module (see Fig. 6.) Both GPSwhat'smore,GSMareexecutedas atwo-waywork in this module.Quad-Bandis upheldforGSM. Satellite it is upheld with the assistance ofGPS innovation. A less expensive arrangementoftwo-waycorrespondenceisaccomplishedutilizing a GSM modem contrastedand the two-wayGPScorrespondencesatellite.

*6)* Buzzer:

It is Small PCB Mountable 5V Passive Signal(see Fig. 7.). It is utilized to add Audio Alert toelectronicplans.Adiscernibletoneiscreatedutiliz ing the loop component furthermore, chipsaway at 5vstock

*7)* Cameramodule:

Wi-FiBluetoothDevelopmentBoardwithCamera Module OV2640.Fully compliant with Wi-Fi 802.11b/g/n/e/i and Bluetooth 4.2 standards. Itcanbeusedasamastermodetobuildan independent networkcontroller,orasaslavetoother host MCUs to add networking capabilities toexisting devices(see Fig:8).

Fig.6.GPS-GSM module Fig. 7.Buzzer Fig.8.camera

*8)* Microcontroller:

Forconveyinguniquesensors,switches,modules,theA rduinoUno(seeFig.9)microcontrollerisutilized.Itfun

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ctionsasadirection regulator by getting different signs fromtheuniquesensorsandsettingoffyieldsensorspro perly.

9}Powersupply:
A12V batterypoweredLi-particlebattery(seeFig.10)isutilizedtogivethepowert othecontrollerwhichthustakescareoftherequiredcapa city to every one of the indicators and modules associated withit.

Fig.9.ArduinoUno. Fig.10.12VBattery

TABLE I. ANALOG VOLTAGEOUTPUT ONFORCEAPPLIED ONPRESSURESENSOR

| Force(N) | FSRResistance | Voltage |
|---|---|---|
| None | Infinite | 0V |
| 0.2N | 30Kohm | 1.3V |
| 1N | 6Kohm | 3.1V |
| 10N | 1Kohm | 4.5V |
| 100N | 250Kohm | 4.9V |

## V. METHODOLOGY

Theprocessflowcanbedividedinto threemechanisms

*A.* Manualmechanism

Manualcomponent(seeFig.11.)isthecycle stream which happens when the ladiesare experiencing the situation to answer. Itcontains a buttonwhichcanbesqueezed by the lady when she feels risky. Whenever thebuttonissqueezed,theringerisenactedto makeanuproariousclamortoalarmindividuals around who can help her. Then thealertmechanismisready.

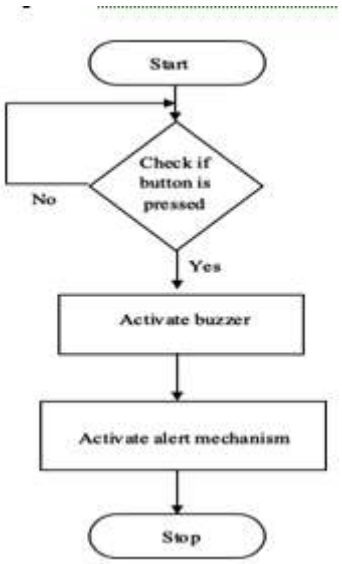


Fig.11.Flowchartofmanualmechanism

*B.* Automatedmechanism

In maximum of the situations, the girl won't becapableofreact andusethemanual mechanism.So, automate the mechanism the usage of pressure,temperature and pulse-rate sensor (see Fig. 12.) anduse a conjunction of the readings of those sensors tokeep away from fake positives. When any of the 2sensorscomeacrossanabnormality,thealertmechani smisactivatedthepressuresensorisapressure sensing resistor sensor (FSR). With a smallgrowthinpressuretheresistancedecreasesexpon entially.The resistancepriceis transformed to analogvoltage whichlevelsamong0-5V.

A trial and mistakes technique to discover thethresholds of the sensors after taking the everydayand odd values for all of the 3 sensors. Wheneverthe sensors readings go the thresholds values thentheyturnouttobehigh.Thevoltageoutputof pressuresensorfordiversevarietiesofsportsincluding aneveryday touch, pushing etc. had beenfound at some stage in this process. For a pressurewhich can be taken into consideration dangerous,approximately 4V analog output turned into proven that isround 5Npressure.

The temperature sensor is utilized to measure thetemperatureoftheenvironmentalfactors.Asanindi vidual draws nearer to the individual space ofthepersoninquestion,thetemperatureencompassin g her increments. Along these lines, atemperature sensor is coordinated so that it goeshighwhenthereisanabruptexpansioninthetempe rature around the lady. The beat rate sensorgoeshighwhen thepulse crosses90bpm.

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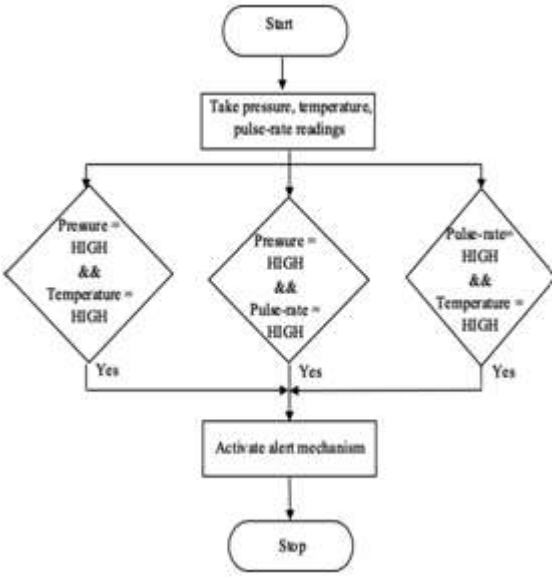


Fig.12.Flowchartofautomatedmechanism

*C.* Alertmechanism

Thegeared-updeviceis promptviaoneoftheabovestructuresatsomepointofad angerousoccasion.Whenevertheg eared-upmachineisprompt,GPSandGSMareappliedtosendt hemessage containing the region of the casualty to owncircle of relative's participants and authorities. Theregion is dispatched as a Google Maps interface foreasy access.

Theframeworkengineeringofthegeared-updevice is displayed in Fig. 13. TheregionarrangesaregottenfromtheGPSmoduleata nythingfactor the geared-up device is prompt. The GPS receives the areaorganizes from the satellite. As those instructions are difficulttodecipher,theregionarrangesismodified over right into a google maps interface andalong with the image captured for easy access. Aftertheinstructionsbeinggottenagoogle,interfaceis framed which incorporates the casualty's region. Thisconnectionisdistributedofftheenlistednumbers with the helpof GSM.


Fig.13.SystemArchitectureofAlertmechanism

## VI. RESULTS

Theadditivesandmodulesusedforconstructingthemo dulehadbeenprovenindeterminefourteenbelow,the3s ensorsparticularly pressure, temperature and pulse ratesensors forthe automatedmechanism are provenat the highpoint of the version together with theoppositehardwarerequiredlikeGPS,GSM,buzzert ogetherwiththeArduinoarepresentwithin the version. And a digital digicam moduleis used to take photos of the sufferer while shemakes use of any of the mechanism. When thesufferer is in hazard and pushes the button then an alert message is dispatched to the cell of the pre-set cell numbers (see Fig.14). The computerizedmechanism may be prompted in any individual ofthe3eventualitieswhichincludespressureand temperaturesensorsturnouttobehighor temperatureandpulse-ratesensorturnouttobe highor pulse-rate and pressuresensorturn out to be high.Themaingainoftheproposeddeviceisthatit'smile sadaptablei.e.,inascenariowhereinit'smiles humanly feasibletoattainthedevice,itpermits activating thealertmechanismviaaneasybuttonandfor conditionswhereinitisn'tfeasibletoreactit nevertheless detectsthehazardwiththeuseofthe sensor.

Andtakeimageofthecrookandtheplace.Theproposed deviceislikewiselightweight,cost-effectiveandeasytowearanduse.Itis straight forwardtorecognizeanduse.Itdoesn't require any net connection. The simplestrequirementisthatthevicinityhascel lalertsforthe simcard.

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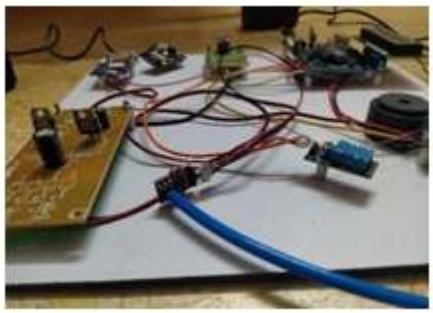

Fig.14.PrototypeSimulation

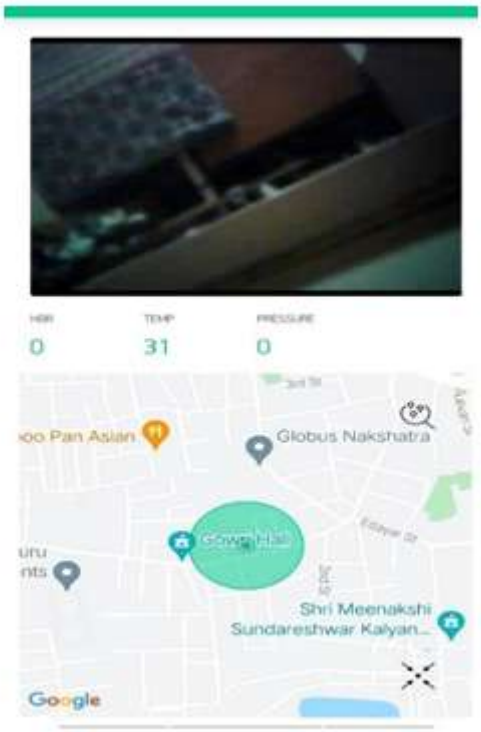


Fig.15.Result

## VII. CONCLUSION AND FUTURE SCOPE

The principal purpose of constructing a femaleprotection tool to behaveas a rescue andsavethemanydamageonthetimeofthreatinparticular for ladies. Through the proposed gadget asmarttoolforladies'protectionwhichautomates the emergency alert gadget is designed.This gadget detects and sends the indicators forthe pricey ones with the place coordinates of theladies without the requirement of her interplay inimportant times. It sends an emergency messagetogetherwiththepictureroutinelytothehouseholdandclosebypolicestation.The prototype is appropriate to wear and use. Through the manner of customization, this prototype maybechangedtootherwearablelikebracelets,necklaceand many otherswithother function init. The principal gain of our proposed gadget isthatbothautomatedandmanualmechanismisimplemented.Itislikewisecost-effectiveand smoothtouseandwear.Theproposedgadget maybeinadditionevolvedwithabilitieslikerecording audio, video of theperpetrator whilethealertmechanismisactivatedwhichcanbeproducedasapieceofstrongevidencein the court.

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