

Wireless Blackbox Using MEMS Accelerometer GPS and GSM Tracking For Accident Monitoring Vehicle

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Engineering Degree in
Electrical and Electronics Engineering

By

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SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade “A” by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **NANDHINI R** (Reg.No.37140058) and **PARAMESHWARI L** (Reg.No.37140062) who carried out the Project entitled “**Wireless Blackbox Using MEMS Accelerometer and GPS and GSM Accident Monitoring system**” under our supervision from Dec 2020 to April 2021

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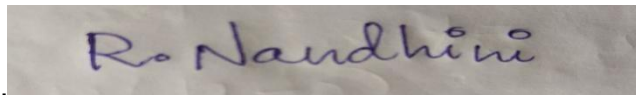
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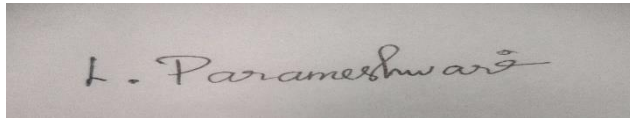
DECLARATION

We **NANDHINI R** (Reg.No.37140058) and **PARAMESHWARI L** (Reg.No.37140062) hereby declare that the Project Report entitled “**Wireless Blackbox Using MEMS Accelerometer and GPS and GSM Accident Monitoring System**” done by us under the guidance of **Mrs. V. GEETHA** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering Degree in Electrical and Electronics Engineering.

1.



2.



SIGNATURE OF THE CANDIDATES

DATE: 10/04/2021

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ACKNOWLEDGEMENT

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We wish to express our thanks to all Teaching and Non-teaching staff members of the Department of Electrical and Electronics Engineering who were helpful in many ways for the completion of the project.

ABSTRACT

This project is to develop a wireless black box using vibration sensor and GPS tracking system for accidental monitoring. The system consists of cooperative components of an vibration sensor, node mcu and GSM module. If any accident occurs, this wireless device will send mobile phone a short massage indicating the position of vehicle by tracing the location of the vehicle through GPS system to family member, emergency medical service (EMS) and nearest hospital. The threshold algorithm and speed of motorcycle are used to determine fall or accident in real-time. This paper uses temperature sensor and which are interfaced to the micro controller. With the help of temperature sensor we can measure amount of temperature exhausted from the vehicle and with the help of gas sensor we can measure amount of gas exhausted from the vehicle.

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CHAPTER 1

INTRODUCTION

1.1 GENERAL INFORMATION

Now a day's accidents became a serious public drawback in several countries and in drunk driving, riding with no helmet protection, riding while not decent sleep, etc. Many campaigns are conducted by the individuals for the attention however the numbers of death and incapacity area unit terribly high attributable to late help to individuals those who got through the accident. Therefore, many analysis teams and major motorcycle makers as well as Honda have developed safety devices to guard riders from accidental injuries. Presently, pursuit system is simply put in in some high-end motorcycles as a result of these systems area unit still too high-priced for many motorcycle's riders. Thus, fall detection and accident warning device for 2 wheelers has recently gained attention as a result of these systems area unit expected to avoid wasting people's life by serving to riders to induce medical treatment on time. This project is often used for accidental monitoring. If any accident happens, this wireless device can send a message from mobile phone and indicating the position of auto by pursuit the situation through GPS system to friend, emergency medical service and nearest hospital in order that they can offer automobile and necessary treatment. This project is a couple of system that is developed to mechanically find Associate in Nursing accident and alert the closest hospitals and medical services concerning it. this method can even find the place of the accident in order that the medical services are often directed now towards it. A recently developed detector technology known as the MEMS measuring instrument is employed during this project to find Associate in Nursing accident.

Accelerometer could be a device which may find a tilt or a fast jerk in any of the three axis(x,y,z). It is often accustomed find any uncommon acceleration and tilting of vehicles which indicates that the vehicle is out of management and will have suffered Associate in Nursing accident. GPS system is deployed to find the place of the accident and GSM technology is used to send messages to emergency

services and family exploitation net of things. If the medical services get Associate in Nursing alert through GSM message concerning Associate in Nursing accident and its location through GPS coordinates, they'll reach there now. If the one that has suffered the accident receives medical facilitate in time, he will survive the accident and many vital lives are often saved. The system is straightforward to make and compact in size therefore that it are often simply put in any vehicle. Associate in Nursing Embedded System could be a combination of computer hardware and code, and maybe extra mechanical or alternative components, designed to perform a selected perform. Associate in Nursing embedded system could be a microcontroller based, code driven, reliable, time period system, autonomous, or human or network interactive, operative on various physical variables and in various environments and oversubscribed into a competitive and value aware market. Associate in Nursing embedded system isn't a computer system that's used primarily for process, not a package on computer or UNIX, not a standard business or scientific application. High-end embedded & lower end embedded systems. High-end embedded system - usually thirty-two, sixty four Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc. Lower end embedded systems - usually eight, 16 Bit Controllers used with Associate in Nursing marginal operative systems and hardware layout designed for the accurate purpose.

1.2 LITERATURE SURVEY

Suchandra Pal (2017), "Remote health assistant and automatic ambulance service". This method is supposed where a basic analysis of knowledge is performed. If accident happens GSM sent message to machine. All medical data if the patient is distributed to server thus doctor can check the patient's condition. this method not only enhance patients modify and on increase economy of country.

Neha Firadaush Rain (2018), "Monitoring patient's health with wise ambulance system victimization IOT". Notice the middle beat and sign of the patient. Doctor look the patient's data. If it's crucial doctor provides alert Buzzer will blow if any obstacles on the aim of machine. victimization Google map machine will reach the hospital on time.

Nikhil Nair (2017), "Smart secure system for human health monitoring". In this study guaranteeing a seamless look the ECG signal and completely fully totally different parameter. This system unit place in merely altogether hospitals and huge data can keep. This system AES cryptography is used as a result of it's very secured AES is low power Consumption, low methodology time.

Omkar Udawant (2019), "Smart machine victimization IOT". Throughout this method ensures quick response for energy of affairs by automatically dominant the sunshine on the path of machine. This method is totally machine-driven thus it's progressing to able to operate spontaneously from investigation the vehicle to achieve the hospital.

P.S.Bangare (2019), "Developing Accident look victimization wireless application". It's developed to automatically notice associate accident and alert the nearest hospital and medical services. The logic implementation is to boost accuracy to have an impression on reducing the death rate caused by traffic accidents.

Handayani (2019), "Intelligent transport system for traffic accident look system". This system designs the pattern of public transportation look system victimization ITS which works in associate extremely real time with associate golem applications. Its associate correct performance proven to be able to browse the slope and noise in exhausting condition.

Alexey Kashevnik (2019), "Methodology and mobile application for driver behaviour analysis and accident prevention". This system supports the driver's dangerous states distraction and temporary state what's additional as pulse. It given for unsafe driving by using a front facing camera and sensors of non-public driver's smartphone. It within the foremost detects the states of drunk driving, aggressive driving and stress condition.

Yu Yao (2019), "Unsupervised traffic accident detection at intervals the flesh videos". It's planned associate unattended deep learning frame work for traffic accident from egocentric videos. This new dataset consisting of a ramification of globe accidents on roads and on evaluated our technique associate existing traffic accident datas.

Renuka BhajanTri (2018), "Patient health care and machine chase system". This method will decrease accident due to the traffic intersections at intervals the roads. It is used for crucial patient data merely resolve out. The machine chase system can facilitate varied lives. It's progressing to send the message to the server. The server sends the patient data to the doctor.

Potable Genus Handayani (2017), "Intelligent facility for traffic accident monitoring". The designof public transportation look system using ITS that works in associate extremely real time with associate golem applications. Its associate correct performance verified to be able to browse the slope and noise in exhausting condition.

Deeksha Gour (2019), "Algorithm for instrumentation to note road traffic accident and alert system". The enhance algorithmic program is trained on convention datasets of accident imageswith the MAP of thirty 3.31% and vehicle detection can be tested on the dataset with the live video from camera. it's faster than the selection object detection methods. Further the system alerts via wireless communication shut emergency vehicles.

P.Aruna (2018), "Traffic dominant and health look system in ambulance". This method delineates which may unendingly monitor the patient's health parameters and at an equivalent time will management the sunshine just merely simply just in case if emergency occurred. The patient health parameter is distributed for the hospital analysis due to time taken of the machine.

Mhu Khan (2015), "Design of associate intelligent autonomous accident prevention detection and vehicle look system". Throughout this recorder thought is used. This method provides accident detection and rescuing system. and this method is also for accident bar.

Metric Long Measure Howlader (2017), "A wise approach for post-accident crash recovery victimization IOT". Throughout this method temperature of engine and alcohol level if driver is detected. Here MEMS instrument is used to note vibration.

Bhamara Priyanka (2018), "Implementation of wise recorder system for gathering the protection data in vehicles". Blackbox system is used to record and store vehicle location. Time, temperature, obstacles gift or not in real time and store the collected data in history. this method investigates the accident and inform to relations.

CHAPTER 2

PRINCIPLE AND OPERATION OF EXISTING AND PROPOSED SYSTEMS

2.1 PRINCIPLE OF EXISTING SYSTEM

In the existing system, if any accident occurs, the accident is detected by vibration sensor and therefore the message is distributed to automobile by mistreatment GSM module and therefore the location also can send mistreatment GPS module. the prevailing system uses the external GPS and GSM modules thence increasing the value of their project. GSM in-built the user's mobile phone. Most of individuals associate recorder with airplanes however they're not simply key tool in investigation aero plane accident. Presently pursuit system introduced in vehicle to avoid accident and save the peoples life. However, this technique still put in in a number of high-end vehicles solely as a result of this technique square measure too big-ticket for many of the vehicle user. This project introducing detection and warning device that is anticipated to avoid wasting people's life by sleuthing the accident occurred and provides the assistance by tracing location of the vehicle user with facilitate of GPS technology. If any accident occurred to the vehicle. This system can offer the data of car user to the relations and at the same time it'll send message to the closest hospital for the assistance.

2.2 PRINCIPLE OF PROPOSED SYSTEM

There are a unit several solutions planned for the involved downside and everyone have some advantage over others. Among the opposite GSM and GPS solutions, some proposed the answer offinding the accident condition mistreatment solely measuring instrument device which might be a haul because it may cause warning for a few of the cases. Our system uses quite one device to extend the accuracy of the system and conjointly we have a tendency to have provision to avoid theintimation just in case of warning. Our system cut the 7 unnecessary value by mistreatment the already exist in a structure like GPS; GSM in-built the users

itinerant. during this planned system we have a tendency to take into account 2 section. One is vehicle section and different one is car section. The wireless recording machine has temperature sensor, smoke device that area unit interfaced to the small controller. Temperature device measure quantity of temperature exhausted from the vehicle. Smoke device can sense the amount of gas emitted from the vehicle. the overall instrumentality of this project is placed inside a vehicle isn't visible to others. once an accident happens with vehicle are going to be detected by the vibration device and this data is given to microcontroller. The system uses GPS (global positioning system) module to urge the situation of the vehicle where the accident has occurred. the situation values area unit given to microcontroller. Controller can provide this data to GSM module. GSM can send the message to concerned person having data regarding temperature level, smoke condition and speed of the vehicle and real time of accident. it conjointly has graphical location of the vehicle. In car section we have a tendency to use HBR device and GSR device to observe the health of the patient.

2.2.1 EXISTING SYSTEM BLOCK DIAGRAM

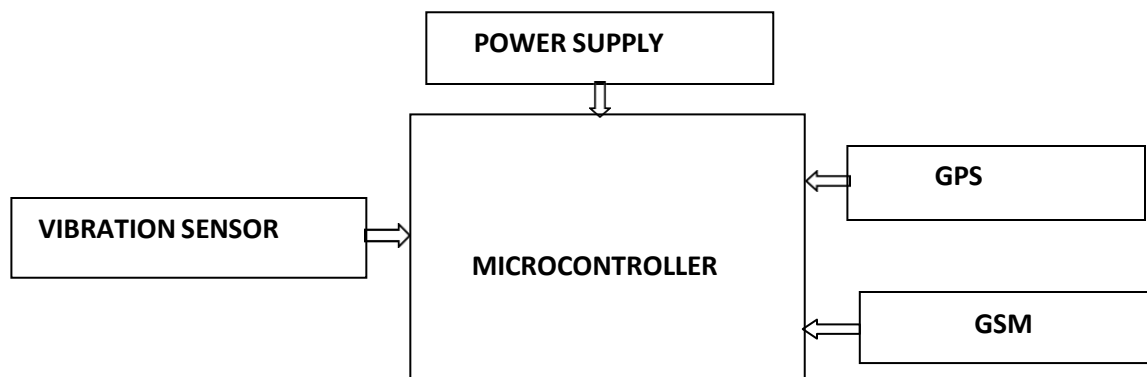


Fig2.1. Block diagram of existing system

In the fig 2.1, In the higher than figure vibration sensing element discover the accident and it sends the message to the microcontroller. This message is sent to the members of the family, hospital and ambulance through GPS. The microcontroller that sends the placement of the accident spot to the machine victimization GSM.

2.2.2 DISADVANTAGES OF EXISTING SYSTEM

- i. In existing system only one sensing element that is vibration sensing element employed in vehicle section, which discover the accident.
- ii. It doesn't thought of alternative parameter within the vehicle section.
- iii. This technique not considering the health of the victim.

2.3 PROPOSED SYSTEM BLOCK DIAGRAM

This system consists of two sections. They are vehicle section and ambulance section. In vehicle section the wireless instruments as temperature sensor, smoke sensor and vibration sensor that is connected to node mcu. IN ambulance section the heart beat sensor, GSR sensor used for health monitoring of patient. The victim's heartbeat rate and properties of skin details is sent to the hospital.

2.3.1 VEHICLE SECTION

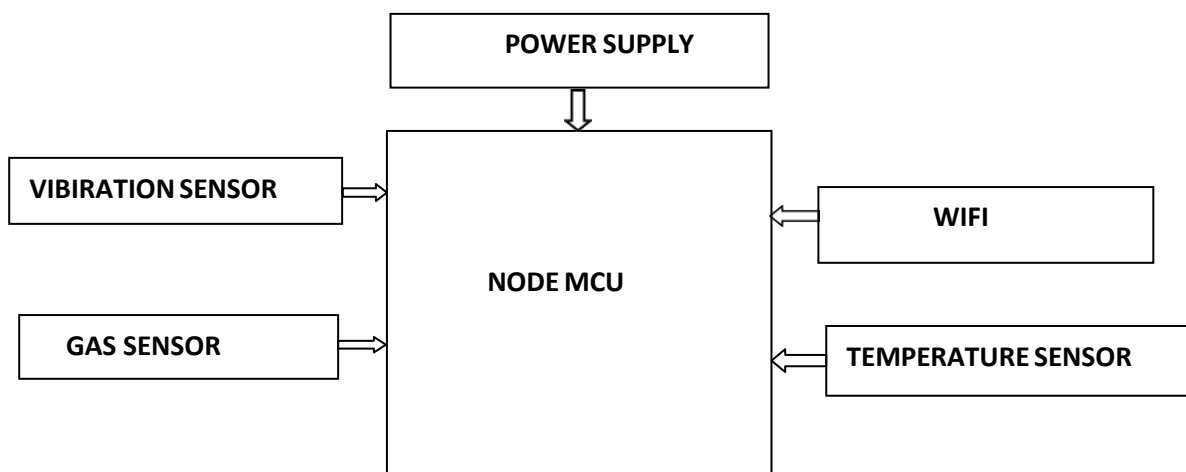


Fig 2.2. Block diagram for vehicle section

In this fig 2.2, the instrumentality area unit controlled by node mcu. Vibration sensing element which is often referred to as electricity sensing element had been wont to live the changes in vibration and send's this data to the nose mcu by changing it to electrical charge. The controller compares the brink worth and if it equals or exceeds the bounds that, then controller mechanically switches on the indicator within the vehicle. The GPS system finds the correct position of the vehicle and provides the situation to the most server. victimization net of things message and site is distributed to the relations, hospital and auto. The gas sensor and vibration sensing element are connected to node mcu. The gas level and temperature of the motor is measured and this messages conjointly sent. All the message area unit hold on within the server and we can see at any time. Andthis is often referred to as recorder construct.

2.3.2 AMBULANCE SECTION

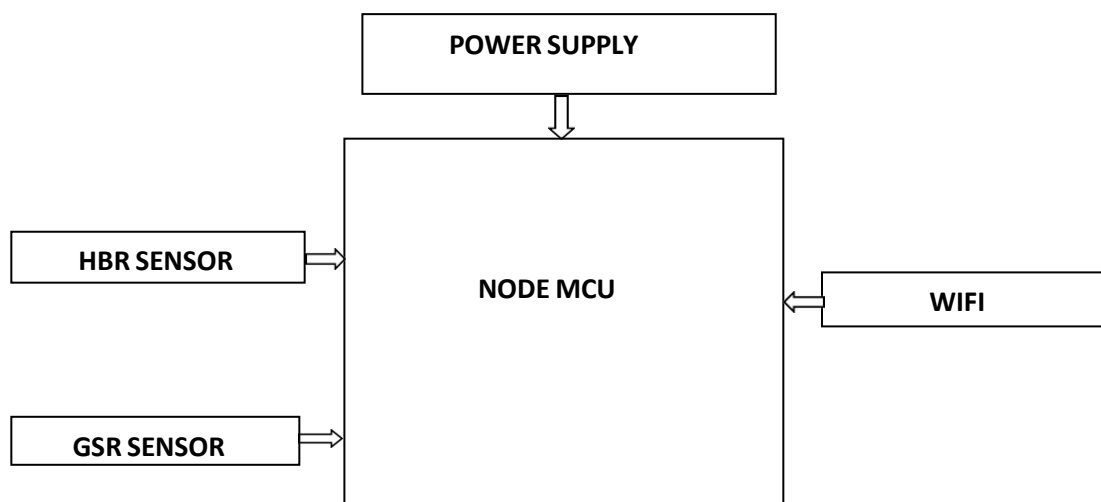


Fig 2.3. Block diagram for ambulance section

In this fig 2.3, Node mcu is employed within the car section. Whenever the car unit receives the GPS location of the accident spot from the vehicle unit in real

time the nearby car reaches the accident location spot. Then rescue the victim and ambulance can attend the hospital. On the other hand to reach the hospital, the small print like victims heart beat rate, pain level rate and electrical properties of the skin area unit send to the hospital. These details area unit live details that ceaselessly send to the hospital. So that the doctors within the hospital can take some measures or arrangement for operation.

2.4 WORKING OF PROPOSED SYSTEM

This system has two section vehicle section and car section. In vehicle section, the wireless recorder has temperature device, smoke device that square measure interfaced to the node mcu. Temperature device live quantity of temperature exhausted from the vehicle. Smoke device can sense the quantity of gas emitted from the vehicle. the overall instrumentation of this project is placed within a vehicle isn't visible to others. once associate accident happens with vehicle are detected by the vibration and this information is given to node mcu. The system uses GPS (global positioning system) module to induce the placement of the vehicle wherever the accident has occurred. the placement values square measure given to node mcu. Controller can offer this info to GSM module. GSM will send the message to involved person having info concerning temperature level, smoke condition of the vehicle and real time of accident. it conjointly has graphical location of the vehicle. In car section the victims heart beat rate and details of physical phenomenon and properties of skinis send to the hospital.

2.5 ADVANTAGES OF PROPOSED SYTSEM

- i. In car section heart beat device and GSR device is employed.
- ii. The entire info (Like skin electrical phenomenon, pain level, etc.) from the patient and send it to hospital.
- iii. In vehicle section gas and temperature device is employed.
- iv. Recorder is employed during this system

CHAPTER 3

PROTEUS SIMULATION MODEL AND RESULTS

3.1 INTRODUCTION TO EMBEDDED C

Embedded C could even be a bunch of language extensions for the C communication by the Ccommonplace committee to the alter commonality issues that exist between C extensions for variedembedded system. historically embedded C programming needs nonstandard extensions to the C language therefore on support exotic options like mounted purpose arithmetic, multiple distinct memory blocks and basic I/O operations. In 2008, the C Standards Committee extended the C language to the alter these problems by providing a commonplace for all implementations to stay to. It includes kind of choices not offered in ancient C, such as, fixed-point arithmetic, named address areas, and basic I/O hardware addressing. Embedded C uses most of the syntax and linguistics of ancient C, e.g., main() perform, variable definition, datatype declaration, if statement, conditional statements such as switch and case, for loop, while loops, functions, arrays and strings, structures, and unions, bit operations, macros, etc.

3.2 PROTEUS MODEL

The Proteus style Suite could be a proprietary computer code tool suite used primarily for electronic style automation. The computer code is employed primarily by electronic style engineers and technicians to form schematics and electronic prints for producing printed circuit boards.

3.2.1 VEHICLE SECTION-SIMULATION DIAGRAM

First, 5V supply is given to the circuit. All the equipment get power. If the accident occurs, the vibration sensor will detect. Accident responsive to family, automobile and hospital. Once associate accident has occurred, the controller within the vehicle sends the accident location to the family, automobile and hospital. The accident message has been sent to the automobile. Then the temperature of the vehicle will know by temperature sensor and gas level will know by using gas sensor, it's shown in the fig 3.1

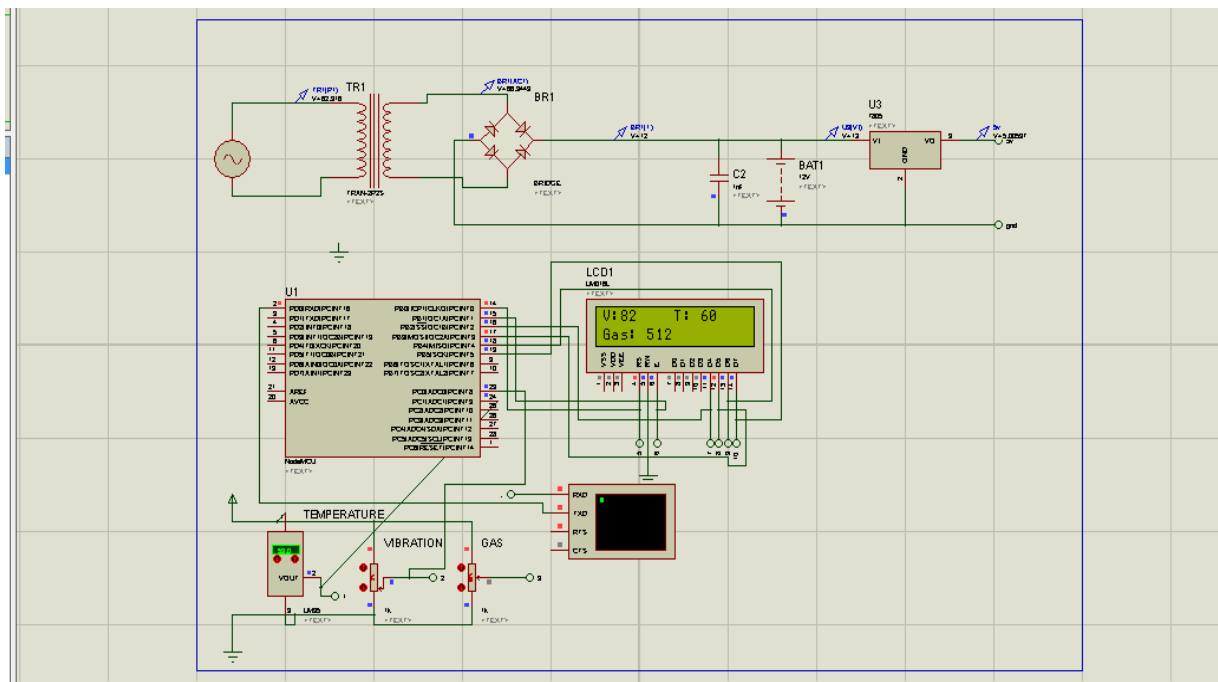


Fig 3.1. Vehicle section - simulation diagram

3.2.2 AMBULANCE SECTION-SIMULATION DIAGRAM

Power supply is given to the circuit, all the devices get power. Here we use heart beat sensor and GSR sensor. Heart beat sensor checks the heartbeat rate of the victim. GSR sensor checks the pain rate of the victim. In the automobile section, the heart beat rate and electrical properties of skin are sent to the hospital. These information's are live information's. These information's will send to the hospital continuously till the victim reaches the hospital. The message sent to the hospital is shown in fig 3.2

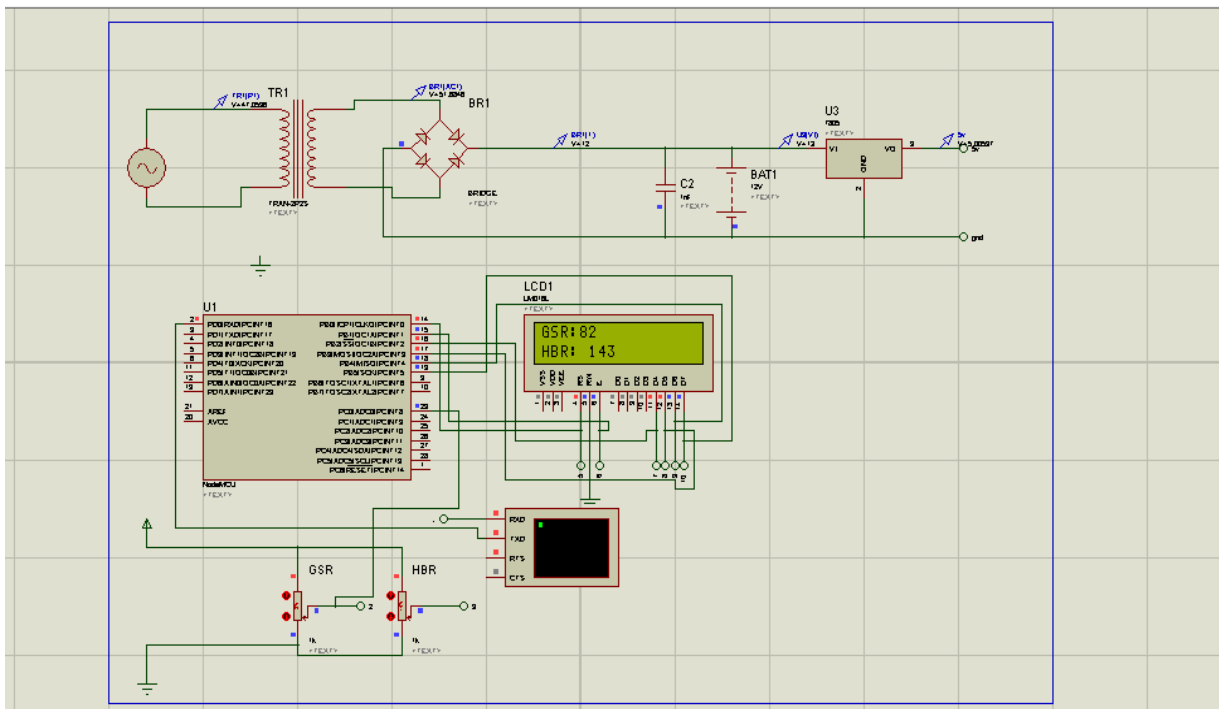


Fig 3.2.Ambulance section-simulation diagram

CHAPTER 4

HARDWARE DESCRIPTION

4.1 HARDWARE SETUP FOR VEHICLE SECTION

Fig 4.1 describes vehicle section. This section is fastened with vehicle. Whenever the accident happens the vibration sensors detects the accident. The message were sent to the friend, ambulance. Then the temperature is measured by using temperature sensor. And by using gas sensor, we can able to know that whether the gas get leak in a vehicle or not. All these details of the are sent to the owner of the vehicle.

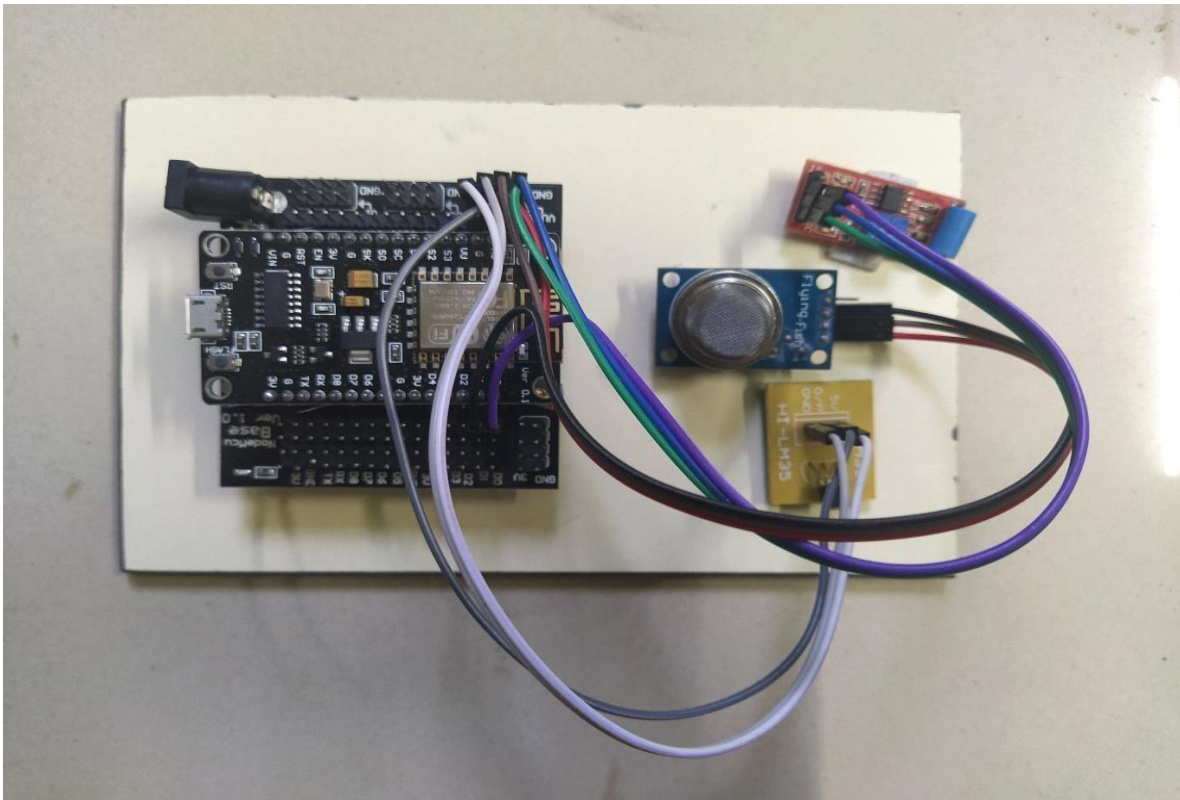


Fig 4.1. Hardware setup for Vehicle section

4.2 HARDWARE SETUP FOR AMBULANCE SECTION

Fig 4.2 describes ambulance section. This section is fixed in the ambulance. It contains heartbeat sensor and GSR sensor. Once the victim is got into the ambulance that victim is monitored using these sensors. The data from the sensors are send to hospital lively using Wi-Fi module.

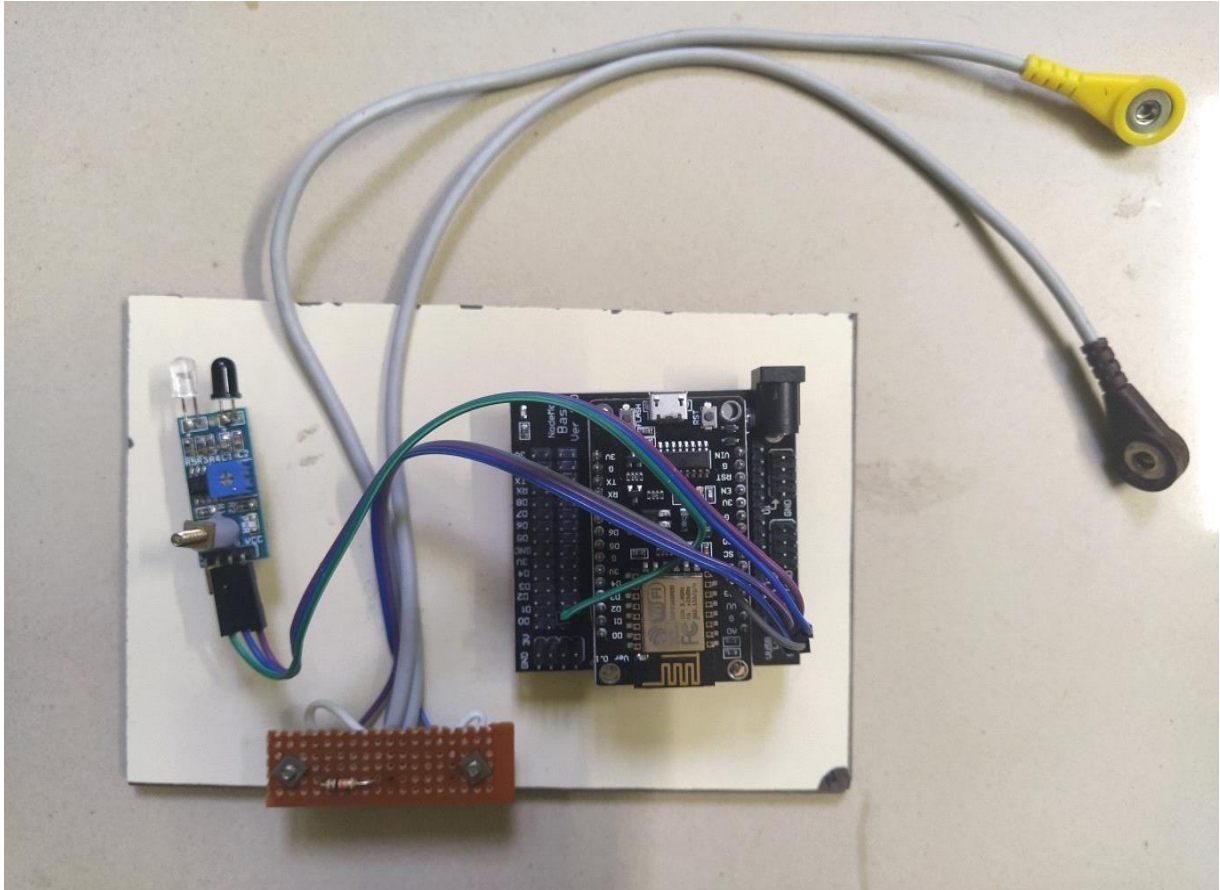


Fig 4.2. Hardware setup for Ambulance section

4.3 HARDWARE IMPLEMENTATION AND RESULTS

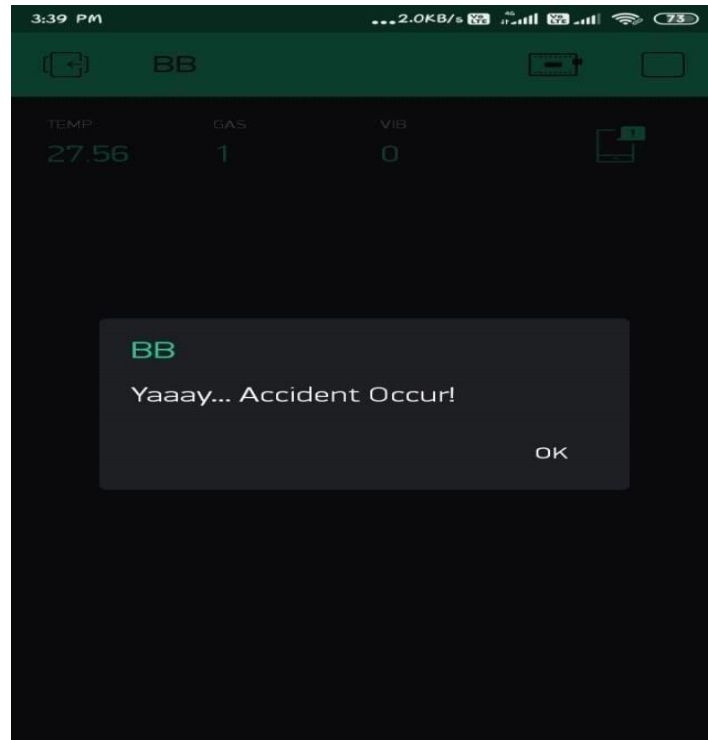


Fig 4.3.Accident occur

The above fig 4.3 shows about the message to alert the accident. If the accident occur and the vibration is detected, the message will come and alert that the accident was occurred.

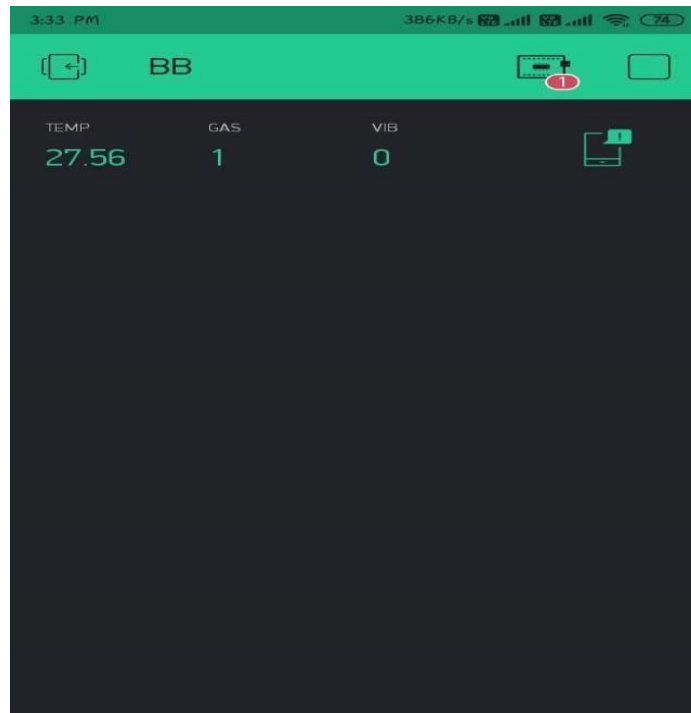


Fig 4.4. Gas, Temp, Vibration values

The above Fig 4.4 shows the detail about vehicles. Since we use temperature and gas sensor in the vehicle section, it gives temperature value and gas value of the vehicle.

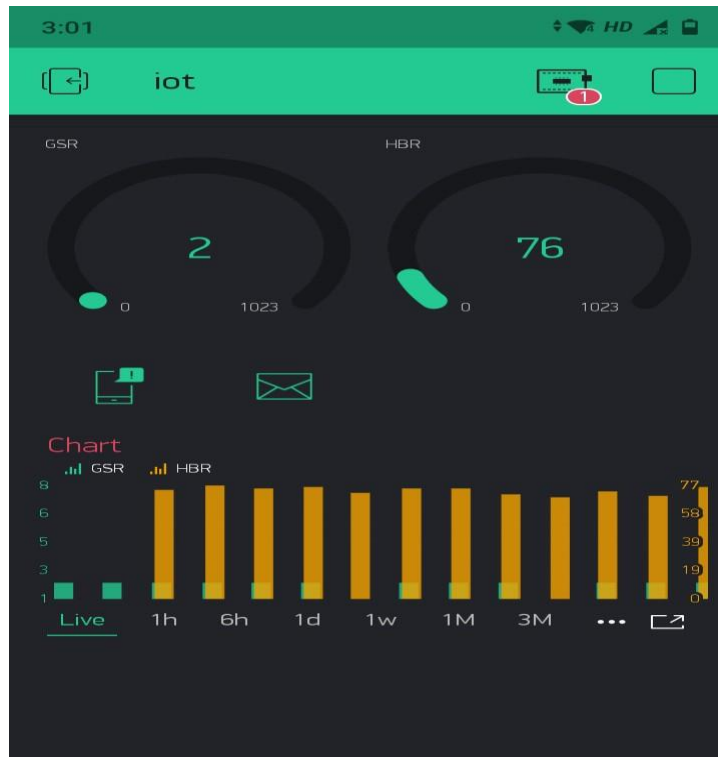


Fig 4.5.GSR and HBR values

The above Fig 4.5 shows that GSR and HBR value of victim. The ambulance section includes GSR and HBR sensor, so heart beat rate and pain level is send to hospital.

4.4 HARDWARE REQUIRMENTS

- i. Vibration sensor
- ii. Temperature sensor
- iii. Gas sensor
- iv. GSR Sensor
- v. WIFI module

4.5 COMPONENT DESCRIPTION

4.5.1 NODE MCU

Node mcu is associate code file development board, supported notable ESP8266 chip, which is able to be a 32-bit controller with inner native house network transceiver. And it's really low price. higher of all, this board is Arduino IDE compatible, you will utilize the infinite example code and library on Node MCU. Besides Arduino IDE or Arduino programming language, Node MCU supports many various languages like LUA script, micro python etc. With these scripting languages, you may develop your example at intervals type of script lines. This base board is meant to ease the prototyping victimization Node MCU V3 board (Lolin). It extends the GPIO of Node MCU to header pins, that place on includes the Vin, VUSB, 5V, 3.3V and GND. you may any use these pins for 24 prototyping, with the male to feminine jumper wires. With the onboard electrical device, you may presently power the Node MCU and whole system with DC jack, voltage vary from 6V to 24VDC. The board place on comes with power indicator. The Node MCU picks a additional powerful processor than the Arduino's Atmega328, a 4Mb store and far additional RAM.

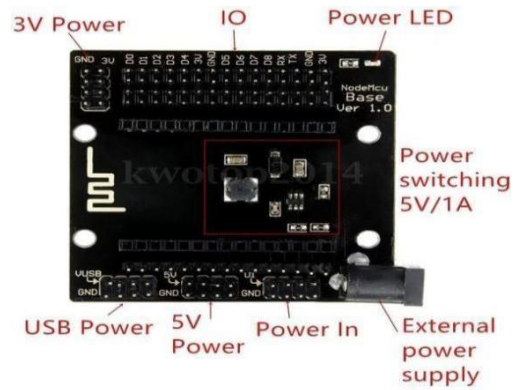


Fig 4.6. Node MCU

4.5.2 FEATURES

- i. It is ease to access the GPIO pins on Node MCU
- ii. Plug and use prototyping board for Node MCU LUA V3 board
- iii. Eliminate the requirements of board and to increase the 5V, 3.3V, GND pins
- iv. Ease the interface between Node MCU to varied detector and mechanism module
- v. Comes with on board 5V device that's capable of output most 1A
- vi. DC Barrel Jack for power input
- vii. Vin: 6V to 24VDC, through DC Jack
- viii. Comes with Power Indicator semiconductor.

NodeMCU Development Board Pinout Configuration

Pin	Name	Description
Category		
Power	Micro-USB, 3.3V, GND, Vin	Micro-USB: NodeMCU can be powered through the USB port 3.3V: Regulated 3.3V can be supplied to this pin to power the board GND: Ground pins Vin: External Power Supply
Control Pins	EN, RST	The pin and the button resets the microcontroller
Analog Pin	A0	Used to measure analog voltage in the range of 0-3.3V
GPIO Pins	GPIO1 to GPIO16	NodeMCU has 16 general purpose input-output pins on its board
SPI Pins	SD1, CMD, SD0, CLK	NodeMCU has four pins available for SPI communication.
UART Pins	TXD0, RXD0, TXD2, RXD2	NodeMCU has two UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to upload the firmware/program.
I2C Pins		NodeMCU has I2C functionality support but due to the internal functionality of these pins, you have to find which pin is I2C.

Table 4.1.Pin configuration of node MCU

4.6 VIBRATION SENSOR

Vibration sensors square measure employed in variety of various comes, machines and applications. whether or not you are making an attempt to measure the speed of a vehicle, or to measure the power of Associate in Nursing at hand earthquake, the device you are possible victimization is taken into account to be a vibration detector. a number of them treat their own, et al need their own power supply. numerous machines in operation conditions regarding temperature extremes, magnetic fields, vibration vary, frequency vary, magnetism compatibility (EMC) and electricity discharge (ESD) conditions and also the needed signal quality necessitate the need for aspread of sensors.

4.6.1 MEASUREMENT OF VIBRATION

The measure of vibration may be a advanced subject. SKF has optimized its selection of vibration sensors to get the simplest performance, in a very style of industrial applications, from its vary of vibration instrumentation systems.

4.6.2 WORKING OF VIBRATION SENSOR

The rule of vibration device may be a device that operates supported different optical otherwise mechanical principles for sleuthing ascertained system vibrations. The sensitivity of those sensors commonly ranges from ten mV/g to one hundred mV/g and their area unit lower and better sensitivities are accessible. The sensitivity of the sensor may be hand-picked supported the applying. therefore, it's essential to understand the degree of vibration amplitude vary to that the device are exposed throughout measurements.

4.6.3 VARIETY OF SENSORS

The SKF Vibration Sensors Catalogue options a spread of commercial sensors and proven accessories to satisfy your specific desires. Use this comprehensive catalogue as a reference guide

It's sorted into the subsequent categories:

- i. Industrial accelerometers for widespread applications
- ii. Economical accelerometers
- iii. Integral cable accelerometers
- iv. Accelerometers with extended temperature vary
- v. Combination vibration and temperature sensors
- vi. Speed sensors
- vii. Transportable analysis accelerometers
- viii. Vibration detector installation and mounting necessities
- ix. Vibration detector cables and accessories

4.8 TEMPERATURE SENSOR

The LM35 is academic degree integrated circuit detector that will be accustomed live temperature with academic degree electrical output proportional to the temperature (in °C). The LM35 - academic degree integrated circuit Temperature detector will be ready to live temperature extra accurately than a using a semiconductor unit. The detector equipment is sealed and not subject to chemical reaction, etc. The LM35 generates ensuing output voltage than thermocouples and cannot want that the output voltage be amplified.



Fig 4.8.Pin of temperature sensor

The output voltage is measured from the center pin to ground. *What are you ready to Expect* once you utilize award LM35? You'll need to be compelled to be compelled to use a meter to sense V_{out} . The output voltage is regenerate to temperature by an easy conversion factor. The detector contains a sensitivity of $10\text{mV} / ^\circ\text{C}$. Use an area that's the reciprocal, that's one hundred $^\circ\text{C}/\text{V}$. The last word equation accustomed convert output voltage to temperature is: $\text{Temperature} (^\circ\text{C}) = V_{out} * (100 ^\circ\text{C}/\text{V})$. Therefore if V_{out} is 1V , then, $\text{Temperature} = \text{one hundred } ^\circ\text{C}$. The output voltage varies linearly with temperature.

4.9 ELECTRO DERMAL ACTIVITY (GALVANIC SKIN RESPONSE [GSR])

4.9.1 DESCRIPTION



FIG 4.9.GSR sensor

GSR, standing for galvanic skin response, may be a technique of measure the electrical phenomenon of the skin. sturdy feeling will cause information to your sympathetic systema nervosum, ensuing additional sweat being secreted by the sweat glands Grove – Fere phenomenonpermits you to identify such sturdy emotions by easy attaching 2 electrodes to 2 fingers on one hand, a stimulating gear to form feeling connected projects, like sleep quality monitor. The Fere phenomenon device is measure arousal, primarily what quantity you're sweating. Two electrodes are strapped sometimes in 2 fingers. within the case of the microcontroller, one was connected to the 5V and also the alternative to at least one of the analog Output/Input and to the 31GND. The construct of the Fere phenomenon device is predicated on the very fact that our body is employed as a resistor. According to what you're measure the information that you simply get, show however straightforward(conductance) or however tough (resistance) it's for this to submit to your body Of course it's perceivable that since electrical phenomenon and resistance are opposite, when the resistance information are remodeled into electrical phenomenon information and so pictured the two graphs for resistance and electrical phenomenon can show opposite trends. As resistance

increased, electrical phenomenon decreases and the other way around. The equation for resistance is: $R = V/I$

Resistance is opposite to electrical phenomenon then:

$$G = 1/R$$

4.9.2 EXAMPLES OF GSR

A painful stimulant like a pinprick elicits a sympathetic response by the sweat glands, increasing secretion. though this increase is mostly terribly tiny, sweat contains water and electrolytes, that increase electrical conduction, therefore lowering the electrical resistance of the skin. These changes successively have an effect on electrodermal response. Another common manifestation is that the dilatation (dilation) of blood vessels within the face, noted as blushing, still as redoubled sweating that happens once one is embarrassed. EDA is very attentive to emotions in some individuals. Fear, anger, startled response, dimensioning response, and sexual feelings are among the reactions which will be reflected in EDA. These responses are used as a part of the medical instrument or polygraph test. EDA in regular subjects differs in line with feelings of being treated fairly or below the belt, but psychopaths are shown to manifest no such variations. this means that the EDA record of a medical instrument is also deceptive in an exceedingly criminal investigation.

4.9.3 USES OF GSR

EDA is also a sensitive psychophysiological index of changes in involuntary sympathetic arousal that unit integrated with emotional and psychological feature states." Many biofeedback medical care devices utilize EDA as Associate in Nursing indicator of the user's stress response with the goal of serving to the user to control anxiety. EDA observation is combined with the recording of pulse, rate of respiration, and blood pressure, as a results of they are all autonomically dependent variables. EDA measurement is one part of recent instrument devices, that unit typically used as lie detectors. The E-meter utilised by the Church of faith as a region of its observe of auditing and security is checking is also a custom EDA live device. An

ongoing European multicenter study, driven by the analysis company Emotra, in cooperation with the medicine Association - Suicide Section, EPASS, is testing to what extent Electro Dermal disorder are going to be Associate in Nursing indicator of increased risk for suicide among depressed patients, Galvanic Skin Response originates from the involuntary activation of sweat glands in the skin. The sweating on hands and feet is triggered by emotional stimulation: Whenever we tend to tend to unit emotionally aroused, the reaction data shows distinctive patterns that unit visible with blank eyes which is able to be quantified statistically.

4.9.4 SPECIFICATIONS

- i. Input Voltage: 5V/3.3V
- ii. Sensitivity adjustable via a potentiometer
- iii. External measure finger cots

4.10 HEARTBEAT SENSOR

Heartbeat sensing element is associate device that's accustomed live the guts rate i.e. speed of the heartbeat. watching vital sign, rate and area unit} are the basic things that we have a tendency to waste order to stay North American nation healthy. watching rate is extremely important for athletes, patients because it determines the condition of the guts (just heartrate). There square measure many ways to live rate and therefore the most precise one is exploitation associate Electrocardiography. However the less difficult thanks to monitor the guts rate is to use a Heartbeat sensing element. It comes in several shapes and sizes and permits a rapid thanks to measure the heartbeat. Heartbeat Sensors square measure out there in carpus Watches (Smart Watches), good phones, chest straps, etc. The heartbeat is measured the beat rates in per minute or M.M. which indicates the amount of times the guts is acquiring or increasing in an exceedingly minute.

4.10.1 PRINCIPLE OF HEARTBEAT SENSOR

The principle behind the operating of the Heartbeat detector is icon plethysmograph. in line with this principle, the changes within the volume of blood in associate degree organ is measured by the changes within the intensity of the sunshine passing through that organ. Usually, the supply of sunshine {in a|during a|in associate degree exceedingly| in a very} heartbeat detector would be an IR light-emitting diode and also the detector would be any icon Detector sort of a icon Diode, associate degree LDR (Light Dependent Resistor) or a photograph junction transistor. With these 2

i.e. a lightweight supply and a detector, we can arrange them in 2 ways:

- i. A Transmissive detector and a Reflective detector. In a Transmissive detector, the lightsource and also the detector square measure place facing one another and also the finger of the person must be connected with the transmitter and receiver.
- ii. Reflective detector, on the opposite hand, has the sunshine supply and also the notice adjacent to each other and also the finger of the person should be placed before of the detector.

4.10.2 WORKING OF HEARTBEAT SENSOR

The basic heartbeat detector consists of a LED and a detector variety of a light investigating device or a photodiode. The heartbeat pulses cause a variation among the flow of blood to utterly completely different regions of the body. once tissue is tissue) or transmits the light (earlobe). variety of the sunshine is absorbed by the blood and additionally the transmitted or the reflected light-weight is received by the sunshine detector. the quantity of sunshine absorbed depends on the blood volume during this tissue. The detector output is among the type of the electrical signal is corresponding to the heartbeat rate.

This signal could be a DC signal about the tissues and therefore the blood volume and therefore the AC component synchronous with the heartbeat and caused by pulsatile changes in blood vessel blood volume is placed on the DC signal. Therefore the key demand is to isolate that AC element because it is of prime

importance. to attain the task of obtaining the AC signal, the output from the detector is initial filtered employing a two stage HP-LP circuit and is then born-again to digital pulses employing a comparator circuit or victimization easy ADC. The digital pulses square measure givento a microcontroller for calculative the heartbeat rate, given by the formula

$$\text{BPM(Beats per minute)} = 60 * f, \text{ wherever } f \text{ is that the pulse frequency.}$$

4.11 WIFI MODULE

The ESP8266 might be a cheap Wi-Fi semiconductor unit, with a full TCP/IP stack and microcontroller capability, created by Express if Systems in Shanghai, China. This tiny module permits microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections victimization Hayes-style commands. However, at first there was nearly no English-languagedocumentation on the chip and so the commands it accepted. The very low price and so the indisputable fact that there are solely some external components on the module, that suggested thatit'd eventually be very cheap in volume, attracted many hackers to explore the module, the chip, and so the package on that, conjointly on translate the Chinese documentation. The ESP8285 is AN ESP8266 with one MiB of intrinsic flash, allowing the building of single-chip devices capable of connecting to Wi-Fi. These microcontroller chips area unit succeeded by the ESP32 family of devices, alongside the pin-compatible ESP32-C3.

4.11.1 FEATURES OF ESP8266

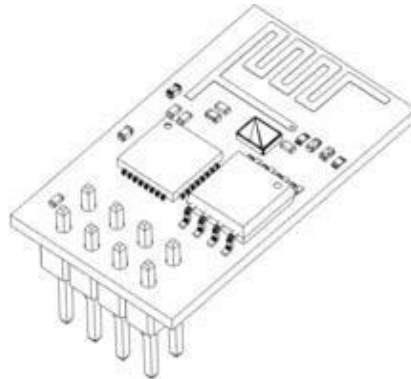


Fig 4.10.ESP8266

ESP-01 module wireframe:

Processor: L106 32-bit laptop pc vogue conductor core supported the Tensilica Xtensa Diamond customary 106Micro running at eighty megahertz per second per second. Memory of ESP-01 is thirty a pair of KiB instruction RAM, thirty a pair of KiB instruction cache RAM, eighty KiBuser-data RAM, sixteen KiB ETS system-data RAM36,External QSPI flash: up to sixteen MiB is supported (512 KiB to four MiB generally included).Integrated TR switch, balun, LNA, power instrumentation and matching network, WEP or WPA/WPA2 authentication, or open networks sixteen GPIO pins, SPI, I2C (software implementation),I2S interfaces with DMA (sharing pins withGPIO), UART on dedicated pins, and a transmit-only UART might even be enabled on GPIO2,10- bit ADC (successive approximation ADC)

4.11.1 USE OF ESP8266-01

The ESP8266 could be a terribly user friendly and low value device to supply net connectivity to your comes. The module will work each as a Access purpose (can produce hotspot) and as a station (can hook up with Wi-Fi), thus it will simply fetch information and upload it to the net creating net of Things as straightforward as potential. It can even fetch data from net victimization API's thus your project may access any info that's available within the net, so creating it smarter. Another exciting feature of this module is that it are often programmed victimization the Arduino IDE that makes it loads a lot of user friendly. but this version of the module has solely a pair of GPIO pins (you will hack it to use upto 4) thus you've got to use it along side another microcontroller like Arduino, else you can look onto the a lot of standalone ESP-12 or ESP-32 versions. Thus if you're looking for a module to urge started with IOT or to supply net property to your project then this module is that the right selection for you. There are numerous strategies and day out there to with parapsychology modules, however the foremost commonly used on is that the Arduino IDE. Thus allow us to discuss solely that more below. The ESP8266 module works with three.3V only, something quite three.7V would kill the module thus be cautions along with your circuits. the simplest thanks to program associate degree ESP-01 is by victimisation the FTDI board that supports three.3V programming. If you don't have one it's recommended to shop for one or for present you'll be able to additionally use associate degree Arduino board. One commonly downside that each one faces with ESP-01 is that the powering up downside. The 37 module could be a bit power hungry whereas programming and thus you'll be able to power it with a 3.3V pin on Arduino or simply use a possible divider. Therefore it's necessary to create a little voltage regulator for three.31v that would provide a minimum of 500mA. One counselled regulator is that the LM317 that might handle the duty simply.

4.11.2 APPLICATIONS

- i. IOT Projects
- ii. Access Point Portals
- iii. Wireless Data logging
- iv. Smart Home Automation
- v. Learn basics of networking
- vi. Portable Electronics
- vii. Smart bulbs and Sockets

CHAPTER 5

CONCLUSION

5.1 SUMMARY

In vehicle section, accident is detected the message is distributed to the Ambulance, hospital and members of the family. Vibration, gas and temperature level of the vehicle is hold on within the server. in order that accident is detected simply and thanks to that stored information we are able to claim insurance. In machine section, heart beat sensing element and GSR sensing element is employed. the guts beat rate and reaction worth are unceasingly sent to the hospital. The doctors will unceasingly monitor the patient and organize the requirementsfor operation. in order that we are able to save the human life. With the projected system the lifetime of human being is saved and death rate thanks to accident is reduced.

5.2 APPLICATIONS

- i. Reduces the time loss
- ii. Monitor the victim within the machine
- iii. information collected from vehicle hold on safely.

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APPENDIX

PROGRAM FOR VEHICLE SECTION

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <LiquidCrystal.h>
#include <DHT.h>
#include <BlynkSimpleEsp8266.h>
char auth[] = "zCLpIE867GH3ewrGKPj9g3pTegmn2sBA";
char ssid[] = "IOT";
char pass[] = "IOT@1234";

void setup()
{
  pinMode(4,INPUT);
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass);
  Blynk.syncAll();
  Blynk.notify("Yaaay... Device detected!");
  pinMode(16,OUTPUT);
}

void dataa()
{
  int sw=digitalRead(4);
  Serial.println(sw);
  if(sw==0)
  {
    digitalWrite(16,1);
  }
  else
```

```
{
  digitalWrite(16,0);
}
```

```
}
```

```
void loop()
{
  Blynk.run();
  dataa();
}
```

PROGRAM FOR AMBULANCE SECTION

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <LiquidCrystal.h>
#include <DHT.h>
#include <BlynkSimpleEsp8266.h>
char auth[] = "iqmvG0QDISNQvBnpy0elZmpwdm4kHPsS";
char ssid[] = "IOT";
char pass[] = "IOT@1234";
```

```
void setup()
{
  pinMode(16,INPUT);
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass);
  Blynk.syncAll();
  Blynk.notify("Yaaay... Device detected!");
}

void dataa()
```

```

{
float rx=analogRead(A0);
Blynk.virtualWrite(V0, rx);

int hb=digitalRead(16);
if(hb==0)
{
int hbr=random(69,78);
Blynk.virtualWrite(V1, hbr);
Blynk.email("nandhiniramachandran45@gmail.com", "GSR_Value", rx);
delay(1000);
Blynk.email("nandhiniramachandran45@gmail.com", "HBR_Value", hbr);
}

else
{
int hbr=0;
Blynk.virtualWrite(V1, hbr);
Blynk.email("nandhiniramachandran45@gmail.com", "GSR_Value", rx);
delay(1000);
Blynk.email("nandhiniramachandran45@gmail.com", "HBR_Value", hbr);
}
delay(1000);
}

void loop()
{
Blynk.run();
dataa();
}

```

