WIRELESS BLACKBOX FOR CARS USING SENSORS AND GPS MODULE

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Abstract - The main purpose of this wireless black box project is to develop a vehicle black box system that can be installed into any vehicle all over the world. This paradigm is often designed with minimum range of circuits. Wireless black box is basically a device that will indicate all the parameters of a vehicle crash and will also store and display its parameters such as temperature, location, vibration, alcohol limit etc. At the time of accident, the message will be sent from the system built inside the car to the registered mobile numbers such as emergency numbers of police stations, hospitals, family members, owner etc. We have used various types of sensors like temperature sensor, which is used to measure temperature. Vibration sensor measures vibrations felt by the car during accident. Alcohol sensor is located on the steering wheel which will indicate whether the driver is drunk. Gyroscope sensor is used to indicate tilt during the accident. GSM module, GPS module are some of the devices used in this project which helps in accomplishing the output.

Keywords- Arduino, Gas sensor, Temperature sensor, Vibration sensor, Accelerometer, GSM, GPS, SMS.

I. INTRODUCTION

In today's world as the population increases day by day the numbers of vehicle also increases on the road and highways. This results in accident that leads to the traffic jams and people do not get the help instantaneously. Road accidents constitute the major part of the accident deaths all over the world. This takes a toll on the property as well as causes human life loss because of unavailability of immediate safety facilities.

Complete accident prevention is unavoidable but atleast repercussions can be reduced. In highly populated Countries like India, everyday people lose their lives because of accidents and poor emergency facilities. These lives could have been saved if medical facilities are provided at the right time. In many situations the family members or the ambulance and police authority is not informed in time. This result in delaying the help reached to the person suffered due to accident. In order to give treatment for injured people, first we need to know where the accident happened through location tracking and then send a message to your related one or to the emergency services.

II. DESIGNOFSYSTEM

Four sensors that are temperature sensorLM35, vibration sensor, gas sensor MQ3, accelerometer ADXL345 are the primary inputs. LCD display,GPS6MV2,GSM SIM800Lare the primary outputs. To indicate motion of car we are using a motor.

Initially the threshold detection level of sensors value is predefined. When the device is switched on, it displays "Wireless Blackbox". Now the user is prompted to give an input such that it exceeds the threshold of the sensors. Once this happens the SMS is sent to registered mobile number with the location of the accident place.

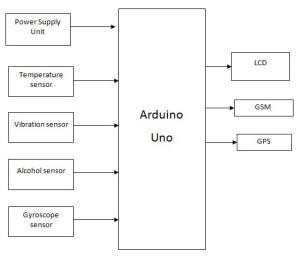


Figure1:Block diagram of blackbox system.

III. LITERATURESURVEY

The BlackBox concept is derived from the aviation industry, a flight recorder, colloquially known as a blackbox; although it is now orange-colored for easy search, is an electronic recording device placed in an aircraft for the purpose of facilitating the investigation of aviation accidents and incidents.

Existing system is a device installed to record vehicle crashes or accidents. Electronically sensed problems in the engine or a sudden change in wheel speed trigger's this device. It do not track the vehicle movement or the driver's action and do record several types of important data only few seconds before the collision, due to the existing system is designed to monitor activation of airbags

IV. METHODOLOGY

The proposal and "expansions of this project are separated into two key parts which are hardware architecture and software details". "In the hardware architecture, the design of the circuit was constructed and the prototype of the project was built. While in the software development, the whole complete prototype was operated via programming codes".

1. HardwareArchitecture:

1.1 "Arduino is the key board; microcontroller on it whichis ATmega328 is used as the main controller to manage the circuitaccordingly". "It is a well-known opensource microcontroller-based kit for creating digital devices and interactive tool that can interact with LEDs, LCD display, switches, GSM, flamesensor, buzzer and manymore".

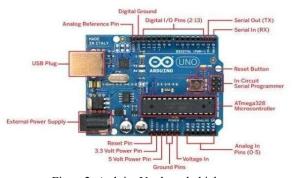
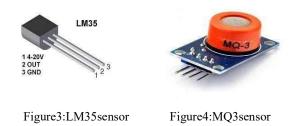


Figure2: ArduinoUnoboardwhich usesmicrocontrollerAtmega328Ponboar d.

1.2 "Alcohol sensor MQ-3 detects the presence of alcohol gas at concentrations from 0.04 mg/L to 4 mg/L, provides an analog resistive output based on alcohol concentration"



1.3 "TemperaturesensorLM35 rated to operate over a -55 °C to 150 °C temperature range, output voltage linearly-proportional to the Centigrade temperature"

1.4 "Accelerometer ADXL345 small, thin, ultralow power,3-axis accelerometer with high resolution (13-bit), measuresthestaticaccelerationofgravityintilt-sensingapplications



Figure5:ADXL345 sensor Figure6:Vibration sensor

1.5 "Vibration sensor measures the amount and frequency of vibration inacipation machine emission frequency of the sensor of t

inagivensystem, machine, or piece of equipment.

1.6 "GPS Module NEO-6MV2 is used for navigation. Themodule simply checks its locationonearthandprovidesoutput data which is longitude and latitude of its position. It is from a family of stand-alone the highperformanceu-GPS receivers featuring box6positioningengine.Theseflexibleandcosteffectivereceive rsoffernumerousconnectivity options in a miniature (16 x 12.2 х 24 mm)package.Thecompactarchitecture,powerandmemoryopti onsmake NEO-6modules idealfor batteryoperatedmobile devices withvery costand strict space constraints.ItsInnovativedesigngives NEO-6MV2 excellentnavigationperformanceeveninthemostchallenginge nvironments.



Figure7:GPSNEO 6MV2Receiver

1.7 "GSMModule,"GSMSIM800Ctypeisselectedtocarry the task in communication part.SIM800C is a quad-bandGSM/GPRSmodulethatworksonfrequenciesGSM850M Hz,EGSM900MHz.DCS1800MHzand

PCS1900 MHz. It has an recognized presentation, industrialgradeinterfaceTypicalplusembeddedTCP/IPprotoco lwhichmakesittobepresentableandsuitablefortheelectronics project. Since it consumes smallof power in itsoperation, thus it is said able to communicate with any lowpowerconsumptionmicrocontrollerinterface".

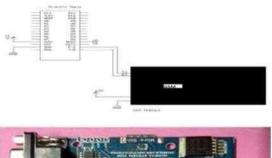




Figure8:GSMModuleinterfacingwithar duino

2. SoftwareDevelopment:

The software of the project is based on the flow chart infigure 9. When input is exceeded threshold are values ofthesensors, microcontrolleron the Arduino Uno boardwill notify GSM module to send an alert messages to thepre coded mobile numbers. By referring to bothfigures, the complete program can be constructed later in ArduinoIDE software with vibrationsensor, temperature sensor, accelerometer, alcohol sensor, GPS module, GSM module, LCDdisplayscreen.

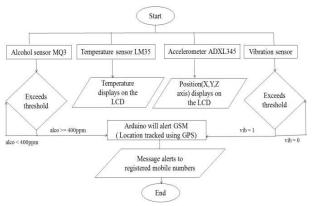


Figure9:Flowchartblackboxsystem.

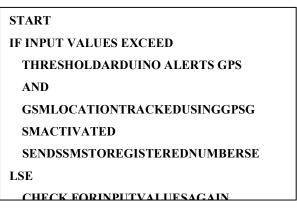


Figure10:PseudocodefortheProject

This pseudo code gives a brief idea as to how theproject "Wireless Blackbox for cars using sensors and gpsmodule"works.

Initially the thresholddetectionlevelofsensorsvalueispredefined.Whenthe deviceisswitchedon,itdisplays "Wireless Blackbox". Now the user is prompted togiveaninputsuchthatitexceedsthethresholdofthesensors. Once this happens the SMS is sent to registeredmobile number with the location of the accident place. TheGPS receiver helps to collect the location of the place. TheGSM modulesendstheSMS.

V. SCHEMATICDIAGRAM

SchematicdiagramshowstheconnectionandinterfacingofArd uinoUnoboard:

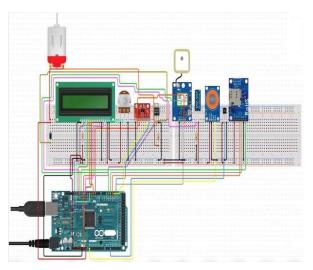


Figure11:Schematicdiagram

VI. RESULT

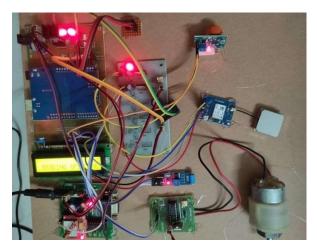


Figure12:HardwareSetup



+	Text message	\uparrow

Figure 13: Messagealerttotheregistered number when alcohollimitexceeded

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Figure14:Mess	ageale	erttoth	eregister	ednumb	er
	w	hen ac	cidentoc	curred	

VII. CONCLUSION

The sole purpose of this project was to develop a blackboxsystem for car accidental monitoring and alerting. The

systemhassuccessfullyovercomethedrawbacksoftheexistingsys tembyintroducingalertmessages.

Finally, We conclude that system wireless black box usingsensors, GSM and GPS tracking has been developed for caraccidental monitoring and alerting which gives an intelligent solution to the problem.

Infuture,byapplyingultrasonicsensorsfeatureswecandetect the distance of a vehicles moving nearby our vehicles. This system can be interfaced with vehicle airbag system that prevents vehicle occupants from striking interior objects suchas steeringwheelorwindow.

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