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Hybrid Safety and Security System for Traffic Control

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Abstract:
Accidents mainly occur due to driver carelessness. The main aim is to provide awareness and safety mechanism for the driver. Main reason of an accident is due to drowsiness, alcohol consumption and abnormal pulse rate of driving person. In addition to this theft detection, security system and person level identification is determined. In this paper alcohol detection and heart rate monitoring system, person level identification system, eye blink that is drowsiness level, theft detection and mobile free auto reply method is used to avoid an accident. Password authentication, calls divert method, pulse level and eye blink checking mechanism is processed. Each method is used to rectify the carelessness of the driver and immediate intimation technique is developed by use of GSM technology.

Index Terms:
MQ3 sensor, IR sensor, Heart rate monitoring system, Passive infrared sensor, Password authentication and auto reply SMS GSM.

INTRODUCTION:

Road accidents and collisions occur frequently. Every hour, 40 people under the age of 25 die in road accidents. Most of the city accidents are due to carelessness of driver but outside the city, accidents occur due to drunken driving only. Due to health condition accident may occur, that is if there is a less pulse level then person may lead to unconscious stage. Loss of person is mainly due to heart attack, drunken driving only so this can be reduced by using different techniques. Alcohol detection method, Heart rate monitoring system, Human level identification methods are used to minimize the level of an accident. Apart from this due to driver vigilance within a fraction of second accident may occur. Most of the accidents occur, if person attends a phone call while driving. To avoid this problem many technique have been used. For Heart rate heartbeats are typically expressed as beats per minute. Sensor is a device that detects changes or events in quantities and provides an output corresponding to the input the signal generally is in optical or electrical signal. Sensors obey certain condition and rules. It is sensitive to the measured property only. It is insensitive to any other property likely in its application. An individual PIR sensor detects changes in the amount of infrared radiation. Their value varies on the temperature and surface characteristics of the objects in front of the sensor. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. For counting the eye blink and detecting the drowsiness level by use of IR sensor. Every year nearly 1.4 million people have been killed because of the wireless customers. There is a highly efficient automatic system for early detection of incoming and outgoing call. Detecting the causes such as alcohol consumption, range pulse level, person and drowsiness level identification, theft detection and security systems are handled in the hybrid driver safety awareness method.

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The main aim of the project is to provide awareness and safety mechanism for the driver. Main reason of an accident is due to drowsiness, alcohol consumption and abnormal pulse rate of driving person. In addition to this theft detection, security system and person level identification is determined. The paper alcohol detection and heart rate monitoring system, person level identification system, eye blink that is drowsiness level, theft detection and mobile free auto reply method is used to avoid an accident. Password authentication, calls divert method, pulse level and eye blink checking mechanism is processed. Each method is used to rectify the carelessness of the driver and immediate intimation technique is developed by the use of GSM technology.

LITERATURE SURVEY

The main primary purpose is to develop a system that can reduce the number of accidents due to driver abnormal behavior.

EXISTING SYSTEM:

Traffic accidents are a major public issue worldwide. The huge number of injuries and death as a result of road traffic accident uncovers the story of global crisis of road safety. Every day around the world, a large percentage of people die from traffic accident injuries. Recent approaches are using built-in vehicle automatic accident detection and notification system. On the other hand, the ability to detect traffic accidents using smart phones has only recently become possible because of the advances in the processing power and sensors deployed on smart phones. As many references assure that 90% of road-traffic accidents occur at low speed of the vehicle. Hence, in addition to the high speed accident detection, this paper concentrated on low speed car accident detection. The Advance traffic management system (ATMS) is based on traffic sensors that are used to monitor the traffic and detect the accidents. we have various kinds of accident alert systems in which when a driver met with an accident can be informed to respective family members through an sms but also other systems like auto breakings in the case of obstacle detection but there is no system which monitors the driver conditions and avoids the accident our system will helpful in this manner.

DISADVANTAGES:

Even though we have all protected equipment but the driver condition is not good then we meet with an accident

1. Human loss
2. Money loss

PROPOSED SYSTEM:

In proposed system the driver drowsiness, alcohol and his abnormal behavior like attacks of heart strokes etc will be monitored if any of this condition detected is abnormal means there is possibility of intimated to the register number along with location.At the time of vehicle start alcohol sensor will detects the alcohol consumption of the driver if the driver alcohol consumption is above 30mg means access for user is denied by locking of ignition. And if alcohol consumed is limited means the vehicle will be running and next the driver may meet accident due to drowsiness so eye blink sensor monitors the eye blink status of the driver if for particular duration driver doesn't blink his eyes means the vehicle is stopped. Heart strokes may be another reason for accident so the heart rate of patient is measured through PULSE sensor if the heart rate detected is beyond threshold value then along with vehicles.

HARDWARE DESIGN

4.1. INTRODUCTION:

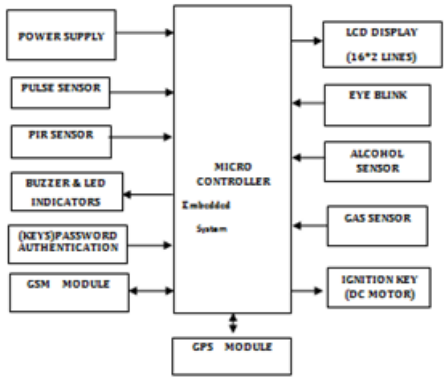

Fig. 4.1: Block Diagram of Driver Safety and Security System for Vehicle

ISSN No: 2348-4845
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PULSE SENSOR:

Pulse sensor is also called as Heart Beat Sensor. This heart beat sensor is designed to give digital output of heat beat when a finger is placed inside it. When the heart detector is working, the top-most LED flashes in unison with each heart beat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

Fig. 4.10: pulse sensor

Working:

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 +5V logic level signal.

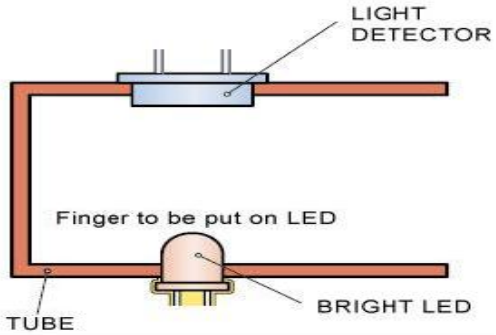

Fig 4.11: sensor construction

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. Below figure shows actual heart beat received by detector (Yellow) and the trigger point of sensor (Red) after which the sensor outputs digital signal (Blue) at 5V level.

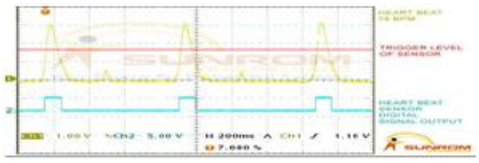

Fig 4.12: Signals view

Applications:

· Digital Heart Rate monitor

· Bio-Feedback control of robotics and applications

· Exercise machines

4.3.3 PIR SENSOR:

A Passive Infra-Red sensor(PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are often used in the construction of PIR-based motion detectors (see below). Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall. All objects emit what is known as black body radiation. It is usually infrared radiation that is invisible to the human eye but can be detected by electronic devices designed for such a purpose. The term passive in this instance means that the PIR device does not emit an infrared beam but merely passively accepts incoming infrared radiation. “Infra” meaning below our ability to detect it visually, and “Red” because this color represents the lowest energy level that our eyes can sense before it becomes invisible. Thus, infrared means below the energy level of the color red, and applies to many sources of invisible energy. In a PIR-based motion detector (usually called a PID, for Passive Infrared Detector), the PIR sensor is typically mounted on a printed circuit board containing the necessary electronics required to interpret the signals from the

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pyroelectric sensor chip. The complete assembly is contained within a housing mounted in a location where the sensor can view the area to be monitored. Infrared energy is able to reach the pyroelectric sensor through the window because the plastic used is transparent to infrared radiation (but only translucent to visible light). This plastic sheet also prevents the intrusion of dust and/or insects from obscuring the sensor's field of view, and in the case of insects, from generating false alarms.

PIR-based remote thermometer

Designs have been implemented in which a PIR circuit measures the temperature of a remote object.[3] In such a circuit, a non-differential PIR output is used. The output signal is evaluated according to a calibration for the IR spectrum of a specific type of matter to be observed. By this means, relatively accurate and precise temperature measurements may be obtained remotely. Without calibration to the type of material being observed, a PIR thermometer device is able to measure changes in IR emission which correspond directly to temperature changes, but the actual temperature values cannot be calculated.

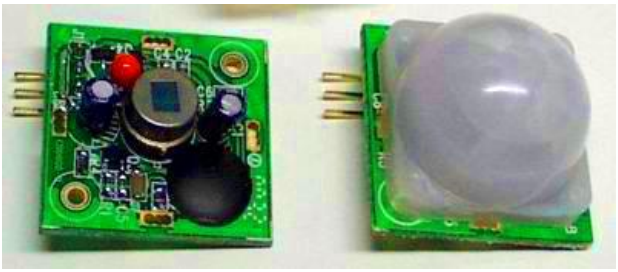

Fig 4.13.: PIR sensor

4.3.4 SMOKE SENSOR (MQ2)

Smoke sensor is used to detect any leakage of smoke and any hazardous gases such that an alarm can be initiated to avoid any damages in the industries. These sensors are also used in many applications like corporate and in any office work areas these are linked to fire alarms and buzzers through the micro-controller. There are two main types of smoke detectors:

Ionization detectors and photoelectric detectors. A smoke alarm uses one or both methods, sometimes plus a heat detector, to warn of a fire.

Ionization Detectors:

Ionization detectors have an ionization chamber and a source of ionizing radiation. The source of ionizing radiation is a minute quantity of americium-241 (perhaps 1/5000th of a gram), which is a source of alpha particles (helium nuclei). The ionization chamber consists of two plates separated by about a centimeter. The battery applies a voltage to the plates, charging one plate positive and the other plate negative. Alpha particles constantly released by the americium knock electrons off of the atoms in the air, ionizing the oxygen and nitrogen atoms in the chamber. The positively-charged oxygen and nitrogen atoms are attracted to the negative plate and the electrons are attracted to the positive plate, generating a small, continuous electric current. When smoke enters the ionization chamber, the smoke particles attach to the ions and neutralize them, so they do not reach the plate. The drop in current between the plates triggers the alarm.

Photoelectric Detectors:

In one type of photoelectric device, smoke can block a light beam. In this case, the reduction in light reaching a photocell sets off the alarm. In the most common type of photoelectric unit, however, light is scattered by smoke particles onto a photocell, initiating an alarm. In this type of detector there is a T-shaped chamber with a light-emitting diode (LED) that shoots a beam of light across the horizontal bar of the T. A photocell, positioned at the bottom of the vertical base of the T, generates a current when it is exposed to light. Under smoke-free conditions, the light beam crosses the top of the T in an uninterrupted straight line, not striking the photocell positioned at a right angle below the beam. When smoke is present, the light is scattered by smoke particles, and some of the light is directed down the vertical part of the T to strike the photocell. When sufficient light hits the cell, the current triggers the alarm.

ISSN No: 2348-4845
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Sensitive material of MQ-3 gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exist, The sensor's conductivity is more higher along with the gas concentration rising. MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapor. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.

- Good sensitivity to alcohol gas
- Long life and low cost
- Simple drive circuit

Basic test loop

Fig 4.14: Basic test loop

The above is basic test circuit of the sensor. The sensor needs to be put 2 voltage, heater voltage and test voltage（VC）. VH used to supply certified working temperature to the sensor, while VC used to detect voltage (VRL) on load resistance whom is in series with sensor. The sensor has light polarity, Vc need DC power. VC and VH could use same power circuit with precondition to assure performance of sensor. In order to make the sensor with better performance, suitable RL value is needed:

Fig 4.15: Structure and configuration of MQ-3 gas sensor

Sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped MQ-4 has 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current.

Buzzer

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave ovens, & game shows.

The word "buzzer" comes from the rasping noise that buzzers made when they were electromechanical devices, operated from stepped-down AC line voltage at 50 or 60 cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep. The "Piezoelectric sound components" introduced herein operate on an innovative principle utilizing natural oscillation of piezoelectric ceramics. These buzzers are offered in lightweight compact sizes from the smallest diameter of 12mm to large Piezo electric sounders. Today, piezoelectric sound components are used in many ways such as home appliances, OA equipment, audio equipment telephones, etc. And they are applied widely, for example, in alarms, speakers, telephone ringers, receivers, transmitters, beep sounds, etc.

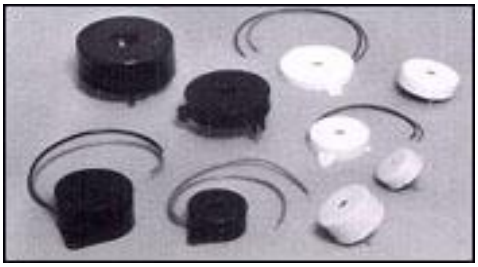

Fig 4.16: Types of Buzzers

DC Motor

DC motors are configured in many types and sizes, including brush less, servo, and gear motor types. A motor consists of a rotor and a permanent magnetic field stator. The magnetic field is maintained using either permanent magnets or electromagnetic windings. DC motors are most commonly used in variable speed and torque. Motion and controls cover a wide range of components that in some way are used to generate and/or control motion. Areas within this category include bearings and bushings, clutches and brakes, controls and drives, drive components, encoders and resolves, Integrated motion control, limit switches, linear actuators, linear and rotary motion components, linear position sensing, motors (both AC and DC motors), orientation position sensing, pneumatics and pneumatic components, positioning stages, slides and guides, power transmission

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(mechanical), seals, slip rings, solenoids, springs. Motors are the devices that provide the actual speed and torque in a drive system. This family includes AC motor types (single and multiphase motors, universal, servo motors, induction, synchronous, and gear motor) and DC motors (brush less, servo motor, and gear motor) as well as linear, stepper and air motors, and motor contactors and starters.

GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM):

GSM (Global System for Mobile communications) is the technology that underpins most of the world's mobile phone networks. The GSM platform is a hugely successful wireless technology and an unprecedented story of global achievement and cooperation. GSM has become the world's fastest growing communications technology of all time and the leading global mobile standard, spanning 218 countries. GSM is an open, digital cellular technology used for transmitting mobile voice and data services. GSM operates in the 900MHz and 1.8GHz bands GSM supports data transfer speeds of up to 9.6 kbps, allowing the transmission of basic data services such as SMS.

Fig. 5.1: GSM board

5.2.2 OPERATION OF GSM

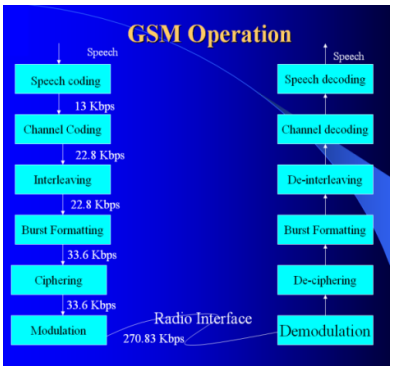

Fig 5.2: Operation of GSMCall Routing

- Call Originating from MS
- Call termination to MS

Outgoing Call

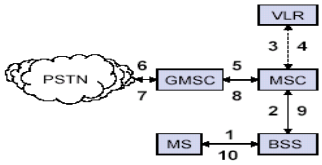

Fig 5.3: operation of GSM on out going call

1. MS sends dialed number to BSS
2. BSS sends dialed number to MSC
3. MSC checks VLR if MS is allowed the requested service. If so, MSC asks BSS to allocate resources for call.
4. MSC routes the call to GMSC
5. GMSC routes the call to local exchange of called use 7,8,9, 10 Answer back (ring back) tone is routed from called user to MS via GMSC, MSC, BSS

Incoming Call

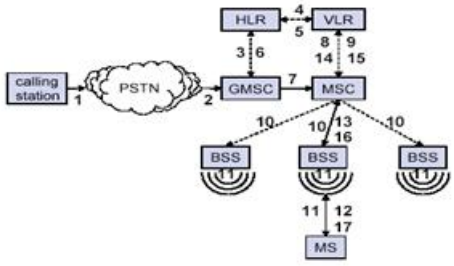

Fig 5.4: operation of GSM on incomming call

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1. Calling a GSM subscribers
2. Forwarding call to GSMC
3. Signal Setup to HLR
4. 5. Request MSRN from VLR
6. Forward responsible MSC to GMSC
7. Forward Call to current MSC
8. Get current status of MS
9. Paging of MS
10. MS answers
11. Security checks
12. Set up connection

DESIGN TOOLS

6.1 KEIL SOFTWARE:

It is possible to create the source files in a text editor such as Notepad, run the Compiler on each C source file, specifying a list of controls, run the Assembler on each Assembler source file, specifying another list of controls, run either the Library Manager or Linker (again specifying a list of controls) and finally running the Object-HEX Converter to convert the Linker output file to an Intel Hex File. Once that has been completed the Hex File can be downloaded to the target hardware and debugged. Alternatively KEIL can be used to create source files; automatically compile, link and covert using options set with an easy to use user interface and finally simulate or perform debugging on the hardware with access to C variables and memory. Unless you have to use the tolls on the command line, the choice is clear. KEIL Greatly simplifies the process of creating and testing an embedded application.

- KEIL µVision using Embedded C programming
- Express PCB for lay out design
- Express SCH for schematic design

Express PCB

Express PCB is a Circuit Design Software and PCB manufacturing service. One can learn almost everything you need to know about Express PCB from the help topics included with the programs given.
Details:
Express PCB, Version 5.6.0

Express SCH

The Express SCH schematic design program is very easy to use. This software enables the user to draw the Schematics with drag and drop options. A Quick Start Guide is provided by which the user can learn how to use it.

Details:
Express SCH, Version 5.6.0

EMBEDDED C:

The programming Language used here in this project is an **Embedded C** Language. This Embedded C Language is different from the generic C language in few things like

a) Data types
b) Access over the architecture addresses.

The Embedded C Programming Language forms the user friendly language with access over Port addresses, SFR Register addresses etc.
Embedded C Data types:

KEIL µVision using Embedded C programming:

The user of KEIL centers on “projects”. A project is a list of all the source files required to build a single application, all the tool options which specify exactly how to build the application, and – if required – how the application should be simulated. A project contains enough information to take a set of source files and generate exactly the binary code required for the application. Because of the high degree of flexibility required from the tools, there are many options that can be set to configure the tools to operate in a specific manner. It would be tedious to have to set these options up every time the application is being built; therefore they are stored in a project file. Loading the project file into KEIL informs KEIL which source files are required, where they are, and how to configure the tools in the correct way. KEIL can then execute each tool with the correct options.

ISSN No: 2348-4845
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It is also possible to create new projects in KEIL. Source files are added to the project and the tool options are set as required. The project can then be saved to preserve the settings. The project is reloaded and the simulator or debugger started, all the desired windows are opened. KEIL project files have the extension.

RESLUTS & DISCUSSIONS

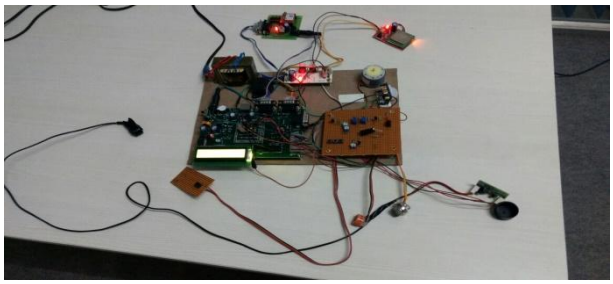

Fig.7.1: Original Hardware Kit

Fig. 7.2: Welcome to Project Fig. 7.3: Initializing Fig. 7.4: Connected

Fig. 7.2: Welcome to Project -Initializing - Connected

When It takes few minutes for initializing and as shown in figure 7.4. GPS Will be connected. It will be generated Latitude and Longitude as shown in figure 7.5. and 7.6 Rapidly…..

Fig. 7.5: LT & LG Fig. 7.6: Enter Code Fig. 7.7: Code

Fig. 7.5: LT &LG values- Enter Code – Code

It takes enter code for verification as shown in above figure 7.7.When it is correct to continue the process like bellow figuree bellow figures.

Fig. 7.8: AL & Gas Fig. 7.9: EB Open

Fig. 7.8: AL &Gas -EB Open

Alcohol and Gas detection as shown in figure7.8.and EB is Open as shown in fig.7.9.in this steps for continues process. Each Sensor performs a differently like…..

PULSE SENSOR:

Fig. 7.10: Pulse Sensor Fig. 7.11:Pulse reading

Fig. 7.10: Pulse Sensor -Pulse reading

It takes pulse reading to connect your finger as shown in figure7.10. Then will respond a pulse sensor movement is nearer to the PIR sensor, after it takes some time to generate a pulse sensor(PS) as shown in above fig 7.11.

Fig. 7.11: Sending SMS Fig.7.12: SMS Alert Fig.7.12: SMS Sended

Fig. 7.11: Sending SMS - SMS Alert - SMSSended

When the Mobile Number Registration is initialized to kit. So SMS alters are in mobile as shown in fig.7.11 and fig. 7.12.

ISSN No: 2348-4845
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ALCOHOL SENSOR:


Fig.7.13: Alcohol Sensor

Fig.7.14: AL reading

Fig.7.15: Capture

Fig.7.13: Alcohol Sensor - AL reading -capture

It takes spare using Alcohol sensor as shown in fig.7.13. so, it will generate a alcohol range in particular surroundings as shown in fig.7.14and fig,7.15.

GAS SENSOR:


Fig.7.16: Gas Sensor

Fig.7.17: Gas reading

Fig.7.16: Gas Sensor - Gas reading

It takes lighter by using Gas sensor as shown in fig.7.16. so, it will generate Gas reading in particular surroundings as shown in fig.7.17.

CONCLUSION AND FUTURE ENCHANCEMENT:

CONCLUSION:

The project "Driver Safety and Security System for Vehicle" has been successfully designed and tested. In this project, to avoided accident is due to drowsiness, alcohol consumption and abnormal pulse rate of driving person. In addition to theft detection, security system and person level identification is determined. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented. The Accidents due to is avoided by implemented.

Table 6: Data types

Data Types	Size in Bits	Data Range/Usage
unsigned char	8-bit	0-255
signed char	8-bit	-128 to +127
unsigned int	16-bit	0 to 65535
signed int	16-bit	-32,768 to +32,767

FUTURE ENHANCEMENT:

The Driver Safety and Security System for Vehicle using GSM and GPS is implemented to avoid accidents due to alcohol consumption, abnormal pulse rate etc., of a driving person. In future it can be modified to utilize IOT, Mobile hand held system and face recognition techniques can be used to provide better solutions.

REFERENCES:

1. Alexander M. Chan, Nandakumar Selvaraj, Nima Ferdosi, and Ravi Narasimhan, (2014)'Wireless patch sensor for remote monitoring of Heart Rate Respiration, Activity and Falls.

2. Martinez F,Toh, Cano J.C, Calafate C. and Manzoni P, 2010,'Emergency services in future intelligent transportation systems based on vehicular communication networks', IEEE Intelligent Transportation Systems Magazine.

3. Chin Teng Lin, 2014'Wireless and Wearable EEG System for Evaluating Driver Vigilance', IEEE Transactions on biomedical circuits and systems, Vol.15,No.8,pp.230-255.

4. Chuan L. and Hong,' Method of Freeway Incident Detection Using wireless Positioning', in proceedings of the IEEE International Conference on Automation and Logistics.

5. Chi Zhang, Hong Wang and Rongrong Fu,' Automated Detection of Driver Fatigue Based on

Entropy and Complexity Measures', IEEE Transaction on intelligent transportation systems.

6. Dai, Jin Teng, XiaoleBai, Zhaohui Shen (2010),'Mobile Phonebased Drunk Driving DetectionPervasiveComputingTechnologiesforHealthcare',InternationalIEEEConference.

7. ARM7TDMI datasheet ARM

8. LPC2119/2129/2194/2292/2294 User Manual Philips

9. ARM System on chip architecture Steve Furber

10. Architecture Reference Manual David Seal

11. http://ieeexplore.ieee.org

12. http://www.keil.co.uk
http://gcc.gnu.org/onlinedocs/gcc/Evaluation Boards And Module.

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Mrs.M.Kalpana received her Master of Technology degree from Seshachala Institute of Technology in 2015. Currently working as an Assistant Professor in ECE department of SHREE Institute of Technical Education, affiliated to JNTUA, Tirupati, A.P. India. She is having more than 4 years teaching experience in engineering education. She was participated and presented papers in various National and International conferences and workshops. Her research areas including but not limited to image processing and Digital Electronics.