Research Article Impact Factor: 0.621 ISSN: 2319-507X
Sagar More, IJPRET, 2014; Volume 2 (9): 279-289 IJPRET

INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

VEHICLE ACCIDENT DETECTION SYSTEM USING SMS APPLICATION AND GSM

PROF. SAGAR P. MORE[1], PROF. P. D. DUDHAT[2], PROF. MRS. S. P. RATHOD[3]

1. Assistant Professor, Department of Electrical, Electronics and Power Engg (BNCOE) Pusad
2. Assistant Professor in Department of Electrical Electronics and Power (BNCOE) Pusad (M.S.) India.
3. Assistant Professor in Department of Electrical Electronics and Power, (BNCOE) Pusad (M.S.) India.

Accepted Date: 27/02/2014 ; Published Date: 01/05/2014

Abstract: Major studies done by the World Health Organization and the Transport Research Laboratory, showed a growing significance of accidents as a cause of death mainly in developing and transitional countries. These studies showed that in 2008, between 7,50,000 and 8,00,000 people died as a result of crashes. Most of these fatalities (83 to 86 percent) occurred in developing countries. These studies reveal an extremely high rate of injuries due to these types of accidents: 23-34 million injuries per year. Similarly, 20% of deaths occurred due to not getting medical help on time. A Vehicle Accident Detection System with SMS Application using GSM Modem have been put into practical application. By automatically sending the SMS to predefined numbers, this system helps to reduce accident deaths. It is developed aiming to contribute to the reduction in traffic accident deaths at low cost.

Keywords: Literature review, Hardware description, Smoke detector, Future scope.

Corresponding Author: PROF. SAGAR P. MORE

Access Online On:

www.ijpret.com

How to Cite This Article:

Sagar More, IJPRET, 2014; Volume 2 (9): 279-289

PAPER-QR CODE

INTRODUCTION

In India, in recent years, although the general trend in the death toll due to traffic accidents has been a gradual increased, it still exceeds around 8,000 people every year. Moreover, there is an increasing trend in the number of traffic accidents, which stands at around a million every year. Since a large proportion of traffic accidents is caused by the driver (namely, human error), our system which stop human-error accidents before they occur or alleviate damage by alerting the driver of the vehicle just before an accident occurs have been actively developed.

This adaptive driver-assistance system ensures safe driving by assisting the driver by alerting him before accident occur and maintaining driver performance by supporting a driver's "recognition," "judgment," and "actuation" actions.

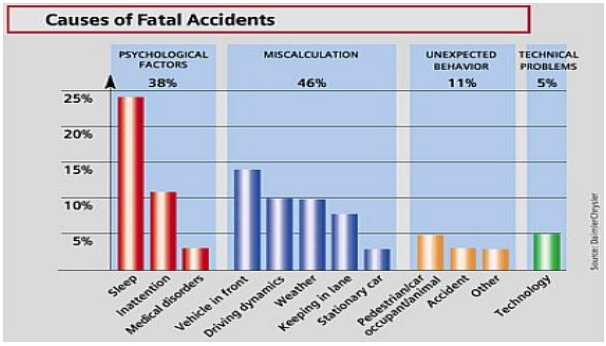
LITERATURE REVIEW

Transportation-Another Accident Preventation System.

Driver assistance systems will help to prevent accidents only if they can provide unambiguous information at exactly the right time. But just when is the optimum moment? DaimlerChrysler researchers want to find out—by observing the processes going on inside the driver's head. "This product may be harmful to your health" could just as well be printed on every car, as it is on packs of cigarettes. That's the opinion of Professor Kare Rumor of the Swedish Road and Transport Research Institute in Linköping. "Being part of road traffic is still the most dangerous everyday activity in most countries—about 40 times more dangerous than working in industry," says Rumor. Statistics corroborate this grim picture. About 42,000 persons currently die in traffic accidents every year in Europe. Only cancer is associated with a higher risk of fatality. Yet, the number of road accident victims has dropped by almost half since 78,000 were killed in 1970, the worst year ever.

The automotive industry itself is taking part of the credit for this improvement, mainly because cars have become much safer in the last 30 years. Systems like the airbag (introduced on the

market in 1981), intelligent wheel brakes such as ABS (1978), ESP (Electronic Stability Program, 1995) and BAS (Brake Assistant, 1996) have reduced the seriousness of accidents or even prevented many. But the automakers don't intend to rest on their laurels. The DaimlerChrysler AG board member responsible for research, Klaus-Dieter Porringer, describes the goal as follows: "In the future, it will be possible to avoid half of all accidents—provided the vehicles involved are equipped with driver assistance systems." Electronic systems are supposed to recognize critical situations early enough to inform or warn the driver, or automatically intervene in an emergency. Porringer even believes that they will put the vision of "accident-free driving" within reach in the coming decades: "We have intentionally framed our vision in the most ambitious way in order to exploit all the technological solutions," he says.



The research results give cause for optimism. Today, for example, some 38 % of fatal traffic accidents occur because the driver was distracted or falling asleep; 46 % are due to miscalculations.

Working:

The model includes temperature sensor, smoke detector (IR transmitter and receiver) and vibration sensor.

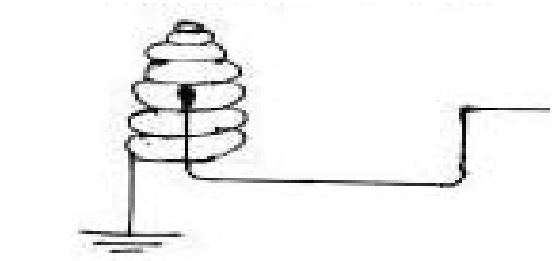


Fig. Vibration Sensor

The vibration sensor is costly so we have designed mechanical sensor as shown above. The designed circuit gets the power from the battery of vehicle.

The circuit includes PIC controller, 16x2 LCD display, matrix keyboard and sensors. Using the microcontroller programming, the parts are initialized first, then initialization of LCD display is carried out. The LCD used here is 16 x 2 LCD.

Description of LCD pins can be given as

1st – Ground

2nd – VCC

3rd – Contrast control

4th – RS bit

5th – Read/write bar

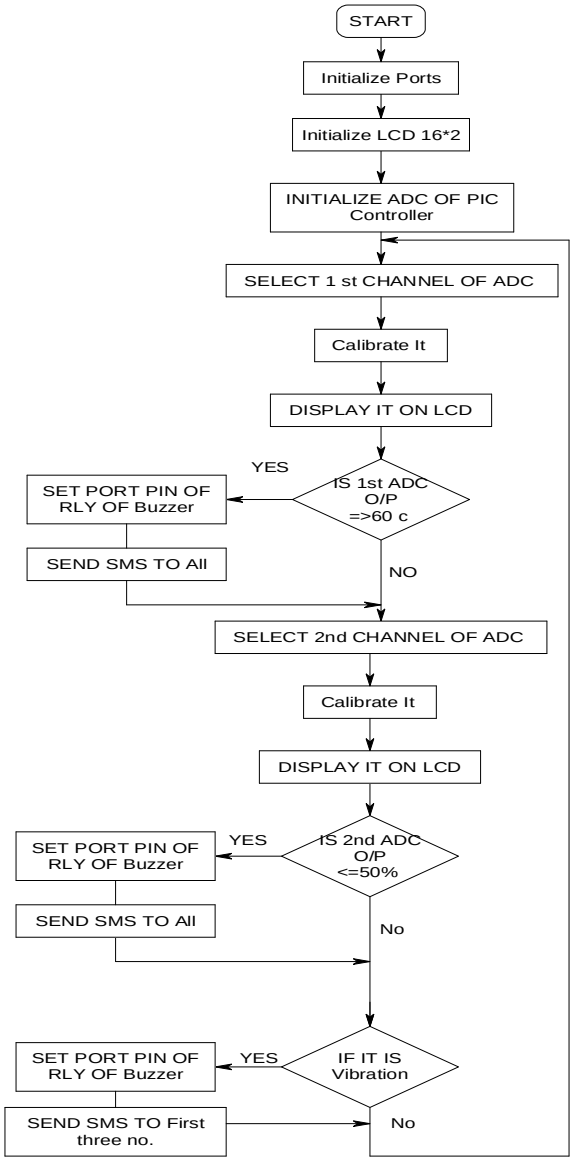
6th – Unable bit.

To send any data on LCD, the 6th pin is to be made high/low. D0-D7 are data/command bus. This can be used in 4/8 bit. In our circuit, 8 bit is used. LCD's RS bit and D0-D7 & E bit are connected to single port of microcontroller. PIC controller contains inbuilt ADC pins. Temperature sensor is connected to this pin. The output of smoke detector and vibration sensor is connected to another port pin of microcontroller. Serial port i.e. transmitter and receiver bit is connected to GSM modem.

The output of temperature sensor is in the form of voltages which converts analog to digital and the value is in the form of Hex calibrated. Hex values displays on LCD in the form of temperature. When the temperature of vehicle crosses the defined upper limit, SMS starts sending to the number stored in EEPROM of microcontroller. The numbers can be write using keyboard.

Same applications are carried out when vibration sensor and smoke detector sensors senses. The data is send serial by serial to GSM modem in particular baud rate and AT command format.

Flowchart

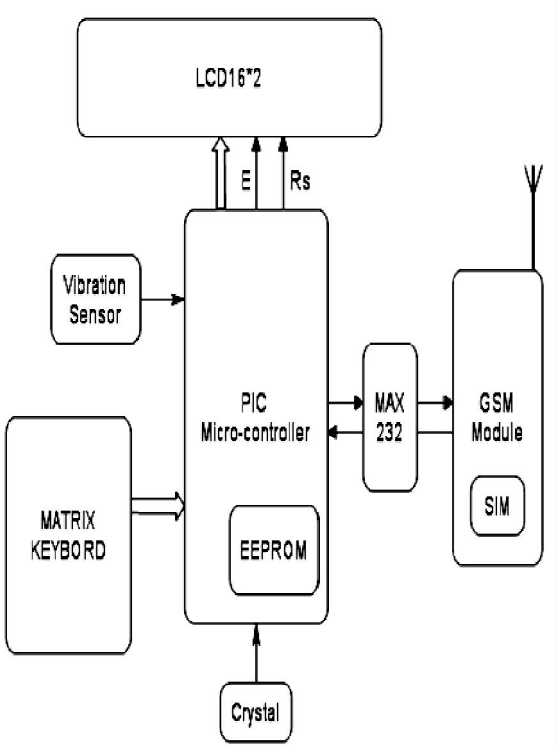


Hardware Description

It is built around the PIC micro controller from Microchip. This micro controller provides all the functionality of the SMS alert system. It also read the temp. And smoke transducer (sensors) a particular range that is predefine values. This time can be varied by adopting small changes in the source code. The uniqueness of this project is, not only alerting the neighbors by its siren,

but also it sends a SMS to four mobile numbers along with latitude and longitude. This numbers can be changed at any time by the user using a 3X4 key pad. These numbers are stored in EEPROM. First two no. for ambulance and fire bridged as per requirement and other no. for family members. Whenever accidents done then SMS send only ambulance and family members otherwise it sends to all. This project uses regulated 5V, 750mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

Block Diagram



Component Description.

Microcontroller PIC16F877

High-Performance RISC CPU:

- Only 35 single-word instructions to learn
- All single-cycle instructions except for program branches, which are two- cycle
- Operating speed: DC – 20 MHz clock input DC – 200 ns instruction cycle

• Up to 8K x 14 words of Flash Program Memory, Up to 368 x 8 bytes of Data Memory (RAM), Up to 256 x 8 bytes of EEPROM Data Memory.

• Pin out compatible to other 40/44-pin.

Periferal Feature

• Timer0: 8-bit timer/counter with 8-bit prescaler

• Timer1: 16-bit timer/counter with prescaler, can be incremented during Sleep Via external crystal/clock

• Timer2: 8-bit timer/counter with 8-bit period register, presale and postscaler.

• Two Capture, Compare, PWM modules

-Capture is 16-bit, max. Resolution is 12.5 ns

-Compare is 16-bit, max. Resolution is 200 ns

-PWM max. Resolution is 10-bit

• Synchronous Serial Port (SSP) with SPI™ (Master mode) and I2C™ (Master/Slave)

• Universal Synchronous Asynchronous Receiver Transmitter (USART/SCI) With 9-bit address detection

• Parallel Slave Port (PSP) – 8 bits wide with external RD, WR and CS controls (40/44-pin only)

• Brown-out detection circuitry for Brown-out Reset (BOR).

• Analog Features:

• 10-bit, up to 8-channel Analog-to-Digital Converter (A/D)

• Brown-out Reset (BOR)

• Analog Comparator module with:

-Two analog comparators

-Programmable on-chip voltage reference (VREF) module

-Programmable input multiplexing from device inputs and internal voltage reference

-Comparator outputs are externally accessible

Special Microcontroller Features:

• 100,000 erase/write cycle Enhanced Flash program memory typical

- 1,000,000 erase/write cycle Data EEPROM memory typical
- Data EEPROM Retention > 40 years
- Self-reprogrammable under software control
- In-Circuit Serial Programming™ (ICSP™) via two pins
- Single-supply 5V In-Circuit Serial Programming
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
- Programmable code protection
- Power saving Sleep mode
- Selectable oscillator options
- In-Circuit Debug (ICD) via two pins

CMOS Technology:

- Low-power, high-speed Flash/EEPROM technology
- Fully static design
- Wide operating voltage range (2.0V to 5.5V)
- Commercial and Industrial temperature ranges
- Low-power consumption

Memory Organisation.

There are three memory blocks in each of the PIC16F87XA devices. The program memory and data memory have separate buses so that concurrent access can occur and is detailed in this section. The EEPROM data memory block is detailed in Section3.0 “Data EEPROM and Flash Program Memory”. Additional information on device memory may be found in the PIC micro.

Status Register

The Status register contains the arithmetic status of the ALU, the Reset status and the bank select bits for data memory. The Status register can be the destination for any instruction, as with any other register. If the Status register is the destination for an instruction that affects the Z, DC or C bits, then the write to these three bits is disabled. These bits are set or cleared according to the device logic. Furthermore, the TO and PD bits are not writable, therefore, the result of an instruction with the Status register as destination may be different than intended.

ULN 2803

The eight NPN Darlington connected transistors in this family of arrays are ideally suited for interfacing between low logic level digital circuitry (such as TTL, CMOS or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers or other similar loads for a broad range of computer, industrial, and consumer applications. All devices feature open–collector outputs and freewheeling clamp diodes for transient suppression.

Voltage Regulator 7805

The LM78XX series of three terminal regulators is available with several fixed output voltages making them useful in a wide range of applications One of these is local on card regulation eliminating the distribution problems associated with single point regulation The voltages available allow these regulators to be used in logic systems instrumentation Hafiz and other solid state electronic equipment Although designed primarily as fixed voltage regulators these devices can be used with external components to obtain adjustable voltages and currents The LM78XX series is available in an aluminum TO-3 package which will allow over 10A load current if adequate heat sinking is provided Current limiting is included to limit the peak output current to a safe value Safe area protection for the output transistor is provided to limit internal power dissipation If internal power dissipation becomes too high for the heat sinking provided the thermal shutdown circuit takes over preventing the IC from overheating Considerable effort was expanded to make the LM78XX series of regulators easy to use and minimize the number of external components It is not necessary to bypass the output although this does improve transient response Input bypassing is needed only if the regulator is located far from the filter capacitor of the power supply

For output voltage other than 5V, 12V and 15V the LM117 series provides an output voltage range from 12V-57V.

Features

- Output current in excess of 1A
- Internal thermal overload protection
- No external components required
- Output transistor safe area protection
- Internal short circuit current limit
- Available in the aluminum TO-3 package

Smoke Detector.

A smoke detector is a device that detects smoke, typically as an indicator of fire. Commercial, industrial, and mass residential devices issue a signal to a fire alarm system, while household detectors, known as smoke alarms, generally issue a local audible or visual alarm from the detector itself.

Smoke detectors are typically housed in a disk-shaped plastic enclosure about 150 millimeters (6 in) in diameter and 25 millimeters (1 in) thick, but the shape can vary by manufacturer or product line. Most smoke detectors work either by optical detection (photoelectric) or by physical process (ionization), while others use both detection methods to increase sensitivity to smoke. Smoke detectors in large commercial, industrial, and residential buildings are usually powered by a central fire alarm system, which is powered by the building power with a battery backup. However, in many single family detached and smaller multiple family housings, a smoke alarm is often powered only by a single disposable battery

Benefits and limitations.

BENEFITS:

- This system will reduce deaths due to the accident on roads.
- The system is much useful on highways.
- Circuit is easy to construct and install.
- This is low cost circuit.
- The parts of this circuit are easily available.

LIMITATIONS:

- Need GSM network all time.
- The temperature range should be predecided according to the vehicle specification and environment conditions
- Applications
- Human life security.
- Remote monitoring.
- Earthquake
- Accident Detection

CONCLUSION

It is expected that our systems will contribute to the reduction of traffic accident deaths; moreover, if the aging of society is taken into consideration, it is thought that such systems will become even more essential features of vehicles in the future.

As we know that due to road accidents, more than 10000 people died every year in India. Thus the accident prevention system can be helpful to reduce these deaths.

FUTURE SCOPE

1)The system will contribute to the reduction of traffic accident deaths

2)Provides security to the human being

3) The system will provides easier transportation

REFERENCES

1. S. Kuragaki et al., "An Adaptive Cruise Control Using Wheel Torque Management Technique," SAE Transactions, 98060 (Feb. 2005).

2. H. Kuroda et al., "Vehicle Control and Information Systems," Hitachi Hyoron 84, pp. 541-546

3. Design with PIC Micro controllers By John b. Peat man

4. Micro-controller by Jay Deshmukh.

5. Microcontroller Apps PIC Micro controller Applications Guide by David Benson.

6. Working with GSM Network by Cruise Leonardo.

7. Power Grid Control and Applications with GSM by Morris Harington.