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AN AUTOMATIC DRIVER DROWSINESS ALERT AND VEHICLE CONTROL SYSTEM BY USING GSM AND ALTRASONIC TECHNOLOGY

P.Rajeev[1] & G.V.Vinod[2]

[1]M.Tech, Vikas college of Engineering and Technology
[2]Assistant Professor, Vikas Group of Institution

ABSTRACT

Drowsy is the reason for most of the road accidents. Manually tracing the drowsy driver is not an easy task, because every day thousands of vehicles are running on the roads. So we need a system that must come with every car and if it detects the sleepy driver it must stop the vehicle immediately. In addition to this if the driver is slept the vehicle will be stopped, and it monitors the heartbeat, Respiration rate and temperature of the driver and displays it in the LCD. These three parameters are very important because it shows the body status of the driver. These parameters are monitored manually and in case of emergency the in -charge of the ward calls the doctor.

Keywords: *LCD display, GSM, GPS, 8051 Microcontroller, and Motor.*

I. INTRODUCTION

Driver drowsiness detection is a car safety technology which helps prevent accidents caused by the driver getting drowsy. Various studies have suggested that around 20% of all road accidents are fatigue-related ,up to 50% on certain roads .Some of the current systems learn driver patterns and can detect when adriver is becoming drowsy. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Because of the hazard that drowsiness present son the road, methods need to be developed for counteracting its affects.

The aim of this project is to develop a prototype drowsiness detection system. The focus will be placed on designing a system that will accurately monitor the eye blink rate, heart-beat respiration rate and temperature of the driver .In the project we use sensors to measure all these factors. The values measured will be sent to the microcontroller where the measured values will be compared with the reference values. If the values measured do not match with there ference values then the microcontroller will send a warning sign in the LCD display thereby preventing accidents.

II. PROPOSED DROWS INES S ALERT UNIT

This is a s mall system, so we can easily embed it on any vehicle. The Eye blink sensor is fixed to the driver. The eye blink sensor senses the movement of the eyeball. The sensor output is connected to a microcontroller. The car engine starting system is directly controlled by the microcontroller. If the sensordetects the no output from the sensor because there is no movement in the eyeball, it sends the signal to the microcontroller. The microcontroller immediately stops the engine or locks it from starting, also give warning signal and display the reason in a LCD. The system is developed by interfacing a heart beat sensor, eye blink sensor and a temperature sensor with an ADC which converts the analog readings to digital ,thus extracted dig ital data is processed using a microcontroller. The reference values of these three parameters and the phone number arestored in the microcontroller memory . If any one of these three parameter exceeds the reference value the microcontroller automatically calls thestored number. The microcontroller used here is PICI6F877A, it has an in built ADC and counters, and the counter is used to count heartbeat, respirator rate and ADC for converting analog temperature to digital.

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III. PROPOSED SYSTEM

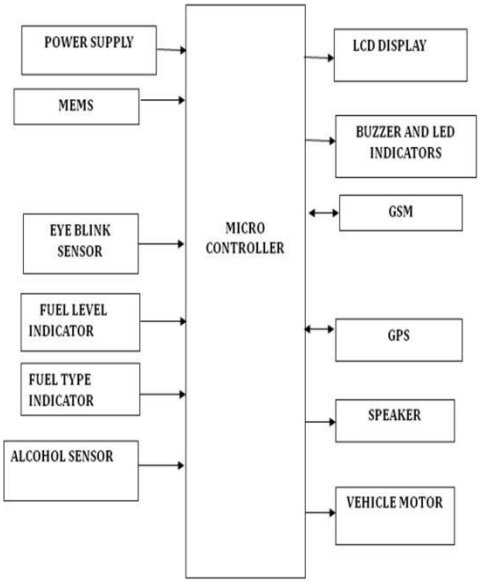

Fig.1: Block Diagram

IV. METHODOLOGY

Micro controller:
This section forms the control unit of the whole p roject. This section basically consists of a Microcontroller with its associated circuit ry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI:
ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simp ler than those of Co mp lex Instruction Set Computer (CISC) designs.

Liquid-crystal display (**LCD**):
It is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

Power Supply Unit:
Supply of 230v, 50Hz ac signal from main supply board is given to a step down transformer. The transformer is selected such that its output ranges from10v to 12v.Thus the main function of the power supply is to give the voltage supply required for the logic families, which is an output of +5v.5v regulated supply can be shown as below. Power Supply Unit Diagram The ac voltage typically 230v is connected to the transformer, which steps the ac voltage down to initially filtered by a simp le capacitive filter to produce a dc voltage usually has some ripple o r ac voltage variation. A regulator circuit can use this dc in put to provide a regulated that not only has much ripple voltage. This voltage regulation is usually obtained using one of a number of proper voltage regulation IC units.

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MEMS:

Micro-Electro-Mechanical Systems (MEM S) is the integration of mechanical elements, sensors, actuators, and electronics on a co mmon silicon substrate through micro fabrication technology. While the electronics are fabricated using integrated circuit (IC) p rocess sequences (e.g., CMOS, Bipolar, or BICMOS processes), the micro mechanical co mponents are fabricated using compatible " micro machining" processes that selectively etch away parts of the silicon wafer or add new structural layers to form the mechanical and electro mechanical devices. M EMS pro mises to revolutionize nearly every product category by bringing together silicon-based microelectronics with micro mach ining technology, making possible the realization of comp lete systems -on-a-chip. M EMS is an enabling technology allo wing the develop ment of smart products, augmenting the computational ability of microelectronics with the perception and control capabilit ies of micro sensors and micro actuators and expanding the space of possible designs and applications. Microelectronic integrated circuits can be thought of as the "brains" of a system and M EMS augments this decision-making capability with "eyes" and "arms", to allo w micro systems to sense and control the environment. Sensors gather information fro m the environ ment through measuring mechanical, thermal, bio logical, chemical, optical, and magnetic phenomena. The electronics then process the informat ion derived fro m the sensors and through some decision making capability d irect the actuators to respond by moving, positioning, regulating, pumping, and filtering, thereby controlling the environment for some desired outcome or purpose. Because MEMS devices are manufactured using batch fabrication techniques similar to those used for integrated circuits, unprecedented levels of functionality, reliability, and sophistication can be placed on a small silicon chip at a relatively low cost.

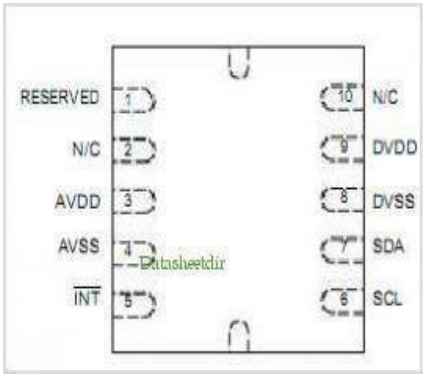

Fig.2: MEMS IC

Fuel level sensor:

The sensor used for measurement of fluid levels is called a level sensor. The sensing probe element consists of a special wire cable which is capable of accurately sensing the surface level of nearly any fluid, including water, saltwater, and o ils. The sensor element is electrically insulated and isolated fro m the liquid into wh ich it is inserted, and will not corrode over time. Unlike, other sensors, the measurement range is adjustable from a few centimeters to over several meters. A variety of sensors are available for point level detection of solids. These include vibrating, rotating paddle, mechanical (d iaphragm), micro wave (radar), capacitance, optical, pulsed-ultrasonic and ultrasonic level sensors

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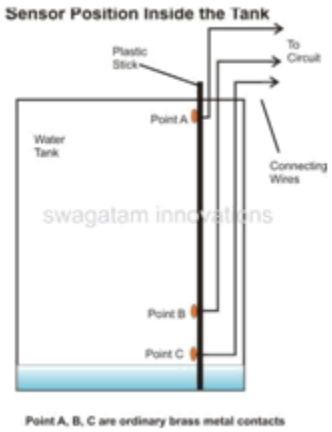

Fig.3: Water level sensor

Alcohol sensor:

Sensitive material of M Q-3 gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity is higher along with the gas concentration rising. Please use simple electro circu it, Convert change of conductivity to correspond output signal of gas concentration. MQ-3 gas sensor has high sensitivity to A lcohol, 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.

Fig.4: Alcohol sensor

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 electro mechanical 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 fro m 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 equip ment telephones, etc. And they are applied widely, for example, in alarms, speakers, telephone ringers, receivers, trans mitters, beep sounds, etc.

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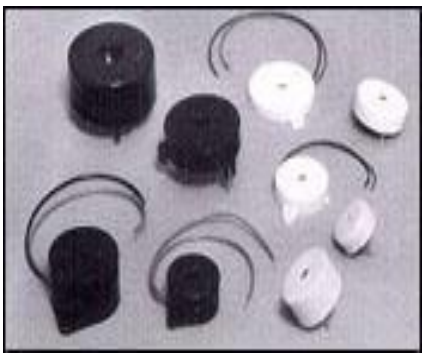

Fig.5: Types of Buzzers

LED: A light-emitting d iode (LED) is a semiconductor light source.LEDs are used as indicator lamps in many devices, and are increasingly used for lightning. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultravio let and infrared wavelengths, with very high brightness.

GSM:
Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service. The network is structured into a number of discrete sections:

- j Base Station Subsystem – the base stations and their controllers explained
- k Network and Switching Subsystem – the part of the network most similar to a fixed network, somet imes just called the "core network"
- l GPRS Core Network – the optional part which allows packet-based Internet connections

SM was intended to be a secure wireless system. It has considered the user authentication using a pre-shared key and challenge-response, and over-the-air encryption. However, GSM is vulnerable to different class of attacks, each of them aiming a d ifferent part of the network.

Fig.6: GSM Module

GPS:
Global Positioning System (GPS) technology is changing the way we work and play. You can use GPS technology when you are driving, flying, fishing, sailing, hiking, running, biking, working, or exploring. With a GPS receiver, you have an amazing amount of information at your fingertips. Here are just a few examples of how you can use GPS technology.

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GPS technology requires the following three segments.

4. Space segment.
5. Control segment.
6. User segment

Space Segment

At least 24 GPS satellites orbit the earth twice a day in a specific pattern. They travel at approximately 7,000 miles per hour about 12,000 miles above the earth's surface. These satellites are spaced so that a GPS receiver anywhere in the world can receive signals from at least four of them.

Control Segment

The control segment is responsible for constantly monitoring satellite health, signal integrity, and orbital configuration from the ground control segment includes the following sections: Master control station, Monitor stations, and Ground antennas.

User Segment

The GPS user segment consists of your GPS receiver. Your receiver collects and processes signals fro m the GPS satellites that are in v iew and then uses that information to determine and d isplay your location, speed, time, and so forth. Your GPS receiver does not transmit any information back to the satellites.

The following points provide a summary of the technology at work:

The control segment constantly monitors the GPS constellation and uploads information to satellites to provide maximu m user accuracy.

= Your GPS receiver collects information from the GPS satellites that are in view.

= Your GPS receiver accounts for errors. For more information, refer to the Sources of Errors.

= Your GPS receiver determines your current location, velocity, and time.

= Your GPS receiver can calculate other informat ion, such as bearing, track, trip distance, and distance to destination, sunrise and sunset time so forth.

= Your GPS receiver displays the applicable information on the screen.

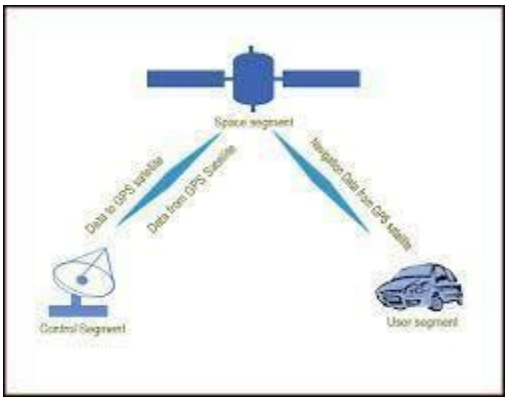

Fig.7: GPS Working

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DC Motor:

A DC motor relies on the fact that like magnet poles repels and unlike magnetic poles attracts each other. A coil o f wire with a current running through it generates an electromagnetic field aligned with the center of the coil. By switching the current on or off in a co il its magnetic field can be switched on or off or by switching the direction of the current in the coil the direction of the generated magnetic field can be switched 180°.

Fig.8: DC Motor

Motor driver:

DC motors are typically controlled by using a transistor configuration called an "H -bridge". This consists of a minimu m of four mechanical or solid-state switches, such as two NPN and two PNP transistors. One NPN and one PNP transistor are activated at a time . Both NPN and PNP transistors can be activated to cause a short across the motor terminals, wh ich can be useful for slowing down the motor from the back EMF it creates.

Table: operation of H-Bridge

High Side Left	**High Side Right**	**Low Side Left**	**Low Side Right**	**Quadrant Description**
On	Off	Off	On	Forward Running
Off	On	On	Off	Backward Running
On	On	Off	Off	Braking
Off	Off	On	On	Braking

H-bridge. So metimes called a "full bridge" the H-bridge is so named because it has four switching elements at the "corners" of the H and the motor forms the cross bar. The switches are turned on in pairs, either high left and lower right, or lower left and high right, but never both switches on the same "side" of the bridge. If both switches on one side of a bridge are turned on it creates a short circuit between the battery plus and battery minus terminals. If the bridge is sufficiently powerful it will absorb that load and your batteries will simp ly drain quickly. Usuallyhowever the switches in question melt.

V. CONCLUSION

In this work we propose a deployment algorithm based on migration rat ios between urban cells without relying on the individual vehicles trajectories. We have so many advantages by implementing this project, it gives complete solution for traffic and transport related problems such as accident alert, tollgate control, parking management and special zone alert system. It is proposed as a low cost optimized solution using RFID and GSM modem.

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