

Real Time Based Driver's Safeguard System by Analyzing Human Physiological Signal

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Abstract: This project “Real Time Based Driver’s Safeguard System by Analyzing Human Physiological signal” is used to reduce the accidents and death rate which is done by the drunk and driving persons and also by the drowsy persons. When a car’s battery is switched ON, then the alcohol sensor also gets ON. Then it senses the persons current state; if the person hasn’t drunk then the car engine gets ON or else the car wont gets ON. Some may drink alcohol while driving; the alcohol sensor will be in ON condition until the car’s battery is switched OFF. While the alcohol sensor senses that person is drinking alcohol while driving then the car speed will be reduced to 10KM/S using the level sensor and the parking lights start glowing and the car steering is controlled automatically and the car is brought to left for some particular angle and then the car gets OFF. At the same time using GPS and GSM the car’s longitude and latitude is sent to the police station. When a person gets heart attack suddenly while driving then he presses an emergency button then the ECG sensor is unlocked and the heart beatings are sensed and converted those signals into Radio Frequency and sent to the controller. At the same time using GPS and GSM the car’s longitude and latitude is sent to the police station and to the Hospital at the same time parking lights start glowing and the car speed will be reduced to 10KM/S using the level sensor and the car steering is controlled automatically and the car is brought to left for some particular angle and the car gets OFF. Based on the heart beatings value the controller sends a reply signal to the Adriano board which is present inside the car. Based on that signals value the Adriano board gets some voltage from battery and convert it to AC and then amplifies it and sent to the patient’s heart using the electrodes which is placed along with the ECG sensor. This is because to maintain the heart rate upto a level until the ambulance comes.

Keywords: Analyzing Human Physiological signal, Real Time Based Driver’s Safeguard System, car steering is controlled automatically.

1. INTRODUCTION

The article looks on the work of improving the accident reduce systems that are on previous existent. In this paper, we have provided an opaque way to reduce the Guidant that leads to death. This paper has the usage of latest sensors that is available in the market and user friendly systems that can reduce the risk of accidents and prevent the drivers.

2. EXISTING SYSTEM

In this paper a new approach based on bio-signal sensing was used for real time accident avoidance. A wireless embedded system with real time bio-signal processing technique was proposed. The bio-signals sensor module consists of ECG and alcohol sensor. These bio-signals were first acquired by the sensor module. Then the signal is processed and scheduled in the microcontroller. The processed signal is transmitted to the receiving section by using the wireless data communication. The GPS sense the latitude and longitude values. This received real time gps data is transmitted using by GSM. This can provide warning to the driver by giving alarm and also having vehicle engine ignition control for stopping the vehicle. The parking light must be turned on before the engine stops so that the driver’s coming behind can control the vehicle and thereby accident can be avoided. When you think of work-related safety hazards, you probably think about what goes on inside the workplace. But one of the greatest threats to your safety is not in the workplace, but rather on the

road. Someone is injured every 18 seconds. Over 2 million of those injuries turn out to be disabling. A person dies in a crash on U.S. roads every 11 minutes. In fact, motor vehicle accidents are the most common cause of death in the United States more than cancer or heart attacks. When we think about the serious accident, it could change your life- and not for the better. As of now most of the research and implementation on with mechanical behavior of the car, its safety and passengers, but what if the driver misbehaviors what can be done? Each year, car enthusiasts salivate at the prospect of seeing what bleeding-edge designs automakers will unveil on the car show circuit. Those same enthusiasts are often disappointed when the amazing concepts still haven't made it to the auto dealer's showroom floor several years later. But before any new car model can ever go on sale to the public, it must first undergo a battery of testing to make sure it'll be safe, reliable and reasonably in tune with the demands of the motoring public. The government demands some of this testing, while other major components of it are devised by the car companies themselves in an effort to ensure they meet specific standards for performance, fuel economy, comfort and other measures, but those which don't are axed.

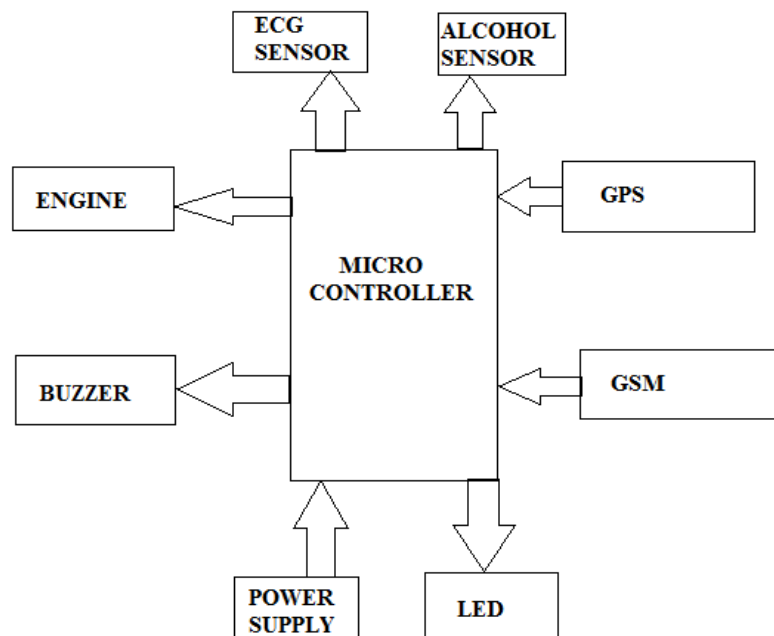
3. PROPOSED SYSTEM

Intelligent systems are in used with every aspect of systems, CARs are the critical systems which are real time and lives are involved. This System not only deals with component monitoring, does even more than that like Passenger activity monitoring, Behavior analysis, System behavior, Notification & co-ordinate. Alcohol detection are the vital and of great importance from the perspective of passenger safety and traffic safety. Impact detection and notification is also one of the life saving and critical information provider system.

Advantage:

- Easy and fast to install
- Superior urban canyon performance
- Low cost with high performance

4. BLOCK DIAGRAM



5. MODULES

Global Positioning System (GPS):

A variety of GPS modules designed for many different applications. The modules are classified into two families: FGPMOSLx and FGPMOPAx series (x denotes the model number). The major difference between these two families is the inclusion of smart patch antenna. PAX comes with the ceramic antenna, while SLx does not. These GPS modules

provide a complete GPS solution that excels in position, speed, and accuracy performances as well as high insensitivity and tracking capabilities in urban environment. The GPS module are powered by MediaTek Inc. It is necessary to provide a clean and stable power supply for our GPS module in order to obtain good performances (Ex: TTFF). Unstable power source will have a significant negative impact on the GPS performance. To achieve this, the Vcc ripple must be controlled under 50mVpp.

UART 0 (RX/TX) –Serial Interface:

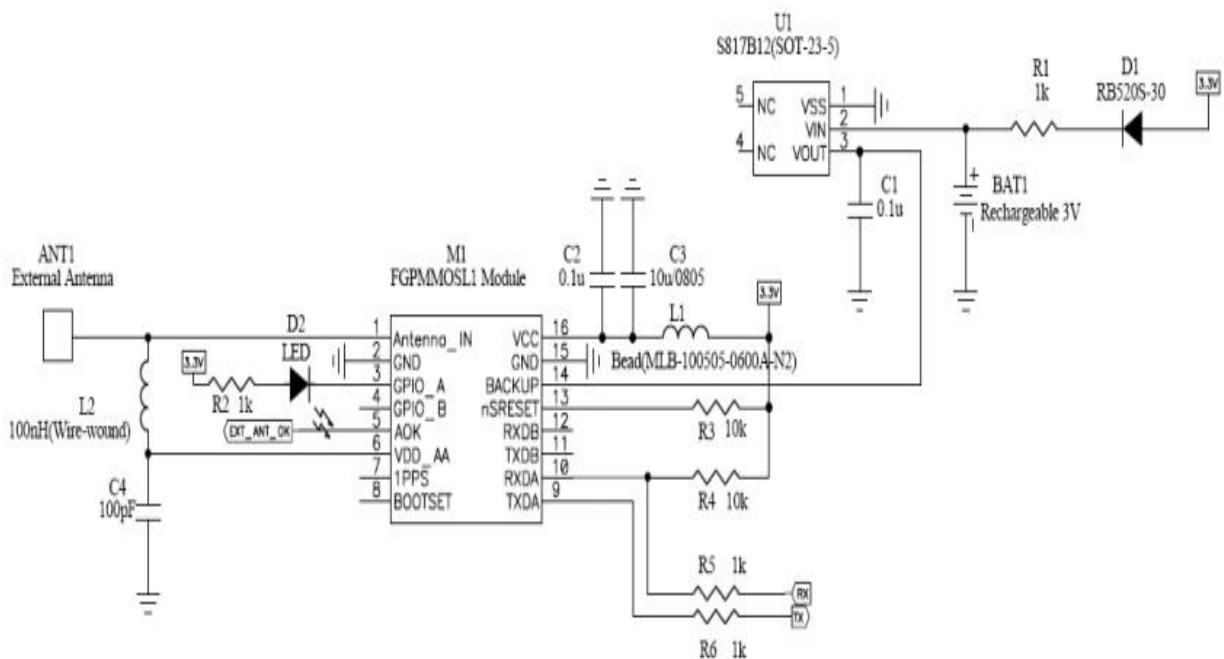
UART is the default interface, and it supports transfer baud rate ranging from 4800 bps to 115200 bps. The logic is TTL level. If the RS232 logic-level is needed for application, then the use of level shifters is necessary. Please leave RX open if it is not used, there is an internal pull-up to VCC. Please don't use an external pull-up for unexpected current draw.

Antenna Design, ANTENNA_IN:

GPS antenna is a receiving device to acquire weak GPS signal from sky. Popular solution would be ceramic patch antenna due to its small form factor with low cost. There are two types of antennas, passive and active. Passive antenna is with solely antenna itself. Active antenna is with LNA to have high gain with the cost of current supply.

Antenna can be chosen according to radiation efficiency, radiation pattern, gain, bandwidth, form factor and cost. Make sure the ground plane is sufficient for the antenna to operate with acceptable performance. And place the matching circuit between antenna and GPS module to compensate the frequency shift due to PCB layout.

6. CIRCUIT DIAGRAM



7. GSM MODEM

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz.

THE GSM NETWORK:

GSM provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardware. The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers. The GSM network is divided into

three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS).

GSM MODEM:

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

As mentioned in earlier sections of this SMS tutorial, computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands. You can use a GSM modem just like a dial-up modem.

In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. With the extended AT commands, you can do things like:

- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.

The number of SMS messages that can be processed by a GSM modem per minute is very low -- only about six to ten SMS messages per minute.

GSM MODEM APPLICATIONS:

The GSM/GPRS Modem comes with a serial interface through which the modem can be controlled using AT command interface. An antenna and a power adapter are provided. The basic segregation of working of the modem is as under

- Voice calls
- SMS
- GSM Data calls
- GPRS.

8. MICROCONTROLLER

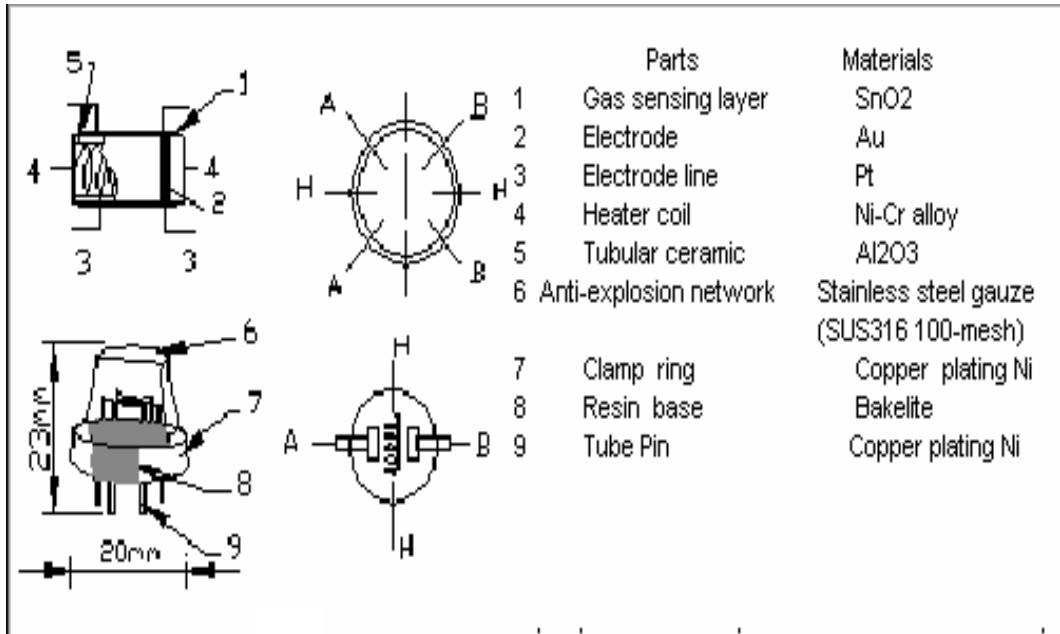
Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

MQ-3 Semiconductor Sensor for Alcohol:

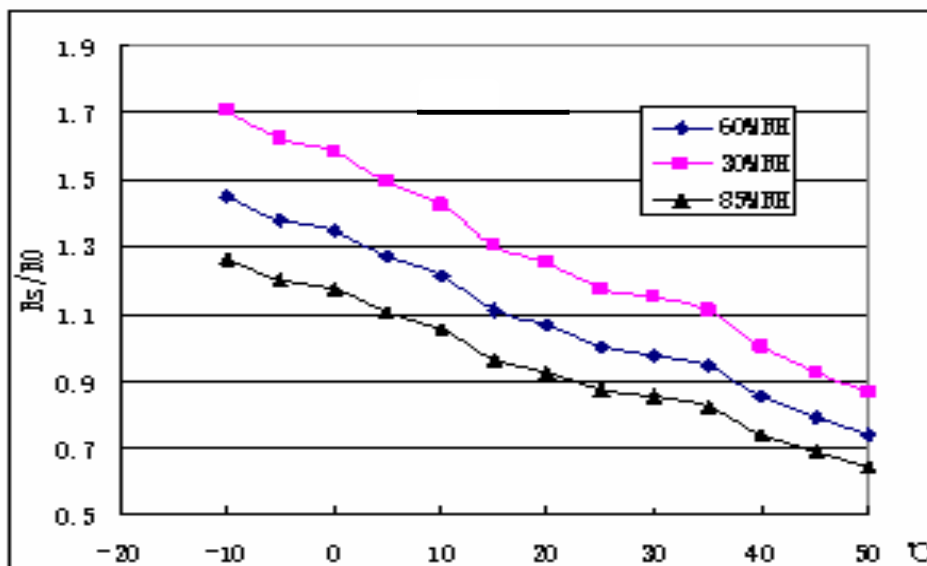
Sensitive material of MQ-3 gas sensor is SnO₂, which with lower conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity is more higher along with the gas concentration rising. Please use simple electro circuit, Convert change of conductivity to correspond output signal of gas concentration.

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.

9. STRUCTURE AND CONFIGURATION



Sensitivity Charactre:



ECG Sensor:

The ECG sensor measures electrical potentials produced by the heart. These small voltages are measured at the skin of the wrists and elbow through electrodes. The ECG sensor can also be used to measures the electrical potentials generated by muscles cells when these cells contract and relax. For safety reasons the sensor uses an optical coupler

to avoid any direct electrical contact between the person whose ECG is measured and the measurement interface or computer. The ECG sensor is delivered together with a package of 100 electrode patches.

The ECG sensor is an I2C digital sensor and can only be connected to special interface that support I2C digital sensors like the CMA MoLab interface. The ECG sensor ML84m is a digital sensor that converts the measured voltage value to a digital value via 14-bit analog signal to digital conversion. The resolution of the sensor is $0.3\mu\text{V}$.

RS-232:

In telecommunication, RS-232 is a standard for serial communication transmission of data. It formally defines the signals connecting between a *DTE* (data terminal equipment) such as a computer terminal, and a *DCE* (*data circuit-terminating equipment*, originally defined as *data communication equipment*), such as a modem. The RS-232 standard is commonly used in computer serial ports. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pinout of connectors. The current version of the standard is *TIA-232-F Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange*, issued in 1997. An RS-232 serial port was once a standard feature of a personal computer, used for connections to modems, printers, mice, data storage, uninterruptible power supplies, and other peripheral devices. However, RS-232 is hampered by low transmission speed, large voltage swing, and large standard connectors. In modern personal computers, USB has displaced RS-232 from most of its peripheral interface roles. Many computers do not come equipped with RS-232 ports and must use either an external USB-to-RS232 converter.

10. CONCLUSION

Therefore using this project I conclude that the death rate will be reduced which is done by the drunken and drowsy people and also we can safeguard the drivers by analyzing their physiological signal.

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