

Smart Vehicles

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Abstract- *Advances in Vehicles are one of the key enablers of the Smart Vehicles (SVs) development. In fact, SVs rely on safety sensors to interpret the environment, understand its conditions, and make driving-related decisions. Thus, it basically replicates the human driver actions when driving a vehicle. The objective of this project is to develop a system to keep the vehicle secure and protect it by accidents. The main aim of the project is to develop a system automatic speed control of vehicle and accident avoidance using microcontroller with various types of sensors and synchronizing the output of a sensors using the Bluetooth technology, This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable after receiving the message driver can take immediate action to avoid accident and provide require protection.*

Keywords- Smart Vehicle, Android App, Arduino, Bluetooth, GPS, Sensors

I. INTRODUCTION

Smart Vehicles are expected to bring considerable benefits to society, such as traffic optimization and accidents reduction. They rely heavily on advances in many different approaches and techniques. Increasing demand in urban mobility and modern logistics sector, the vehicle population has been steadily growing over the past several decades the number of traffic accidents has been maintaining in a high number during the past five years and people are having more and more vehicles

So in this project, the development of simple and low cost Smart Vehicle is presented. This proposed system uses Bluetooth based wireless serial data communication. For this purpose, Android based application programs for Bluetooth communication between Android based devices, display and indicators are used. At receiver end, a low cost microcontroller board (Arduino Uno) is programmed to receive and display messages in the above communication mode.

The main aim of the project is to design a system to protect the people who are inside the car as well as outside of the car and by using GPS tracker system we can also locate the location of vehicle and proving the output of the system

through various indicators, display system and android app to design a simple, easy and user friendly system, which can receive and display output in a particular manner which will help the user to easily keep the track condition of vehicle and surrounding area to avoid accidents.

II. SYSTEM DESCRIPTION

The system contain vehicle which operate smartly on the occurrence of any disturbances inside as well as outside of the vehicle by using sensors like distance sensor to detect the vehicles collision with external objects, On detection of this critical distance vehicle speed will immediately reduced and breaks will be applied. GPS Tracker will track the vehicle in case of theft. We can see the live location of the vehicle using G-Map.

Vehicle tilt sensors will be used to alert the driver against the vehicle collision. Alcohol and smoke sensors are used to check the drivers condition so that vehicle will not start. And it also contain door lock system in which door of vehicle will be lock until we doesn't provide a password it will secure the vehicle in case of theft.

Android based system which is developed to send and display the required information quickly to the intended user by using Bluetooth transceiver module interfaced with an Arduino UNO microcontroller board. The communication mode i.e. Bluetooth module is selected for data communication using the corresponding transceiver module with microcontroller. The smart vehicle is powered by Arduino with an AC power supply. Arduino is further connected with the different types of indicator and liquid crystal display system thought which driver can receive a signal in case of any disturbances and interruption to the vehicle. The Bluetooth module which carries out serial communication with mobile devices and transfers the data through over the network.

The system block diagram is shown in fig.1

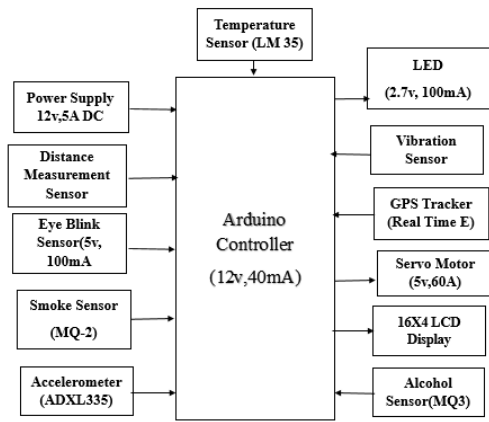


Fig. 1 Block Diagram

Once the sensors sends the signal to the indicators and display through controller then driver can take action according to the output received.

HARDWARE:

1) POWER SUPPLY:



Fig.2 Power Supply

A DC Power Supply Unit (commonly called a PSU) deriving power from the AC mains (line) supply performs a number of tasks:

1. It changes (in most cases reduces) the level of supply to a value suitable for driving the load circuit.
2. It produces a DC supply from a pure AC wave.
3. It prevents any AC from appearing at the supply output.
4. It will ensure that the output voltage is kept at a constant level, independent of changes in: a. The AC supply voltage at the supply input. b. The Load current drawn from the supply output. c. Temperature.

2) ARDUINO UNO R3:



Fig. 3 ARDUINO UNO R3

Arduino Uno is a microcontroller board based on 8-bit ATmega328P microcontroller. Along with ATmega328P, it consists other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, A Power barrel jack, an ICSP header and a reset button.

3) ULTRASONIC SENSOR (HC-SR04):

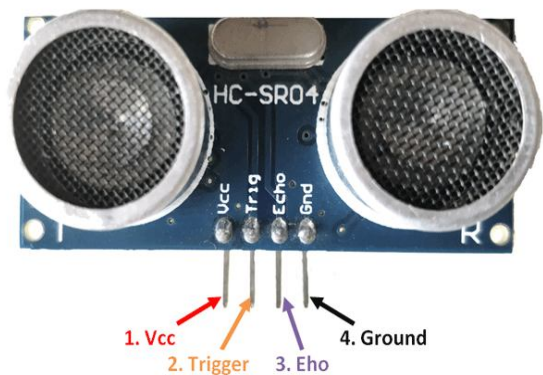


Fig. 4 Ultrasonic Sensor

As shown above the HC-SR04 Ultrasonic (US) sensor is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that

Distance = Speed × Time

4) SMOKE SENSOR (MQ2)



Fig 5. :- Smoke Sensor

The MQ2 Gas sensor can detect or measure gasses like LPG, Butane, Smoke, and even methane. The module version of this sensor comes with a Digital Pin which makes this sensor to operate even without a microcontroller and that comes in handy when you are only trying to detect one particular gas. When it comes to measuring the gas in ppm the analog pin has to be used, the analog pin also TTL driven and works on 5V and hence can be used with most common microcontrollers.

5) ALCOHOL SENSOR (MQ3)



Fig 6. :- Alcohol Sensor

The analog gas sensor- MQ3 is suitable for alcohol detecting, this sensor can be used in a breath analyzer. It has a high sensitivity to alcohol and small sensitivity to benzene. MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapour. It has fine sensitivity rangearound 2 meters. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.

6) ACCELEROMETER SENSOR

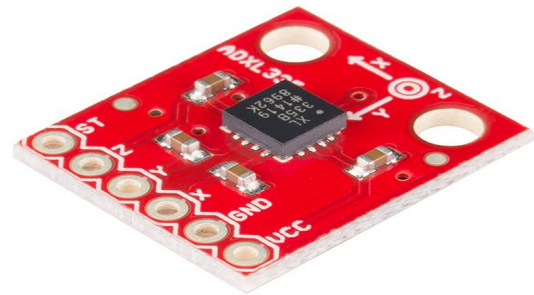


Fig 7. :- Accelerometer Sensor

The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ± 3 g. It can measure the static acceleration of gravity in tilt-sensing

applications, as well as dynamic acceleration resulting from motion, shock, or vibration

7) VIBRATION SENSOR



Fig 8. :- Vibration Sensor

A high sensitivity 801S Vibration Sensor module, which has two output signal pin. one digital pin(D0), When it detect some vibration up to certain threshold, it can output High or Low level. One analog pin(A0), it can real-time output voltage signal of the 801S vibration.

III. CONCLUSION

It may take time to the highest level of semi-automatic and fully automatic phase, but with the accumulation of intelligence technology, together with the formulate of the relevant laws and regulations and the acceptance of people, smart vehicle technology will achieve rapid growth and ultimately promote the smart car popularity.

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