

SMART BUS FOR HUMAN SAFETY

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ABSTRACT

With increase in new technology human life has become easier and at the same time threat to human life has also increased. The major threat to human life in countries like India is road accidents which can be minimized if the accidents are detected before it occurs. For such type of technology, accurate accident detection capability is needed. But in this project, we have to choose between living beings and objects and we have prioritize living being first, rather than objects. We are also going to implement system for no permission to unauthorized person, alcohol detection, over speed indication and emergency button if there is any danger which will avoid the accidents.

Keyword: -Human Being Detection, bus tracking, alcohol detection, over speed indication, no permission for unauthorized person, etc.

1. INTRODUCTION:

According to the Global Status Report on Road Safety by WHO 2013 [1], about 1.24 million deaths occur annually and number of animals dying in road accident is also quite good. For the reduction in number of car crashes, Charles Birdsong, Ph.D., Peter Schuster, Ph.D., John Carlin, Daniel Kawano, William Thompson has designed Pre-crash detection system using ultrasonic, laser range finder and radar sensors [2]. Accident Avoidance and Detection system on Highways is designed by S.P. Bhumkar, V.V. Deotare and R.V.Babar [3]. Also a lot of research work has been done on accident avoidance, crash detection and alarm system. Megalingam, Rajesh Kannan & their group have developed "Wireless vehicular Accident Detection and Reporting System" [4]. Automatic Accident Detection via Embedded GSM message interface with Sensor Technology is developed by C.Vidya Lakshmi, J.R.Balakrishnan [5]. The above mentioned system and research work has the ability to detect/sense the obstacles causing accidents but they lack in detecting living beings which is of major concern. But if the obstacle is human or animal then our system uses avoidance system and if avoidance is not possible and accident happens then this system generate an SMS, also internet based alert through GSM module, including tracking the position of accident using GSM.

2. BLOCK DIAGRAM OF PROPOSED

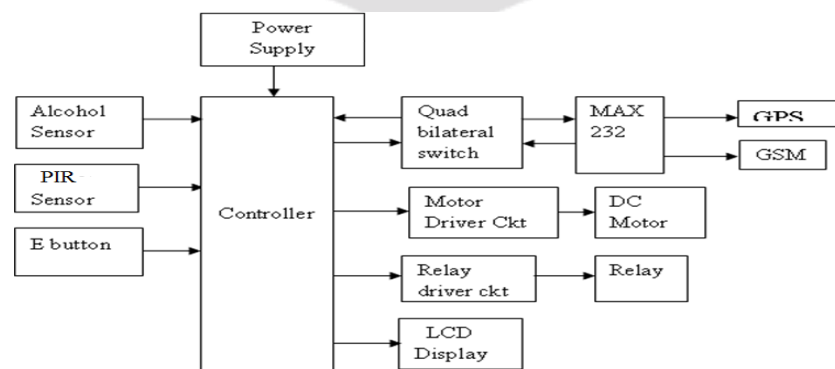


Figure 1: Block diagram

2.1 Passive Infra Red Sensor:-

The major part of this project is human or animal sensing which will be done by Passive Infra Red sensor. Living beings that generate heat also generate infrared radiation. The PIR sensor (a passive device) detects the heat or radiation generated by living being. Below is a picture of working principle of PIR sensor.

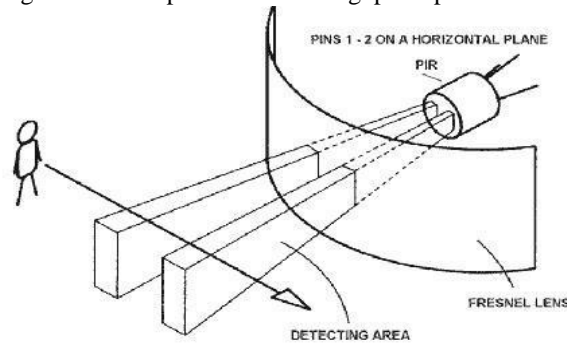


Figure 2: Working principle of PIR sensor [6].

The PIR sensor can create an output signal for approximately 1.2 seconds [6]. The area of detection for a PIR sensor is 3m in width, 5m in length & 3m in height. The PIR Sensor has a range of approximately 20 feet. These specifications can vary with environmental conditions as PIR sensor is a passive device.

2.2 Alcohol Sensor(MQ3 sensor):

The Alcohol detection system is designed to detect the presence of the amount of alcohol in the body. This system uses MQ3 gas sensor for detection of alcohol content and transfers the data to the controller. If the detected value is higher than the threshold value, the ignition system shuts down, thus preventing the drunk driver from driving [8].

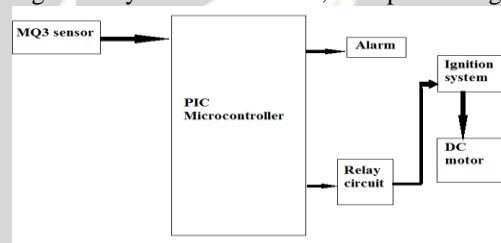


Figure3:Alcohol Detection System

Figure 3 shows an alcohol detection system used to detect alcohol content and Figure 4 shows the MQ3 alcohol sensor which is used to analyze breath to determine alcohol consumption.



Figure 4: MQ3 sensor

The MQ3 sensor converts analog signal into digital signal. This digital data is given to the microcontroller which compares the value with predefined threshold value. If the detected value is higher than the threshold value, a signal is sent to set the alarm inside the bus.

2.3: Emergency Button(E button):

As the name suggests, Emergency button is used for the emergency purposes like criminal attack, any health related emergency or to find your vehicle. Each vehicle has a unique Emergency button. Some can be operated only from a short distance, some work well from a long distance or some might get blocked by the obstacles .



Figure 5: Emergency Button

2.4: Bus Tracking Using GPS-GSM Model:

Tracking of bus or any vehicle using GPS-GSM is a concept by which the geographic location of a vehicle can be determined and transmitting this information to a remotely located server. In this project a microcontroller is interfaced serially to a GSM Modem and GPS Receiver. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle. The GPS modem will continuously give the data i.e. the latitude and longitude indicating the position of the vehicle[10]. To find the location of the vehicle, the owner has to send a message to the vehicle tracking system. When the user request is sent to the number at the modem, the system sends a return reply automatically to that mobile which indicate the position of the vehicle with latitude and longitude.

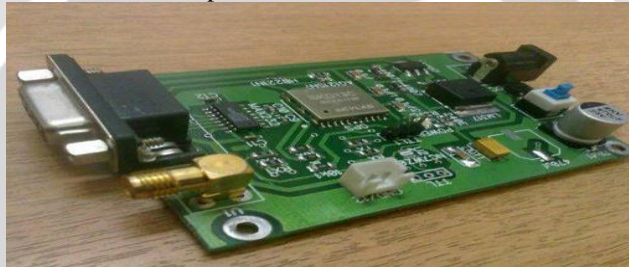


Figure 6: GPS Module [9]



Figure7: GSM Module [9]

2.5: Motor Driver Circuit:

Motor driver circuit is used for controlling the directions of motor. We have used Motor driver IC L293D for this project. Below are the specifications of motor driver and Figure 8 shows Pin diagram for motor driver.

- i. 600mA. Output current capability per channel
- ii. 1.2a peak output current (non repetitive)per channel
- iii. Enable facility
- iv. Internal clamps diodes
- v. Over temperature protection.
- vi. Logical "0" input voltage up to 1.5v (High noise immunity)

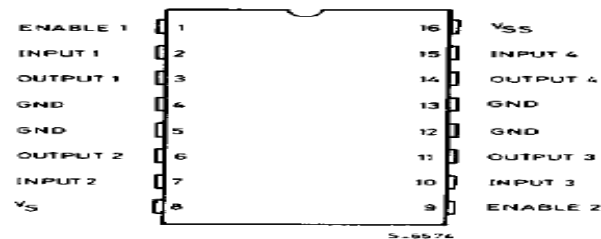


Figure 8: Motor driver

2.6: LCD Display:

LCD is used for the general displaying purpose. Below are the specifications of LCD used in this project.

- i. 16 character x 2 line dot matrix LCD module.
- ii. Powered by 5V DC
- iii. Can display:96 inbuilt ASCII characters,
 - 92 special characters
 - 8 custom characters

3. WORKING OF PROPOSED SYSTEM:

This system will deal with the various parameters which is required for the implementation of smart bus or any vehicle. The parameters included are human safety, bus tracking, no permission to unauthorized person, alcohol detection, over speed detection. The PIR sensor will be implemented in the smart bus. It will sense any living being in its range and if any human or animal is detected then the bus will immediately stop and the accident will be prevented.

4. FURTHER APPLICATION :

1. Avoiding Helicopter collision with birds or Air plane
2. Robots will be able to identify humans & animals.
3. In NASA robot to detect presence of life using sensor.
4. Earthquake survival finding inside buildings.
5. Fire survival finding inside buildings.

5. CONCLUSIONS:

This project is a reliable solution for prevention of road accidents which is a major cause of deaths. If this system is implemented in buses, then road accidents can be minimized to a greater extent. In this project, different parameters related to road safety are combined together to make a smart bus for human safety in India. This project will also be helpful in 100 smart city project launched by the government of India.

6. REFERENCES:

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