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Innovative Smart Car for Safe Drive

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Abstract: - **This paper focuses on how to avoid accidents due to drunk and driving and reduce the impact of the accidents by wearing seat belts. In recent times, accidents due to drunken driving are increasing. Drunken drivers will not be in stable condition and so the rash driving is the inconvenience for other road users and also question of life and death for the drunken driver and for others. The effects of accident can be minimized by wearing seat belts but people often neglect or forget to wear the seat belt. In current project, an Auto Lock System is developed. The input for the system is from Detection Sensors either from Alcohol Breath and the seat belt system. The controller polls the output from these sensors. If there are any traces of Alcohol above the set limit, and if seat belt is open, then the system will lock the Engine.**

Key words— **Sensor; Motor; Microcontroller; Embedded-C.**

I. INTRODUCTION

Transportation is the basic activity for the human race since the ancient times. The mode of transportation kept on evolving through the time line by using animals for transportation to carry people from one place to another. The invention of wheel played a major role in the transportation system. In the late 19th century, invention of engine changed the course of transportation. The invention of engine lead to the commercialization of vehicles and owning a vehicle turned out to be basic need rather than luxury. The things come in package and so vehicles come with both advantage and few disadvantages. The major drawback of the vehicles is that the loss of life due to road accidents because of various factors. Many traffic rules have been passed by the government to avoid and to minimize the accident damages. But they are not completely foolproof. The proposed system is an embedded system which involves various sensors which minimize the damage caused due to road accidents.

II. LITERATURE SURVEY

History of Seat Belts

Seatbelts are the secondary safety devices that operate to reduce the risk of serious or fatal injury when a crash occurs. Seatbelts have been required to be fitted to the driver's seating position to new goods-carrying vehicles over 4.5 tonnes since 1977 and for buses over 3.5 tonnes since 1987. Since seatbelt use by heavy vehicle occupants in NSW became mandatory in 2000, there has been a notable increase in seatbelt usage from an initial low rate of around one-third of truck occupants. Observational studies by the Centre for Road Safety showed that, in New South Wales in 2011, around one-quarter of heavy truck drivers still failed to wear seatbelts at all times. However, the wearing rates have been improving in recent years. Among truck driver deaths, NSW crash data for the five-year period 2010-12 (2012 preliminary data) shows that only 24% of these drivers were not wearing a seatbelt at the time of the crash. This compares favourably to 50% of truck driver fatalities in 2008-10 and 38% in 2009-11. Some attempts have been made to understand the reasons for non-use of seatbelts by this driver group. This research identified factors like: restriction in the use of side mirrors, discomfort during normal driving, inconvenience when performing deliveries and perceptions of impeding the driver's ability to move or escape from the cabin to avoid injury during or after a crash. In the past, public education campaigns have been used in NSW to promote seatbelt use among heavy vehicle drivers. (e.g., 'Do or die: seatbelts save truckers too'). Evaluation of the campaign suggested that it was effective in increasing heavy vehicle driver awareness of the effectiveness of seatbelts in reducing death and injury. However, it was felt that further communication was necessary to ensure that drivers are aware of their legal requirements to wear seatbelts and that operators are aware of their obligations under Workplace Health & Safety law to provide a safe working environment for their drivers. With the development of improved in-vehicle technology such as seatbelt warning systems, there are currently more options for ensuring seatbelt usage by heavy vehicle drivers and greater awareness of the need to encourage wearing. Research from the US suggests that some fleet managers discuss seatbelt use during safety meetings or have company policies requiring seatbelt use. This approach is encouraged by Roads and Maritime Services' practices and by NSW Work Cover. Although these other strategies exist, state-wide education campaigns are still a key approach adopted by TfNSW to encourage seatbelt wearing among heavy vehicle drivers. Heavy Vehicle Driver Seatbelt Use the NSW Road Safety Strategy 2012-2020 highlights the need to increase heavy vehicle compliance, and therefore a new campaign is proposed to encourage restraint use among heavy vehicle drivers. Research is required into the attitudes and practices of heavy vehicle drivers, in order to guide and inform, and ensure effective targeting of, the campaign. The research will also help to guide a more holistic countermeasure strategy to help increase seatbelt use among heavy vehicle drivers.

III. METHODOLOGY

A. Microcontroller:

Microcontrollers are "embedded" inside some other device. They can control the features or actions of the product. Another name for a microcontroller is "embedded controller". Microcontrollers are dedicated to one task and run one specific program. The program is stored in ROM (Read-Only-Memory) and generally does not change. Microcontrollers are often low-power devices. A microcontroller has a dedicated input device and has a small LED or LCD display for output as shown in Fig.1. A microcontroller also takes input from the device it is controlling and controls the device by sending signals to different components in the device.

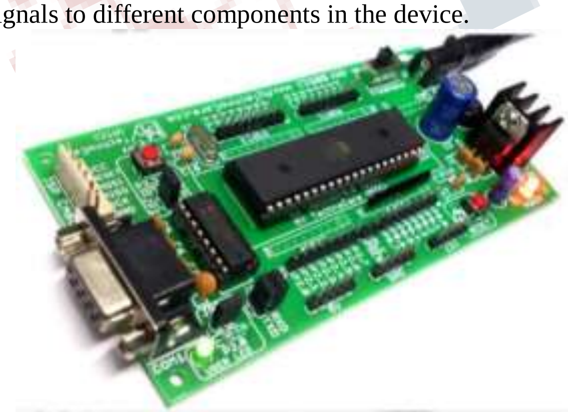

Fig. 1 8051 Development Board (AT89S52)

B. Alcohol sensor (MQ3):

MQ3- Alcohol Gas Sensor is a low-cost semiconductor sensor which, used to detect the presence of alcohol vapour gas at concentrations from 0.05 mg/L to 10 mg/L. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapour and gasoline. The sensitive material used for this sensor is SnO2, whose conductivity is lower in clean air. Its conductivity increases as the concentration of alcohol vapour gas increases. This module provides both digital and analog outputs as shown in the Fig.2.

Fig. 2 Alcohol sensor (MQ3)

C. Heartbeat Sensor:

The heart beat sensor circuit diagram comprises a light detector and a bright red LED as shown in the Fig.3. The LED needs to be of super bright intensity because maximum light passes and spreads if a finger placed on the LED is detected by the detector .Now, when the heart pumps blood through the blood vessels, the finger becomes slightly more opaque; due to this, less amount of light reaches from the LED to the detector. With every heart pulse generated, the detector signal gets varied. The varied detector signal is converted into an electrical pulse. This electrical signal gets amplified and triggered through an amplifier which gives an output of +5V logic level signal. The output signal is also directed by a LED display which blinks on each heartbeat rate.

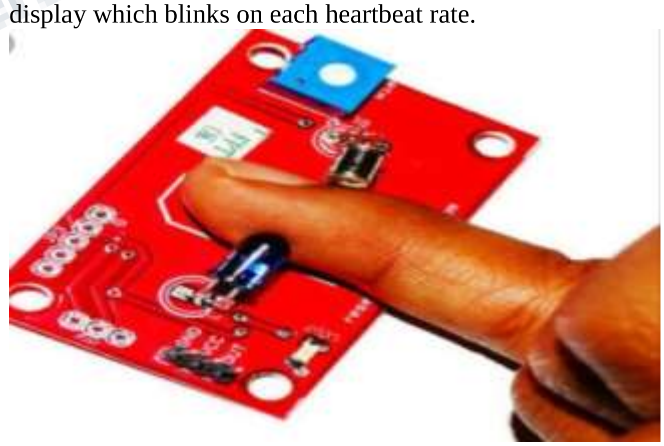

Fig. 3 Heartbeat Sensor

D. Motor:

NR-DC-ECO is high quality low cost DC geared motor as shown in the Fig.4. It contains Brass gears and steel pinions to ensure longer life and better wear and tear

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properties. The gears are fixed on hardened steel spindles polished to a mirror finish. These spindles rotate between bronze plates which ensures silent running. The output shaft rotates in a sintered bushing. The whole assembly is covered with a plastic ring. All the bearings are permanently lubricated and therefore require no maintenance. The motor is screwed to the gear box from inside.

Fig.4 Motor

E. Motor Driver (IC L293D):

The Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoids, DC and stepping motors) and switching power transistors as shown in the Fig.5. The driver circuit is used to drive the motors of the robot. Each L293D is used to drive four motors.

ENABLE	DIRA	DIRB	Function
H	H	L	Turn right
H	L	H	Turn left
H	L/H	H/L	Fast stop
L	either	either	Slow stop

Table1: Directions for Motor Activation

Fig. 5 Motor Driver (IC L293D)

IV.WORKING:

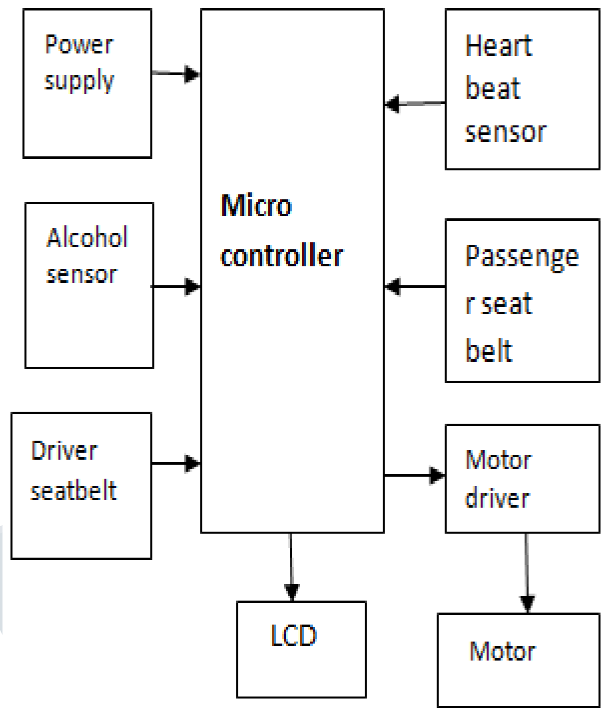

Fig.6 Block Diagram:

When the power is applied to the system, initially it checks for the Driver to be present on the Driver Seat and also examines seat belt condition of the Driver.

If the seat belt is open, a message will be displayed on the LCD to wear the seat belt as shown in fig. 6. If the seat belt is closed, then it checks for alcohol condition, where an alcohol sensor is mounted on the driver's seat belt strip. The alcohol sensor detects whether the driver has consumed an alcohol or not .If he has consumed it, then motor does not start, else the system checks for Front Seat Passenger condition.

To detect the presence of Front Seat Passenger, a heartbeat sensor is used. If the passenger is present, then it checks for the seat belt condition same as mentioned for the driver seat. If the Driver and Front Seat Passenger conditions are satisfied, then the motor runs else it stops. During running condition of the system, if any of the conditions mentioned above fails, it displays warning message on the LCD and speed of engine gradually decreases and stops until the required conditions are satisfied again.

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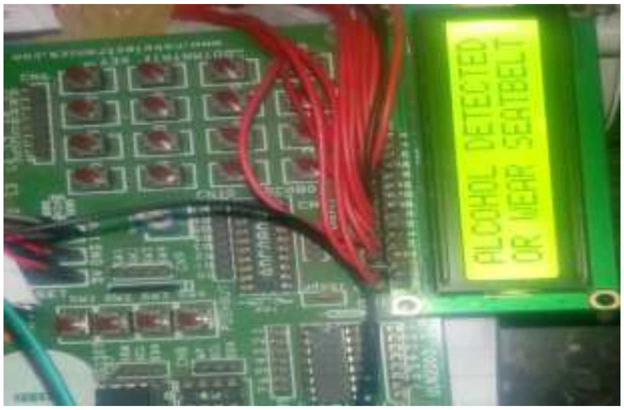

Fig.7 Display of Seat Belt Indication or Alcohol Detection

V. EXPERIMENTAL RESULTS

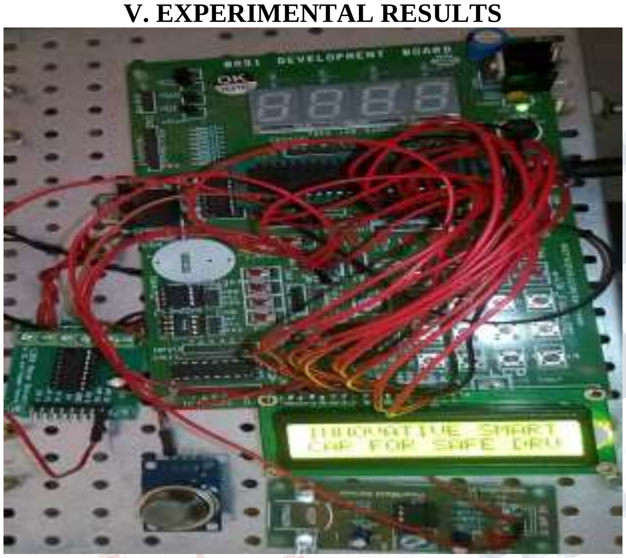

Fig.(a) Experimental Setup

Fig. (b) Implementation Circuit

VI. RESULTS AND CONCLUSION

The present project saves the life of innocent people who are affected by the mistake of others, who are influenced by the consumption of alcohol and drives rashly because of the booziness. Due to some unavoidable accidents caused due to miscellaneous reasons, the effects of such accidents can be reduced by wearing seat belt. Though so many factors like these are considered in framing the traffic rules around the world but due to negligence of the end users, they tend to violate the laws and bring problems upon themselves. The current project helps the law enforcement agencies to strictly implement the laws and helps in saving lives.

VII. FUTURE SCOPE

In future, the current project can be upgraded by using image processing to detect the presence of human instead of only relying on Heart Beat Sensor. Further seat belt fool proofing can be made by using length measurement from the seal belt casing.

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