ADVANCED SAFETY SYTEM FOR THE VEHICLES

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Abstract – *Security is major part of day to day life. The idea to secure the vehicle as well as life of Driver is proposed in this paper, it represents a system for safety of vehicles and vehicle driver. In this system we monitored 4 major accident causing and life saving parameters of vehicles:*

1. Seat belt
2. Speed of vehicle
3. Alcohol Consumption
4. Accident Alarm

These are major causes of accidents, Driver of vehicle not wearing seatbelt, driving the vehicle with high speed, consumed alcohol, and vehicle met with an accident and no one is there to help driver of vehicle, all these reasons are countable reasons that may results in accidents or fatal. This proposed system will promote the idea that will surely reduce the accident rate and improve the safety of vehicle. System will work as follows:

Seat belt: system will monitor, whether driver has worn seat belt, if not, then automatically, message will be sent to the one of his family members that – No seatbelt.

Speed limit: we will monitor the speed of vehicle, if it exceeds beyond the specified value (threshold value), message will be sent to family member regarding speed of vehicle.

Alcohol consumption: Driver will be monitored for alcohol consumption, if driver found drunk the ignition system will be locked and the status of driver will send to the family member with location.
Accident: if vehicle came up with accident, message will be sent to family member about the location of vehicle.

Keywords — Raspberry-Pi, Vibration Sensor, IR Sensor, MQ3 sensor, Hall-Effect sensor.

1. INTRODUCTION

In recent few decades, Count of accidents in India has been increased. Major reason behind the road accidents, mishaps, crashes and fatalities is drunk driver, high speed of vehicle, no seat belt wore by driver etc. Everyone is aware that this kind of driving can take their breath away butt still people ignore the safety and become the victim of accidents. People get themselves in trouble by drinking alcohol, by racing between two vehicles, most of accidents causes due to drunk driver driving vehicle with high speed. To avoid these risky incidents on road, some technical inventions need to be added in the vehicles obviously we should not neglect the

affectivity and cost of system. This paper discusses the new technology that can be implement in vehicle. We have different communicating devices which allows vehicles to communicate with computer, that involves car-to-computer communication devices which utilize the GPS tracking features, geo-fencing capabilities, remote speed sensing, theft deterrence, damage mitigation, and vehicle-to-vehicle communication. Almost all automotive technologies integrate IOT and GPS technology.

The Proposed system is designed for daily users of vehicles that give the real time data like location, speed, idea about wearing seat belt, alcohol intake by driver. The one more purpose is to detect an accident and alert to the family member about the location of vehicle so at least early help will be provided to the injured Driver. Montaser N Ramaden introduced safety system in which he proposed the current location and status of the vehicle using GPS. So, to improve the security of vehicle and for safety of driver this system will be more useful.

2. HADWARE DEAILS:

- Vibration Sensor
- IR Sensor
- Alcohol Sensor
- Hall-Effect Sensor
- Android Application

Vibration Sensor: SW-420 is vibration sensor used which is less power accelerometer and greater resolution device. It detects   the tilted position of sensor on dash or shock and generates output on same basis.

Fig-1: Vibration Sensor

IR Sensor: Infrared sensor is digital sensor that detect heat and motion. These sensors can only detect infrared radiation; This sensor is also known as passive IR sensor. It has 3 pins GND VCC and OUTPUT. It ranges between 3 to 5 V levels.

Alcohol Sensor: Sensor MQ3 is alcohol sensor that detects alcohol. MQ3 will detect consumption of alcohol from drivers breathe and send it to controller. It is much sensitive to BAC. It gives analog output dependent on alcohol content. It is made by sn02 gas which sense alcohol.

Model			MQ-3
Sensor Type			Semiconductor
Standard Encapsulation			Plastic cap
Target Gas			Alcohol gas
Detection range			25~500ppm alcohol
Standard Circuit Conditions	Loop Voltage	V_c	≤24V DC
	Heater Voltage	V_H	5.0V±0.1V AC or DC
	Load Resistance	R_L	Adjustable
Sensor character under standard test conditions	Heater Resistance	R_H	29Ω±3Ω (room tem.)
	Heater consumption	P_H	≤900mW
	Sensitivity	S	Ro(in air)/Rs(125ppm C_2H_5OH)≥5
	Output Voltage	Vs	2.5V~4.0V (in 125ppm C_2H_5OH)
	Concentration Slope	α	≤0.6(R_{300ppm}/R_{50ppm} C_2H_5OH)
Standard test conditions	Tem. Humidity		20℃±2℃; 55%±5%RH
	Standard test circuit		Vc:5.0V±0.1V
			V_H:5.0V±0.1V
	Preheat time		Over 48 hours

TABLE 1: SPECIFICATION OF MQ3-ALCOHOL SENSOR

Hall-Effect Sensor: This sensor is used to measure the magnitude of magnetic field its output is directly proportional to the magnetic field strength through it. Wheel containing magnet is passed by the sensor, Sensor will measure the rpm of wheel which can be used to calculate speed of vehicle.

Android Application: Android App will be installed in the phone of one of family member, who would like to check the status of Driver. The updates of different parameters will be sent on android application. Threshold value has been set for every sensor; The text message will be sent to the family member if driver goes beyond the particular limit.

3. METHODOLOGY

Methodology behind the project is to interface all sensors to Raspberry-Pi, Sensors will send the captured data to Raspberry-Pi which is wirelessly connected to Android Application, will decide what to transmit according to input. Here we propose a framework where the individual is identified for liquor level speed of vehicle, seat belt is wearing or not to stay away from accidents. Drivers will be detected for alcohol consumption by his breath before they begin their vehicle.
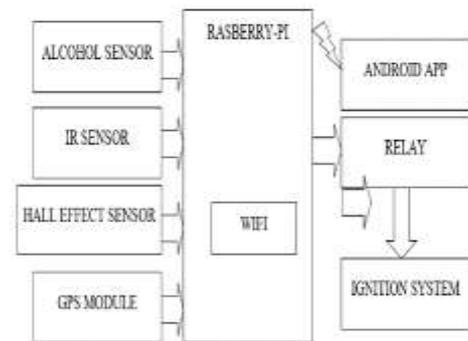
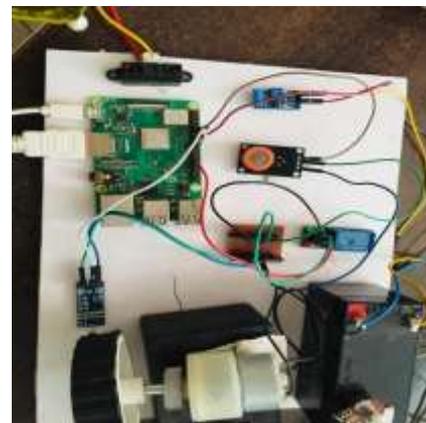**Fig- 2**: Block diagram of proposed system

Fig-3: HARDWARE FRONT VIEW

Let's consider alcohol sensor as the example Alcohol sensor is connected to input of raspberry-pi that detect whether driver is drunk. if driver is drunk than ignition system connected output pin of Raspberry Pi will get locked, at the same time registered mobile number will be notified about the status and location of driver. IR sensor is also connected to input to identify driver is wearing seat belt or not and also when car motor starts hall-effect sensor is connected to Raspberry-Pi detect the speed of the vehicle. In another framework, the individual is identified for wearing seat belt in his body to stay away from accidents. It detected before they begin their vehicle. Driver will be detected by a sensor once he seated on the driver seat by IR Sensor. In this system we are continuously monitoring the speed of vehicle and vibration sensor to avoid accidents

4. RESULT

Following results gives working direction of proposed model. During normal operation, when the authorized person open door of the vehicle and sits at the front sit of the car, then he will be monitored, and checked for all parameters. We can see computer screen will show what data is being transferred from hardware to android application as per shown in Fig 4. The Vibration sensor and the IR Sensor will give output digitally, and the Alcohol

Sensor and Hall-Effect Sensor are both analog sensor that's why we have connected one ADC so to get digital output from these sensors.

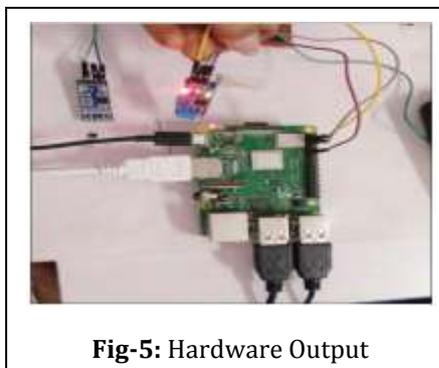**Fig-4:** Desktop Screen Indicating Output

Fig-5: Hardware Output

If Vehicle met with accident, then vibration sensor will sense the vibration of accident, and sensor will send the data as 1 to Raspberry pi and then the message will be sent message to one of the family members with location of vehicle. If rather than using digital sensor if we use analog sensor, the output will be more appropriate and precise.

Similarly, IR sensor and Hall-Effect sensor are monitored to increase the security of vehicles and drivers.

Fig-6: output On Android Application

5. CONCLUSION

This paper has presented the safety system for vehicle using Raspberry-Pi and four sensors to secure the driver and vehicle. Actual implementation of this system will establish a beneficial result, it will decrease the rate of accidents and fatal cases. Driving will be more secure with this system. The android Application is showing current status of driver, so this will helpful for family members to check whether the vehicle is driven with proper speed or not. We may add this system to every vehicle running on road to avoid damage of vehicle as well as to save life of driver. The system can be put in payload, trucks, buses, cars and boats. For advance we can send the message with location of accident to the nearer medical for emergency help, so the victim can find help earlier. If this system is inserted in every vehicle then it is easy to understand how many vehicles are involved in an accident and what cause the vehicle to meet accident

6. REFERENCES

[1] Benjamin Coifman, David Beymer, Philip McLauchlan, Jitendra Malik, "A real-time computer vision system for vehicle tracking and traffic surveillance," Transportation research part C6, 1998.

[2] Akande Noah Oluwatobi, "A GPS based automatic vehicle location system for bus transit," 1999.

[3] Ankit Kesharwani, Vaishali Sadaphal, Maitreya Natu, "Empowering bus transportation system using wireless sensor networks," 2000.

[4] Kunal Maurya, Mandeep Singh, Neelu Jain, "Real time tracking system using GSM and GPS technology – an anti-theft tacking system," International Journal of Electronics and Computer Science Engineering, volume 1, number 3, 2006.

[5] M.S. Joshi, Deepali V. Mahajan, "Arm 7 Based Theft Control Accident Detection and Vehicle Positioning System", *International Journal of Innovative Technology and Exploring Engineering*, vol. 4, no. 2, July 2014.

[6] S.S. Pethakar, N. Srivastava, S.d. Suryawanshi, "RFID GPS and GSM Based Vehicle Tracing and Employee Security System", *International Journal of* Advanced Research in Computer Science and Electronics Engineering, vol. 1, no. 10, Dec 2012.

[7] Pravada P. Wankhade, S.O. Dahad, "Real Time Vehicle Locking and Tracking System using GSM and GPS Technology-An Anti-theft System", International Journal of Technology And Engineering System, vol. 2, no. 3, Jan-March 2011.

[8] Silvan Mayer, "Impact of GPRS on the Signaling of a GSM-based Network", Institute of Communication Networks and Computer Engineering University of Stuttgart.

[9] G.L. Bodic, "20012 Mobile Messaging Technologies and Services", MMS EMS and MMS. Wiley New York.

[10] Mohammad A. Al-Khedher, "Hybrid GPS-GSM Localization of Automobile Tracking system", International Journal of Computer Science & Information Technology (IJCSIT), vol. 3, Dec 2011.