

WIRELESS SAFE, SMART AND SECURED DRIVING SYSTEM

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Introduction:

Road facilities are major concern in the developed areas. Recent study shows that about 60% of roadway accidents are due to unaware about the road map, unconsciousness of driver etc. Many of us face difficulties in unlocking/locking the car because of easily available duplicate keys. These issues have been addressed in this paper and could be avoided by informing drivers about overcoming road work area. Emerging technologies appears to provide faster, safer and more reliable communication techniques. The aim of this paper is to build a reliable driving system for road infrastructure to vehicle communication, which can transmit the information provided by active signals placed on the road to prevent collision. There are different kinds of methods to assist drivers such as GMS, GPS, ZigBee etc., one of those methods is Transceiver. Drunk driving is a major reason of accidents in almost all countries and all over the world. Alcohol detector in vehicles is implemented for the safety of the people for sitting inside the vehicle.

Only having a key, vehicle is not secured because of duplication of keys. So, to have security, in this system password is provided along with the key using HC-05 Bluetooth technology and smart phone.

Objectives:

- The objective of our project is to prevent the risk of accident or rough handling of vehicle which may occur due to improper idea about the road i.e. deep curves, junctions, narrow bridges etc.
- It also prevents the risk of accidents due to consumption of high alcohol by driver.
- It also alerts the other vehicles by activating the vehicle indicators during turning off the vehicle.
- Apart from road information the project is also helpful to maintain security i.e. it's easier to lock the vehicle through cell phone [Android]. User may also control the ignition unit of the vehicle through cell phone [Android].

Methodology:

- Our project is based on mainly two technologies i.e Bluetooth and the transceiver. The main components are 16F877A PIC controller, the MCQ-3 alcohol detector and Liquid crystal display (LCD 16*2).The 16F877A PIC controller is 40 pin IC. It is used to control and process all the functions of circuit provided by user commands. This controller is used because it is rich in peripherals, reprogrammable, low power consumption. It is also easy to program.
- LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. These modules are preferred over seven segments and other multi segment LEDs. These are preferred because LCDs are economical, easily programmable, have no limitation of displaying special & even custom characters, animations and so on.
- The main aim of the system is to have a communication between Roadside Unit (RSU) and On-Board Unit (OBU).The OBU has a Bluetooth module (Bluetooth, a wireless technology standard, exchange data over short distances UHF radio waves in the ISM band from 2.4 GHz to 2.485GHz from fixed and mobile devices for the purpose of building Personal Area Networks) through which we can achieve security by providing password using cellphone (android) to control the vehicle. The vehicle will be turned on only when appropriate password is provided. This action is indicated by the buzzer and also using LCD with appropriate messages.
- The MQ-3 sensor is a alcohol detector which senses the high level of alcohol consumed by driver. If the alcohol level is very high, it warns the driver by using buzzer. After some delay vehicle will be automatically turned off. During turning off it will activates the vehicle indicators along with buzzer which alerts other vehicle drivers.
- The transceiver (HC-12) is used in RSU as well as in OBU. HC-12 wireless serial port communication module is a new-generation multichannel embedded wireless data transmission module. It is used for long distance wireless transmission which operates in the range 800m to 1km. Its wireless working frequency band is 433.4-473.0MHz.It gives all the road related information such as deep curves [left / right], bridges, junctions, sensitive zones like school, hospital, defense area etc. to the transceiver module placed on OBU which informs the driver using buzzer and LCD.

Block diagram:

The block diagram of the receiver is shown in fig 1.

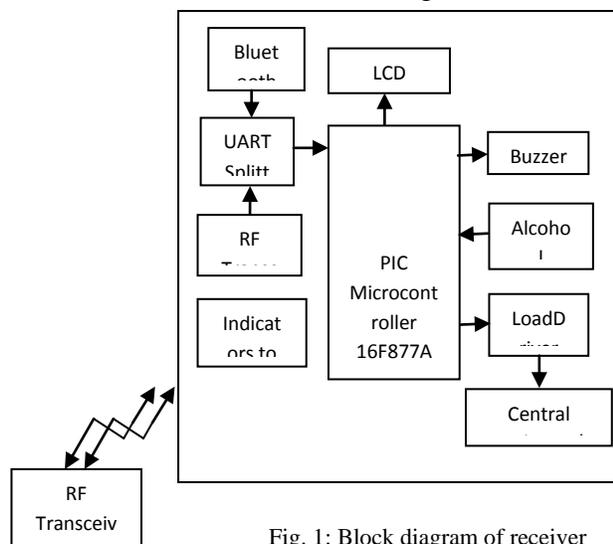


Fig. 1: Block diagram of receiver

Results:

- The real time working of system is presented in Fig. 2.
- It displays road details on LCD that is fitted in dash board.
- Speed / no horn warning will be given in sensitive areas like school, hospital, defense zones etc. as shown into the Fig.3.
- Controls ignition based on command sent through Android Application.
- Activates / De-activates central locking system based on user's commands such as alcohol detection shown in Fig. 4.



Fig. 2: Real time working of model



Fig. 3: Alcohol detection



Fig.4: Display of Road related information

Conclusion:

The road related information issue can be overcome by GSM, GPS, ZigBee, Bluetooth etc. But GSM and GPS has some limitations in remote areas, whereas ZigBee and Bluetooth has range and node problem so Transceivers is better option for implementation of this system in this way the issue of unawareness of road related information is addressed. High Alcohol consumption issue is addressed by detecting alcohol and warning the driver. Also security has been addressed by providing user defined password. This system is suitable to all currently available vehicles.

Future scope:

Transceiver is more helpful in remote areas to for providing information. In future it can be replaced by high speed transceivers. Further security of vehicle can be improved by using biometric method.