Wireless RF-Based Automatic Speed Regulation for Cars

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ABSTRACT

The main aim of this project is to design an electronic system for implementing an efficient alcohol detection system that will be useful to avoid accidents, limit speed according to different zones area, seatbelt, and IR sensor use for avoid the accident There are many different types of accidents which occur in daily life. Accidents may cause due to many reasons it may be due to brake fail. Most often accidents occur due to over drunken person. Though there are laws to punish drunken drivers they cannot be fully implemented because traffic police cannot stand on every road to check each and every car driver whether he/she has drunk or not. This can be a major reason for accidents. So there is a need for an effective system to check drunken drivers. Therefore in order to avoid these accidents we have implemented a prototype project. In our project, initially we check whether the person has drunken or not by using the MQ3 GAS sensor. In this system, sensor circuit is used to detect whether the alcohol was consumed by driver or not. To this end, we have designed such a system that when alcohol concentration is detected alarm is raised.

Keywords: Webcam, Physically Impaired, Gesture, PCA, Image Processing.

I. INTRODUCTION

Nowadays people are driving very fast; accidents are occurring frequently, we lost our valuable life by making small mistake while driving (school zone, hills area, and highways). So in order to avoid such kind of accidents and to alert the drivers and to control their vehicle speed in such kind of places the highway department have placed the signboards. But sometimes it may to possible to view that kind of signboards and there is a chance for accident. So to intimate the driver about the zones and the speed limit automatically, is done by means of using RF technology. The main objective is to design a Smart Display controller meant for vehicle's speed control and monitors the zones, which can runon an embedded system. Smart Display & Control (SDC) can be custom designed to fit into a vehicle's dashboard, and displays information on the vehicle. The project is composed of two separate units: zone status transmitter unit and receiver (speed display and control) unit. Once the information is received from the zones, the vehicle's embedded unit automatically alerts the driver, to reduce the speed according to the zone, it waits for few seconds, and otherwise vehicle's SDC unit automatically reducesthe speed. road lanes has been proposed in order to provide accurate vehicle localization in tunnels or downtown areas where GPS positioning might be unreliable. In the work by REID tagging of cars is offered as an alternative to traffic data collection by inductive loops placed under the road surface.

The information about the traffic collected by a network of RE readers is then used to regulate traffic at intersection or critical points in the city. The work by Sato describes an ADAS, where passive REID tags are arranged in the road close to the position of real traffic signals. An antenna placed in the rear part of the car and close to the floor (since the maximum transmitting range of the tags is about 40 cm) permits reading of the information stored in the tag memo and conveys a visual or auditive message to the driver.

Initial tests at low driving speeds (20 km/h) show good results The work described in this paper is collaboration between AUTOPIA (Autonomous Vehicles Group) and LOPSI (Localization and Exploration for Intelligent Systems), both belonging to the Centre for Automation and Robotics (CAR, UPM-CISC).

The aim of the research is to build a sensor system for infrastructure to vehicle (l2V) communt10n, which can transmit the information provided by active signals placed on the road to adapt the vehicle's speed and prevent collisions. By active signals we mean ordinary traffic signals that incorporate long-range active RFID tags with information stored into them. This information is collected in real time by RFID sensors placed on board of the vehicle (an electric Citroën Berlin go), which we have modified to automatically change its speed to adapt to the circumstances of the road. In particular, we have implemented a fuzzy logic control algorithm acting on the longitudinal speed of the vehicle, with actuators which control the vehicle's throttle and brake to reach and maintain a given target speed.

1.2 Advantages
- This project decreases the rate of accidents in the highways and Ghats areas
- Low cost and easy to implement.
- Can cover maximum area in a zone.
- This can be implemented with other wireless technologies for adding more stuff.

1.3 Disadvantages
- Difficult in case of failure of RF transmitter.
- RF Modules are to be protected from environment Hazards.

1.4 Applications
- It can be implemented in automated systems for wireless control.
- Can be used at heavy traffic areas.
- Used in school zones and ghat roads.
- This can be uses in driving guidance systems and automatic navigation system

II. EARLIER WORKS

Radio Frequency (RF) is an upcoming technology which has recently attracted the interest of the research community because of the extraordinary benefits it offers over the other existing identification and data capturing technologies.

This chapter is formatted to review the existing RF literature and explore the issues in the present RF systems since the technology is still in its acceptance phase. Since the growth of RF technology from 1900's, apart from its stated positive aspects, the technology also bears some concerns or issues.

The intended purpose of this chapter is to examine the literature related to Radio Frequency further extend academic research, and providing an insight into some of the outstanding and crucial issues hindering the growth of the RF technology. There is a strong need to address these issues in order to provide a greater visibility and an increased product velocity of the RF technology.

III. MATERIALS AND METHODS

Component Details
- Circuit Specification
- Supply Voltage – 12 V
- Maximum Current – 200mA
- Output voltage
- Digital Output (5V)
- Analog Output (0 V to 5 V – Variations)
- Collision detection circuit
- Seat belt completion circuit

Features

It provides alcohol gas PPM in the air
TTL Level Compatible (Directly connection to Microcontroller)
Analog output also available to connect this with ADC
Value can be set through given potentiometer

PIN No	PIN Information
GND	Supply Ground
DOUT	Digital Output (TTL Level)
AOUT	Analog Output (0V to 5 V)
5V	Supply +5V

3.3 Applications
- Automotive Domain
- Security & Surveillance
- Smart Home System
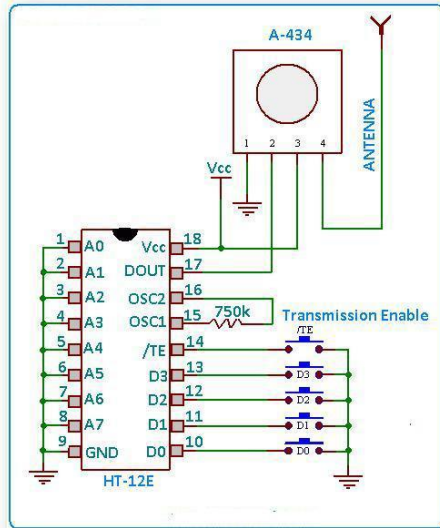- Industrial Control System

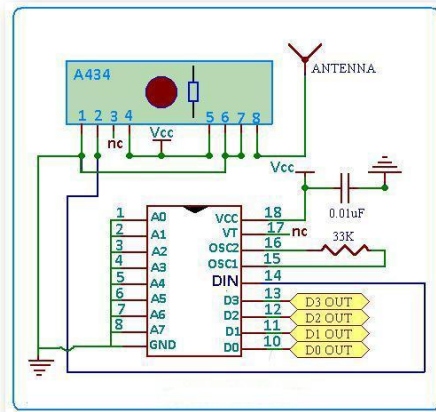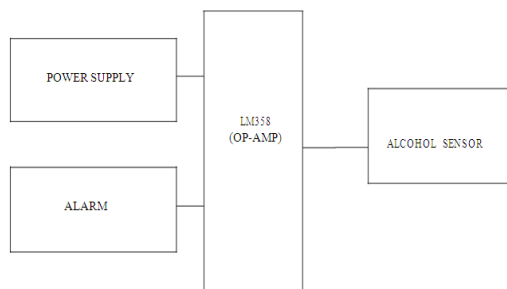*FIG 1: RF Trasmitter Module*

FIG 2: RF Reciever Module

FIG 3: Block Diagram

IV.   WORKING OF CIRCUIT

The alcohol sensor circuit will detect the alcohol PPM in atmosphere depends on human breath and the signal will send data to LM358 (OP-Amp) to other circuits. The result of human breath contains alcohol that has detected from alcohol sensor circuit will changed into digital form.

4.1 Alcohol sensor

The MQ-135 alcohol sensor senses the gases like ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide and smoke. The boost converter of the chip MQ-3 gas sensor is PT1301. The operating voltage of this gas sensor is from 2.5V to 5.0V. The MQ-3 alcohol sensor has a lower conductivity to clean the air as a gas sensing material. In the atmosphere we can find polluting gases, but the conductivity of alcohol sensor increases

as the concentration of polluting gas increases. MQ-135 gas sensor can be implementation to detect the smoke, benzene, steam and other harmful alcohol. It has potential to detect different harmful alcohol. The MQ-135 alcohol sensor is low cost to purchase. The basic image of the MQ-135 sensor is shown in the below figure.
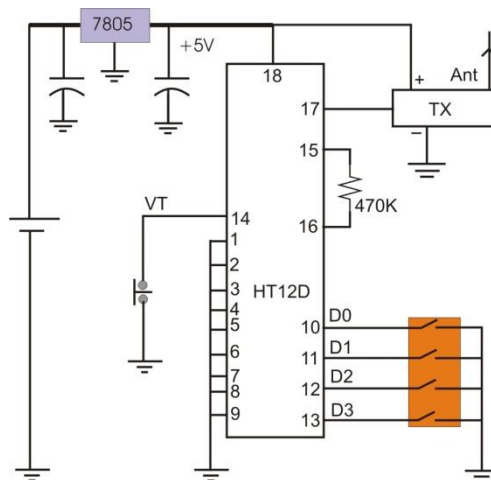

FIG 4: MQ-135 Alcohal Sensor

4.2 Transmitter

FIG 5: Circuit Diagram of Transmitter
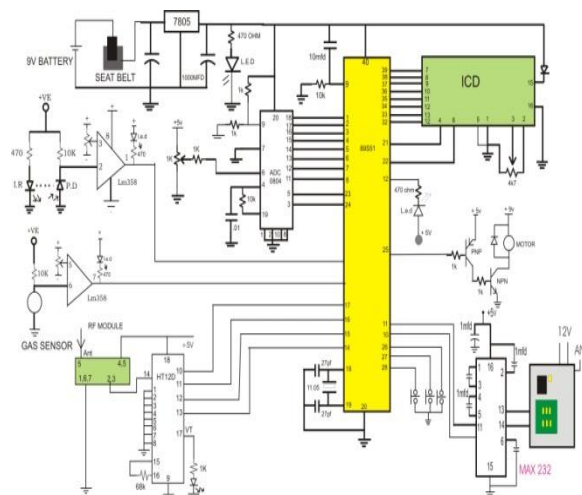
4.3 Receiver

FIG 6: Circuit Diagram of Receiver
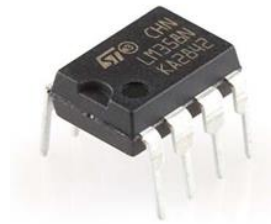
4.4 OP-Amp and Comparator

FIG 7: OP-Amp and Comparator

The LM358 series consists of two independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply.

4.5 Collision detection circuit

A collision detection circuit which indicates to a processing node, while the node is transmitting, that another transmission has, or is occurring, on the network comprises a means for directionally coupling a processing node to the network to discriminate between the outgoing power associated with a first message packet and the incoming power associated with a second message packet. A sensing means receives the incoming power from the directional coupling means during the transmission of the first message packet and indicates that a collision is occurring between the two transmissions. The directional coupling means comprises a cross-coupled voltage divider network configured such that a nulled voltage is generated at a pair of collision detection ports in response to the outgoing transmission, whereas a differential voltage is produced across the collision detection ports whenever an incoming colliding transmission appears.

4.6 Seat belt completion circuit

A safety seatbelt that is constructed so that a vehicle cannot be operated until the seatbelt is properly fastened about a person, and wherein the seatbelt is electrically connected to the ignition switch of a vehicle, so that the circuit cannot be completed and the engine operated until the seatbelt is properly connected in place. In one form of the device, a seatbelt is provided for aircraft, buses and trains, and wherein a lighting system of warning panel is provided to indicate when one or more passengers does not have his or her seatbelt engaged.

V.   CONCLUSION

Here by we conclude that this project is very easy to implement on current system, low cost and durable, ensures maximum safety to passengers and public, the driver gets all information about the road without distracting him from driving, driver gets all information even in bad weather conditions, low power consumption. This project is further enhanced by automatic speed control when the vehicles get any hazard signal from outside environment. A prototype model of controller is built on the speed mixing capability. Signals from The sign board of various zones (school zone, highway zone, "U" turn zone etc) is Intelligently treated individually & generates input signals for driving actuators – car engine and additional DC motor. They, in turn, jointly control the speed of vehicle wheels. This design successfully utilizes a new idea of hybrid vehicle recently immerged in automotive industry. The system does not require a physical braking subsystem which will reduce the overall cost of a car.

We conclude that this project is :-
1. Very easy to implement on current systems.
2. Low cost and durable.
3. Ensures maximum safety to passengers.
4. It will also work in bad weather conditions.
5. Low power consumption

VI.   REFERENCES

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