Original Research Paper Electronics

RADIO FREQUENCY TO PLAY THE VITAL ROLE OF SPEED MONITORING SYSTEM

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ABSTRACT Now a day's people are driving very fast and 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 possible to view that kind of signboards and there is a chance for accident. So to intimate the driver about the zones and limit the speed automatically, is done by means of using RF technology. The main objective is to design a Smart Display and controller meant for vehicle's speed control and monitors the zones. This can run on an embedded system. Smart Display & Control can be custom designed to fit into a vehicle's dashboard and displays information on the vehicle.Once the information is received from the zones then 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 Smart Display & Control unit automatically reduces the speed.

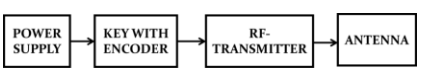
KEYWORDS : Key with Encoder, Power Supply, RF Transmitter, Antenna.

INTRODUCTION

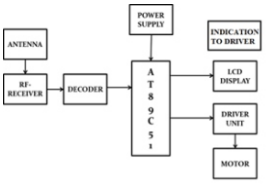
Road facilities are a major concern in the developed world. Recent studies show that one third of the number of fatal or serious accidents are associated with excessive or inappropriate speed, as well as changes in the roadway (like the presence of road-work or unexpected obstacles). Reduction of the number of accidents and mitigation of their consequences are a big concern for traffic authorities, the automotive industry and transport research groups.One important line of action consists in the use of advanced driver assistance systems (ADAS), which are acoustic, hectic or visual signals produced by the vehicle itself to communicate to the driver the possibility of a collision. These systems are somewhat available in commercial vehicles today, and future trends indicate that higher safety will be achieved by automatic driving controls and a growing number of sensors both on the road infrastructure and the vehicle itself. A prime example of driver assistance systems is cruise control (CC), which has the capability of maintaining a constant user preset speed and its evolution, the adaptive cruise control (ACC), which adds to CC the capability of keeping a safe distance from the preceding vehicle .A drawback of these systems is that they are not independently capable of distinguishing between straight and curved parts of the road, where the speed has to be lowered to avoid accidents. However, curve Warning systems (CWS) have been recently developed that use a combination of global positioning systems (GPS) and digital maps obtained from a Geographical Information System (GIS), to assess threat levels for a driver approaching a curve to quickly, Likewise, intelligent speed assistance (ISA) systems warn the driver When the vehicle's velocity is inappropriate, using GPS in combination with a digital road map containing information about the speed limits. However useful, these systems are inoperative in case of unexpected road circumstances (like roadwork, road diversions, accidents, etc.), which would need the use of dynamically generated digital maps. The key idea offered by this paper is to use Radio Frequency Identification (RFID) technology to tag the warning signals placed in the dangerous portions of the road. While artificial vision-based recognition of traffic signals might fail if visibility is poor (insufficient light, difficult weather conditions or blocking of the line of sight by preceding vehicles), RF signals might still be transmitted reliably. In the last years, RFID technology has been gradually incorporated to commercial transportation systems. A well-known example is the REID-based highway toll collection systems which are now routinely employed in many countries, like the Telecasts system in Italy or the Auto pass system in Norway. Other uses include monitoring systems to avoid vehicle theft, access control to car parking or private areas and embedding of REID tags in license plates with specially coded IDs for automatic vehicle detection and identification. Placement of REID tags on the 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 additive message to the driver. Initial tests at low driving speeds (20 km/h) show good results The work described in this paper is collaboration betweenAUTOPIA (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 (I2V) commun10n, 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.

HARDWARE DETAILS: (BLOCK DIAGRAM)

TRANSMITTER:



RECEIVER:



BLOCK DIAGRAM DESCRIPTION:

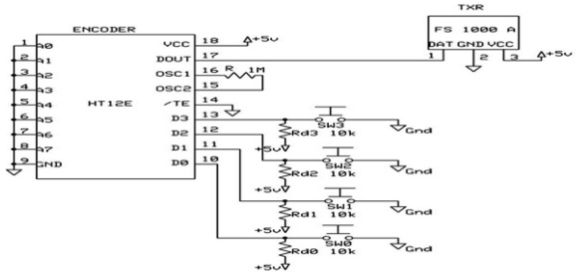
The Circuit is composed of two separate units:

1. Zone status transmitter unit.
2. Receiver (speed display and control) unit.

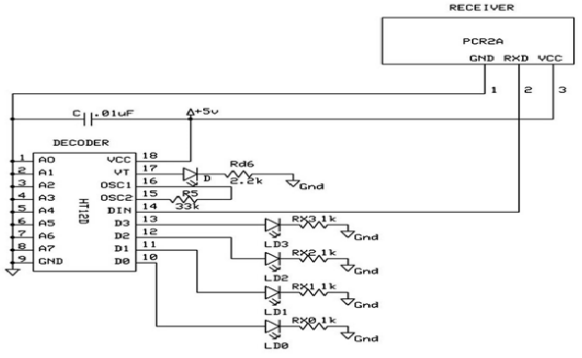
Transmitter section consists of Key with Encoder, RF Transmitter and Antenna. Transmitter placed in the School zone, Hospital zone and City zone. And it'll continuously Transmit the signal to a certain range.Receiver section consist of RF receiver, Smart Display and Control. Micro controller is used to control the whole unit. And this receiver section will be placed on the vehicle's dash board. Receiver continuously monitors the status of the zones and whenever vehicle reaches the particular zone such as School zone, Hospital zone And City zone. Then the receiver will receive the zone status and that signal will fed to the decoder. Decoder will decode the signal and fed to micro controller. Controller will continuously monitor the Decoder output. Whenever controller receives the signal from the decoder and then it'll analyze the works accordingly. And According to the input from the decoder controller will enables the smart display and motor driver unit. Once the information is received from the zones the vehicle's embedded unit automatically alerts the driver with the help of Smart display.

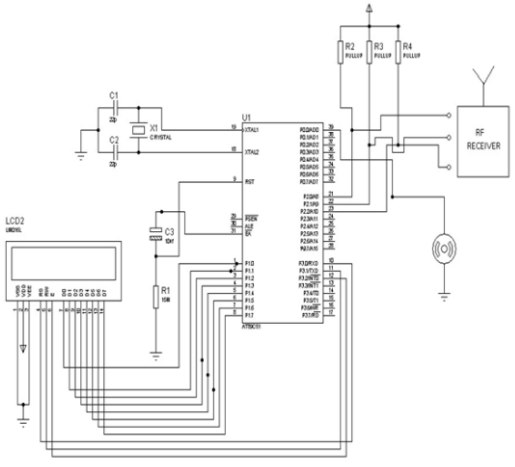
CIRCUIT DIAGRAM:

RF-TRANSMITTER:



RF-RECEIVER:





CIRCUIT OPERATION:

Transmitter section consists of Key with Encoder, RF Transmitter and Antenna. Transmitter placed in the School zone, Hospital zone and City zone. And it'll continuously transmit the signal to a certain range.Receiver section consists of RF receiver, Smart Display and Control Unit. Micro controller is used to control the whole unit. And this receiver section will be placed on the vehicle's dash board.RF Receiver is connected to the microcontroller port bit P2.0, P2.1, P2.2 respectively. Here we used 16X2 LCD Display as a Smart Display Unit. And that Smart Display Unit is connected to port bit P1.0-P1.7 of the microcontroller. LCD's RS, RW, EN Bits are connected to the port bit P3.0-P3.2 of the microcontroller respectively. Motor is connected through the L293D (Dual H-bridge motor driver) to the port bit P0.0 of the microcontroller. This total system is embedded and works automatically with help of microcontroller.RF Receiver continuously monitors the status of the zones. Whenever vehicle reaches the particular zone such as School zone, Hospital zone And City zone. Then the Encoded signal from the RF Transmitter will received by the RF receiver. Decoder will decode the signal and fed to micro controller. Microcontroller will continuously monitor the Decoder output from the RF receiver. Whenever controller receives the signal from the decoder and then it'll analyze And According to the input from the decoder, controller will enables the smart display and motor driver unit. Once the information is received from the zones, Vehicle's embedded unit automatically alerts the driver with the help of Smart display to reduce the speed of the vehicle. Control unit waits for few seconds and monitors the vehicle's speed and driver to reduce the speed, if suppose the driver is not reduce the speed of the vehicle then the Control unit automatically reduces the speed of the vehicle. This entire works can be done with the help of C coding.

WORKING OPERATION OF MICROCONTROLLER:

AT89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family. ATMEL 89C51 has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times. In 40 pin AT89C51, there are four ports designated as P1, P2, P3 and P0. All these ports are 8-bit bi-directional ports, i.e., they can be used as both input and output ports. Except P0 which needs external pull-ups, rest of the ports have internal pull-ups. When 1s are written to these port pins, they are pulled high by the internal pull-ups and can be used as inputs. These ports are also bit addressable and so their bits can also be accessed individually. Port P0 and P2 are also used to provide low byte and high byte addresses, respectively, when connected to an external memory. Port 3 has multiplexed pins for special functions like serial communication, hardware interrupts, timer inputs and read/write operation from external memory. AT89C51 has an inbuilt UART for serial communication. It can be programmed to operate at different baud rates. Including two timers & hardware interrupts, it has a total of six interrupts.

RF MODULE:

The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK).Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable for long range applications. Also, while IR mostly operates in line-of-sight mode, RF signals can travel even when there is an obstruction between transmitter & receiver. Next, RF transmission is more strong and reliable than IR transmission.

FUTURE ENHANCEMENT

Now we have used RF module to determine the zone and with help of that we can alert the driver to reduce the speed by using Smart Display and Control Unit. In future we are aiming to implement GPS system in this project. We can control the vehicle speed, if suppose the driver is not reduces the speed and also we can alert the Police with the help of GPS system. By using GPS system we can increase

the zone range.

CONCLUSION

The Paper **"RF BASED VEHICLE SPEED CONTROL SYSTEM"** has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Thus the data to be sent is encoded within the transmitted signal so that a well-designed receiver can separate the data from the signal upon reception of this signal. The decoded data can then be used to perform specified tasks. Secondly, using highly advanced IC's and with the help of growing technology the paper has been successfully implemented.

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