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Zonal Based Control of Vehicle using Radio Frequency

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***Abstract*—Now a day's people are driving very fast; accidents occur frequently, we lose our valuable life by making small mistake while driving (like near school, college and temple). So in order to avoid such kind of accidents, to alert the drivers, and to control the vehicle speed in such kind of places the highway department have placed the signboards. However, it may not be possible to view that kind of signboards and there is a chance for accident. The main objective of this project is to intimate the driver of the electric vehicle about the zones using RF technology and the speed limit control is automatically done by means of using driver control circuit of Electric Vehicle. LCD can be custom designed to fit into a vehicle's dashboard and is used for displaying the Status of vehicle. The project has two separate units, i.e. transmitter unit & receiver (speed display and control) unit. Once the zone speed information is received from the RF transmitter, the receiver accepts the signal and the vehicle's embedded unit automatically alerts the driver to reduce the speed according to the zone if he didn't reduce the speed then the driver unit automatically reduces the speed of the electric vehicle to the zone speed. The microcontroller compares the speed of the vehicle with the zone speed if the speed is less than the zone speed then there will not be any change in the speed of the electric vehicle. If the speed is more than the zone speed then the microcontroller automatically produces the PWM signal which is given to the driver circuit through which the speed of the vehicle is brought down to the rated speed.**

KeyWords: RFID Transmitter, RFID Receiver, PIC Microcontroller, Encoder, Decoder etc…

1. INTRODUCTION

Road facilities are a major concern in the world. Due to this, serious accidents are associated with excessive or inappropriate speed, as well as Changes in the roadway (like the presence of roadwork). So that in order to reduce these accident and mitigation of their consequences are a big concern for traffic authority persons and transport research people. One important action consists 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 may occur. These action are somewhat available in commercial vehicles today, and future trends indicate that Automatic driving controls and a growing number of sensors on both the road infrastructure and the vehicle itself will achieve higher safety. 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 independently capable of distinguishing between Straight and curved paths Of the road, in order to reduce the speed to avoid accidents. However, when the vehicle velocity is not sufficient while using digital roadmap with a combination of Global Positioning System containing information about the speed limits. However useful, these systems are inoperative in case Of unexpected road circumstances (like roadwork, road diversions etc.), where the system needs the use of digital display maps to guide the driver while driving the vehicle. Here we are using the Radio Frequency Identification (RFID) technology to tag the warning signals placed in the dangerous path of the road. While duplicate vision-based authority of traffic signals might fail if visibility is poor because of difficult weather conditions or blocking of the line of sight by proceeding vehicles, RF signals until now transmitted efficiently. In the last years, RFID technology has been gradually associated to commercial deportation system. A known example for the system is the RFID-based NH toll collection system, which are now employed in many countries, like the Telepass system in Italy, or the Auto pass system in Norway. It also uses the monitoring system to avoid the vehicle robbery, access to control the theft in private areas and embedding of RFID tags in license plates with specially coded IDs for automatic vehicle detection and identification. The requirement of RFID tag on the road path have been proposed in order to provide accurate vehicle localization in tunnels or downtown areas where GPS positioning might be unreliable. In the work by RFID, tagging of cars was offer as an alternative to traffic data collection by inductive loops placed under the road surface.

2. EXISTING SYSTEM

2.1speed Breaker`

Vertical deflection traffic calming devices are engineering measures designed to slow motor-vehicle traffic in order to improve the security system. These include the speed plunk, speed bulge, speed bumper, and speed pulpit. The use of vertical curvature devices is widespread all over the world, and they are most probably found where the vehicle speeds are statutorily mandated to be low, usually 40 km/h (25 mph), or 8 to 16 km/h (5 to 10 mph) in car parks. Although speed plunks are very efficient in keeping the vehicle in low speed, their use is sometimes questionable as they can cause noise and possibly vehicle damage if taken at too great a speed. Poorly manufactured speed plunks often found in private car parks (too tall, too sharp an angle for the expected speed), and can be hard to arrange in vehicles with low ground clearance, sometimes in sports cars, even at a minimum speed.. Speed plunks can also cause severe damage to the motorcyclists and bicyclists if not clearly visible, though in some requirements it causes a small cut across the plunk allows those vehicles to pass through without impediment. Speed bumps cost between $50–200, but have to be replaced after wear.

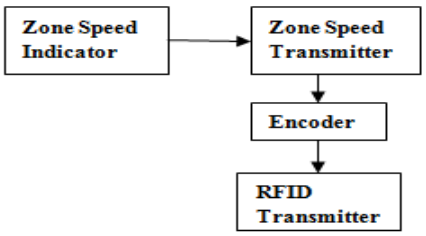
2.2 Drawbacks Of Existing System

The city of Modesto in California, U.S. produced a fact sheet , which contains the following disadvantages:

- The response is slower in the emergency vehicles;
- This system may divert the traffic to resident parallel streets;
- This may increase the possibility of noise and pollution for the residents living immediately adjacent to the speed bumps.

3. PROPOSED SYSTEM

3.1 Block Diagram



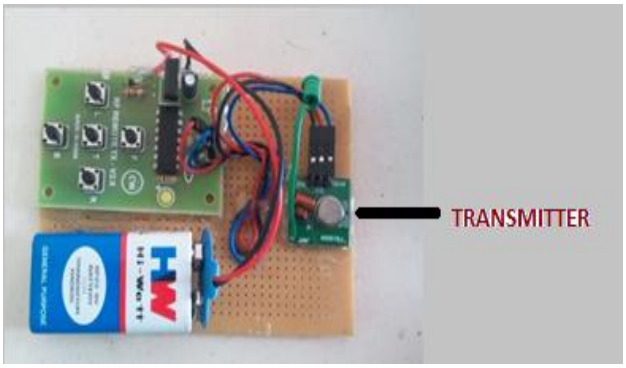
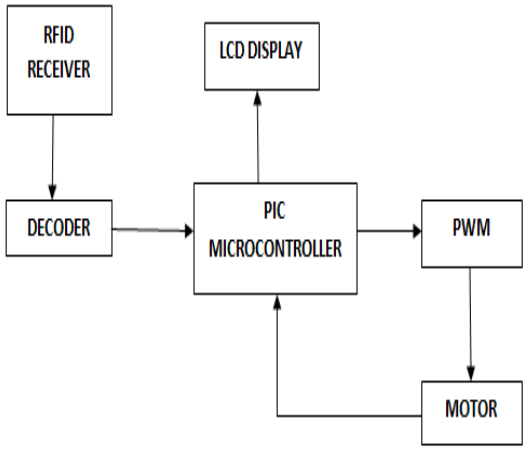


Fig -1: Zone Speed RF Transmitter

3.2 Block Diagram Of Receiver



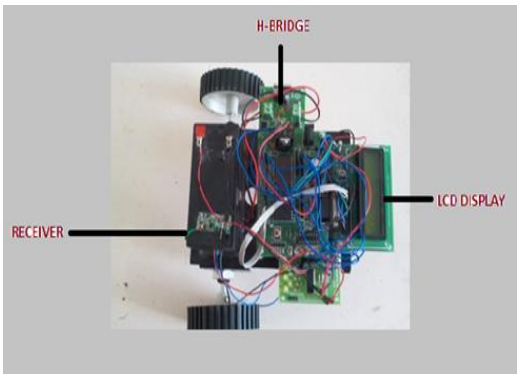


Fig -2: Zone Speed RF Receiver and Driver Control Unit

Here if the vehicles is running below the restricted speed then there won't be any change if the speed is above the restricted speed in a particular zone then the speed of the vehicle is controlled using radiofrequency transmitter and receiver. In the transmitter side, we will be having an encoder and RF transmitter. In the receiver side, we will be having the RF receiver, decoder, PIC microcontroller, PWM through which the speed of the motor of the vehicle is controlled.

3.3 Advantage Of The Proposed System

- high sensitivity
- Automatic systems will prevent accidents
- In future, many speed levels can be added easily. Cost is comparatively less.

Special Microcontroller Features:

- 100,000 erase/write cycle Enhanced Flash program memory typical
- 1,000,000 erase/write cycle Data EEPROM memory typical
- Data EEPROM Retention > 40 years
- Serial Programming™ (ICSP™) has two pins
- Single-supply 5V Serial Programming
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
- Programmable code protection
- Power saving Sleep mode

The RF module, as the name suggests, operates at the condition of RF. The required frequency range varies between 30 kHz & 300 GHz. In this system, the digital display data will be shown as variations in the amplitude of carrier wave. This type of modulation is defined as Amplitude Shift Keying (ASK).

Transmission through RF is better than IR (infrared) because of many reasons. Firstly, the corresponding signals through RF can travel through larger distances making it suitable for long-range applications. Also, while infrared rays operates in the range of line-of-sight mode, it can travel even when there is an obstruction between transmitter & receiver. Next, RF communication model used specific frequency IR signals, which can be damaged, by other IR emitting sources.

The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHZ. An RF transmitter will receive the serial communication data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission will be frequently occurred at the rate of 1Kbps - 10Kbps. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

The RF module is often used along with a pair of encoder/decoder. The encoder is used for detecting parallel data for transmission feed while reception is decoded by a decoder.HT12E-HT12D are some commonly used encoder/decoder pair ICs.

4.H-BRIDGE

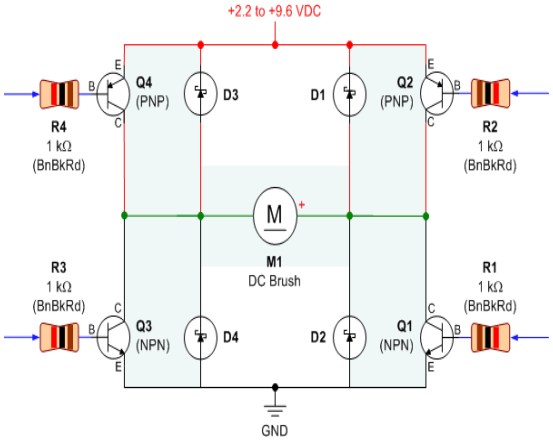


Fig -3: H-bridge Chopper Circuit

The Device is a monolithic integrated with high voltage and current proposed with high four channel driver designed to accept standard DTL or TTL logic levels. Each bridge of channels uses a two bridge method to implement with an enabled input. A separate supply is provided for the logic, allowing the operation at a low voltage and internal clamp diodes are included. This device is suitable for switching applications at frequencies up to 5 KHz. The 16 Lead Quad Flat No_ plastic package is assembled with an L293D which has 4 center pins connected together and used for heat sinking the L293DD is assembled in a 20 lead surface mount which has 8 center pins connected together and used for heat sinking.

5. SIMULATION DIAGRAM:

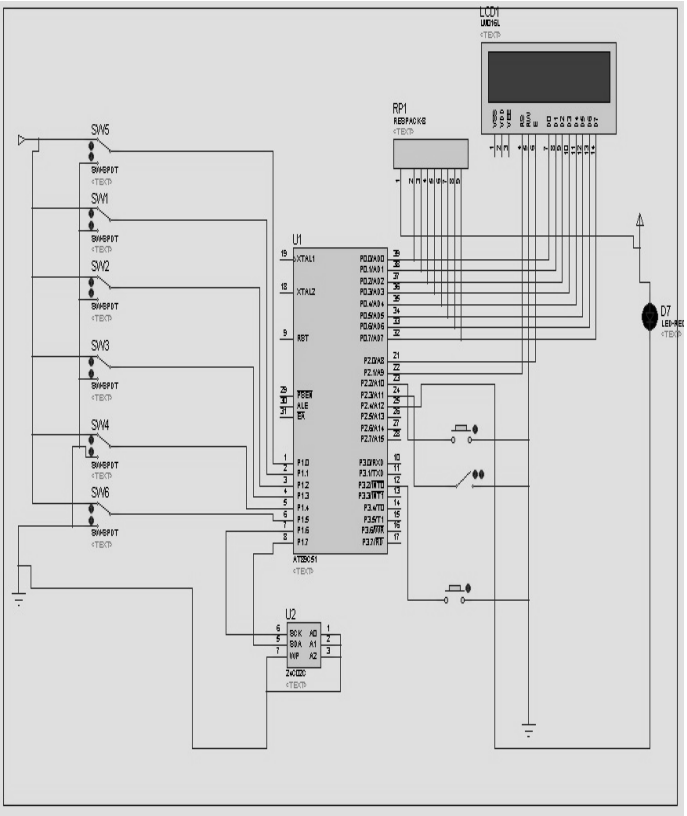


Fig -4: Simulation diagram for electric vehicle speed control

5.1PWM OUTPUT

SCHOOL ZONE=30 Kmph

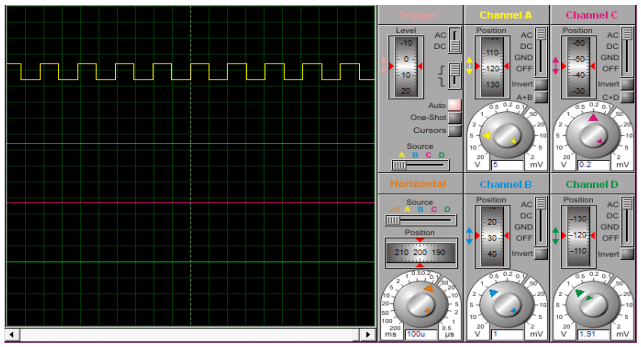


Fig- 5: PWM signal for 30kmph

COLLEGE ZONE=40kmph

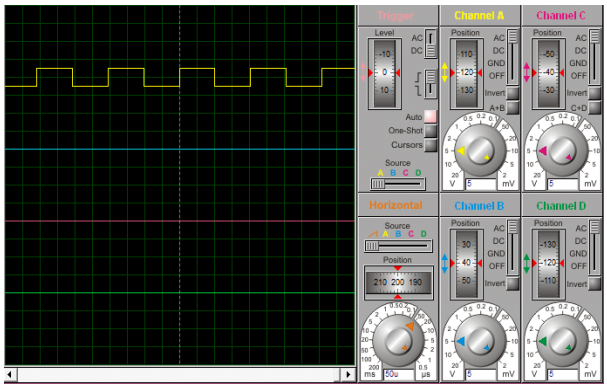


Fig-5.1: PWM signal for 40kmph

TEMPLE ZONE=50 kmph

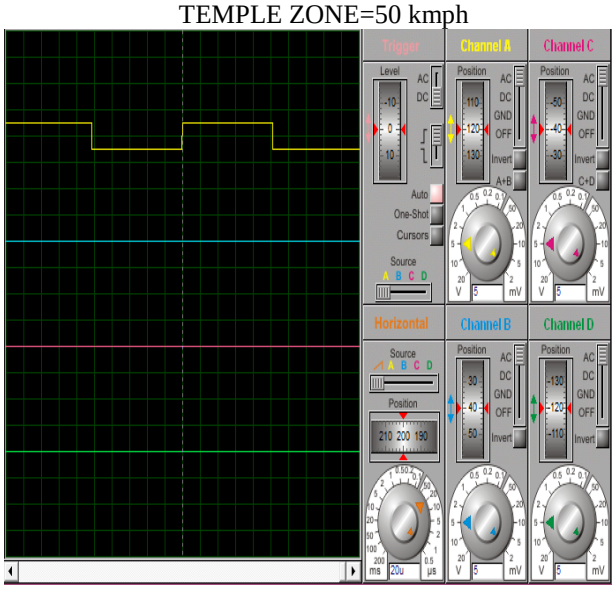


Fig-5.2: PWM signal for 50kmph

6. CONCLUSION

Here by we conclude that this project is very easy to implement with the current running system and also it requires very low cost and durable, ensures maximum safety to the wanderer and communal, the driver has the facility to know all the information about the road without distracting him from driving, and also the driver gets all the intimation about the vehicle even in bad weather conditions, low power consumption. This project is more strengthened by automatic speed control when the vehicles get any hazard signal from outside environment

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