Smart Zone Based Vehicle Speed Control

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ABSTRACT—

Smart zone based vehicle speed control aims at automatically controlling the speed of vehicles at speed restricted areas such as schools, hospital zones etc. Nowadays the drivers drive vehicles at high speed even in speed limited areas without considering the safety of the public. The traffic police are not able to control them with full effect. Also it is not practical to monitor these areas throughout. This project paves way for controlling the speed of the vehicles within certain limit in restricted zones without interruption of the drivers. An RFID is used for this purpose. The RFID reader is attached along with the vehicle and the RFID Tag with these Zones. These tags are programmed to send a coded signal when the reader comes in proximity. Whenever the vehicles enter into these zones their receivers will receive this code and the speed of the vehicles is controlled automatically with the help of the micro controller unit present inside the vehicle. The tags are placed at the beginning and the end of the regions for which the speed should be reduced.

Keyword: RFID, arduino, DC motor

1. INTRODUCTION

A vehicle has become an integral part of a modern family and is no more just a luxurious belonging of a person. Their usage all over the world has drastically increased during the last decade. This rapid increase has led to many concerns about reckless driving, condition of the vehicle and driver anomalies. Nowadays, people expect more than just vehicle quality and reliability. With rapid development of information and communication technologies (ICT), equipping automobiles with wireless communication capabilities is expected to be the frontier for automotive revolution. Connected vehicles refer to the wireless connectivity enabled vehicles that can communicate with their internal and external environments. These interactions provide passengers with an information-rich travel environment and enhance the situational awareness of vehicles.

The thread for this paper was derived from the above mentioned points. Here in this paper, we tried to develop a system to track the speed of the vehicle in a much simpler, economical way. This system has to work 24x7 automatically. The first idea was to use laser module, but finding it costly it was dropped. Later we found out that IR transceivers will help in achieving the goal, which is very simple to construct and very cheap, but it works only if the line of sight is maintained which was the main reason it was dropped. Finally we found that RFID module can fulfill our requirements with its key features as more economic, high reliability etc. In this paper, by using RFID module as its main component, automatic speed control of our vehicle can be achieved. RFID tag is fixed on the different sign boards and RFID reader on the vehicle. When the reader comes in the speed limit area, speed is controlled automatically.

2. HARDWARE SPECIFICATION:

- Arduinouno
- Dc Motor
- LCD Display
- Motor driver
- RFID Module
- Power supply

2.1 ARDUINO NANO:

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. Message can

be sent to the board what to do by sending a set of instructions to the microcontroller on the board. To do so the Arduino programming language and the Arduino Software (IDE) are used.

Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IOT applications, wearable, 3D printing, and embedded envoirments.
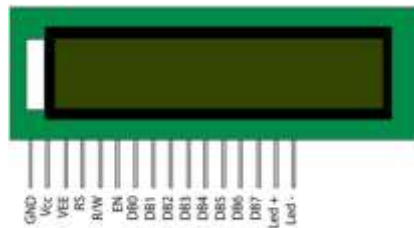
DC MOTOR:

A DC motor is any motor within a class of electrical machines whereby direct current electrical power is converted into mechanical power. Most often, this type of motor relies on forces that magnetic fields produce. Regardless of the type, DC motors have some kind of internal mechanism, which is electronic or electromechanical. In both cases, the direction of current flow in part of the motor is changed periodically.

The speed of a DC motor is controlled using a variable supply voltage or by changing the strength of the current within its field windrings. While smaller DC motors are commonly used in the making of appliances, tools, toys, and automobile mechanisms, such as electric car seats, larger DC motors are used in hoists, elevators, and electric vehicles.

LCD DISPLAY:

There are many display devices used by the hobbyists. LCD displays are one of the most sophisticated display devices used by them. Once you learn how to interface it, it will be the easiest and very reliable output device used by you! More, for micro controller based project, not every time any debugger can be used. So LCD displays can be used to test the output.

MOTOR DRIVE:

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, Hence H-bridge IC are ideal for driving a DC motor. In a single L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. Given below is the pin diagram of a L293D motor controller. There are two Enable pins on l293d. Pin 1 and pin 9, for being able to drive the motor, the pin 1 and 9 need to be high. For driving the motor with left H-bridge you need to enable pin 1 to high. And for right H-Bridge you need to make the pin 9 to high. If anyone of the either pin1 or pin9 goes low then the motor in the corresponding section will suspend working. It's like a switch.

RFID READER:

RFID Reader , are also called as interrogators. They convert radio waves returned from the RFID tag into a form that can be passed on to Controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to communicate. RFID systems use many different frequencies, but the most common and widely used & supported by our Reader is 125 KHz.

POWER SUPPLY:

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector. The board can operate on an external supply of 6 to 20 volts.

3. SOFTWARE SPECIFICATION

ARDUINO IDE SOFTWARE:

With this Arduino Integrated Development Environment you can edit, compile and upload Arduino sketches to the Arduino boards.
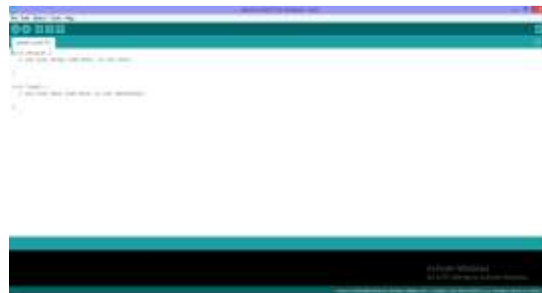
Arduino IDE software

4. EXISTING SYSTEM

- ➢ No other vehicle speed control technique is implemented in the areas of school zone, hills area, highways. Accidents occurs due to over speed.
- ➢ Mostly there are no sign boards are used to indicate the school zone ,hospital area.
- ➢ No technical alerting system required.

4.1. DISADAVANTAGES

- • More Maintenance
- • Cost and complixity

5. PROPOSED SYSTEM

The major advantage of proposed system is to avoid accidents at rush areas and also provide reliable communication to authorized society in case of emergency. Whenever vehicle enters secured zone, the transmitter of vehicle sends a signal to receiver.

5.1. ADVANTAGES

- Low power consumption

- Maximum efficiency

- Easy implementation

6. CIRCUIT DIAGRAM
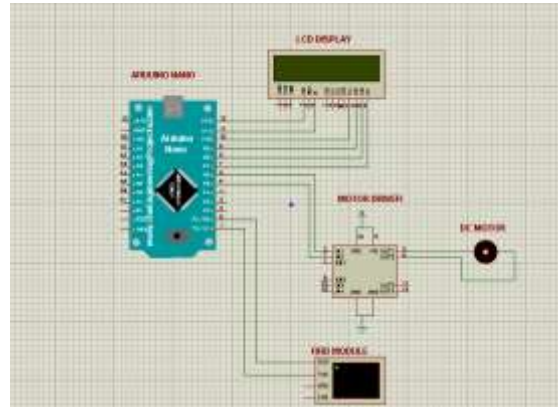
9.CONCLUSION & FUTURE SCOPE:

The project has an RFID tag which indicates the vehicle when it enters a speed limit zone. Hence by using the proximity sensor to monitor the speed of the vehicle and accelerator unit to control the speed, the speed of the vehicle can be maintained in the limited speed without the intervention of the driver. If this can be implemented effectively rash driving and over speeding in the speed limit zones can be reduced to a large extend, thus decreasing the total number of road accidents in our country.

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