



EMBEDDED BASED VEHICLE SPEED CONTROL SYSTEM USING WIRELESS TECHNOLOGY

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Abstract : As far as automobiles are concerned, safety is very important to reduce the occurrence of accidents in speed restricted zones. It minimizes the loss of property and life. According to the recent surveys, in the past few years, an accident near the school zones have increased tremendously, because of their hurry to get the targeted place soon. Therefore, controlling vehicle speed has been a crucial issue to be considered. This project aims to give a practical, compact and simple design to develop an automatic vehicle speed control system, which has to be quickly get implemented in school zones to reduce the number of accidents. This automated speed controlling system is built using the microcontroller-based platform of the Arduino board. Here the Arduino is programmed in such a way that, the prescribed speed limit was incorporated in the transmitter unit which transmits the signals, and it was received by the receiver in the vehicle using Zigbee wireless communication technology and the speed of the vehicle was automatically controlled by the input signals by the receiver, with the help of speed encoder sensor. Once this technique was implemented the accidents will be reduced on a larger rate, and also reduce the nuisance by some drivers.

Index Terms – Arduino, GPS, SpeedControl, RTC module

I. INTRODUCTION:

To make roads safer, cleaner and smarter, sensor and communication technologies are increasingly considered in research, standardization and development. While today's vehicles are already able to sense the surrounding environment, we expect that future cars will communicate with a roadside communication infrastructure and with each other. Connected vehicles create a fundamental building block of intelligent transport systems (ITS) and can provide numerous application services to improve safety and comfort of driving. Current driver assistance systems are based on a number of technologies such as radar, computer vision and sensors. Integrating all of these technologies into a single system is normally a costly and complex solution. Here we thought of introducing zigbee. ZigBee based driver assistance system solution leverages the cost-effective, low power and secure wireless networking features of the ZigBee protocol.

II. LITERATURE SURVEY & EXISTING SYSTEM:

2.1: LITERATURE SURVEY:

In Rubini.R, et al [1] proposed a system has an alerting, recording and reporting system for over speed violation management. The Zigbee transmitter sends the speed limit of the particular lane entered by the vehicle and also gives alerts like "road works", "steep slopes", "school zone" in the form of acoustical messages and also in LCD. The receiver unit placed in the vehicle receives the messages and sends to the microcontroller. When speed of the vehicle nears the speed limit it displays the warning and if exceeds the limit, the microcontroller records the violated speed and time. The LCD displays the lane speed limit and shows the number of times, speed was violated. A GSM module sends message to the nearest traffic personnel immediately after a violation occurs. An authenticated device is also provided, which can be operated only by the traffic police in which he can retrieve the data stored at any time. Increase in the count of violation increases the penalty amount which can be collected in toll gates located nearby. In S.P. Bunker, et al [2] described a real-time online safety prototype that controls the vehicle speed under driver fatigue. The purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents. The main components of the system consist of number of real time sensors like gas, eye blink, alcohol, fuel, impact sensors and a software interface with GPS and Google Maps APIs for location. In Sathya, et al [3] achieved with the help of "AARS using GPRS 3G TECHNOLOGY". Through this, we can provide a smooth flow for the ambulance by controlling the traffic light according to the ambulance location to reach the hospital. The location of the ambulance can be easily identified with the help of the GPS unit installed in it. A controller in the traffic junction can automatically control the traffic flow and thus reduces the time delay taken by ambulance to the hospitals. The traffic junction band the ambulance will have GPRS 3G modem to communicate between them. The chances of misusing the ambulance can overcome with the help of an RFID tag given to the doctors in the respective hospitals

so that the security can be attained. This scheme is helpful for the Traffic police to control the traffic thereby helping the patients who are facing emergency.

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2.2: EXISTING SYSTEM:

Public places such as school, hospital, and work or accident zone have warning sign and messages displayed on a pillar or road sign poles. It has to be followed by the vehicle driver according to the traffic rules.

Disadvantages:

1. The driver might not be aware about the sign or intentionally doesn't follow. It results in violation of the rule and occasionally in accident.

III. PROPOSED SYSTEM:

In proposed system we are using RTC for receiving the time. In this we will set time for the speed control of the vehicle. Here we are implementing this project for schools. The school time is morning time. GPS is used to track the location when the vehicle entered zone at particular time vehicle speed will reduce. So that the time will be sent for the morning then at that time the Transmitter send signal to receiver so that the receiver side the motor will reduce the speed. Likewise, we can control the Vehicle speed.

3.1 BLOCK DAIGRAM;

TX:

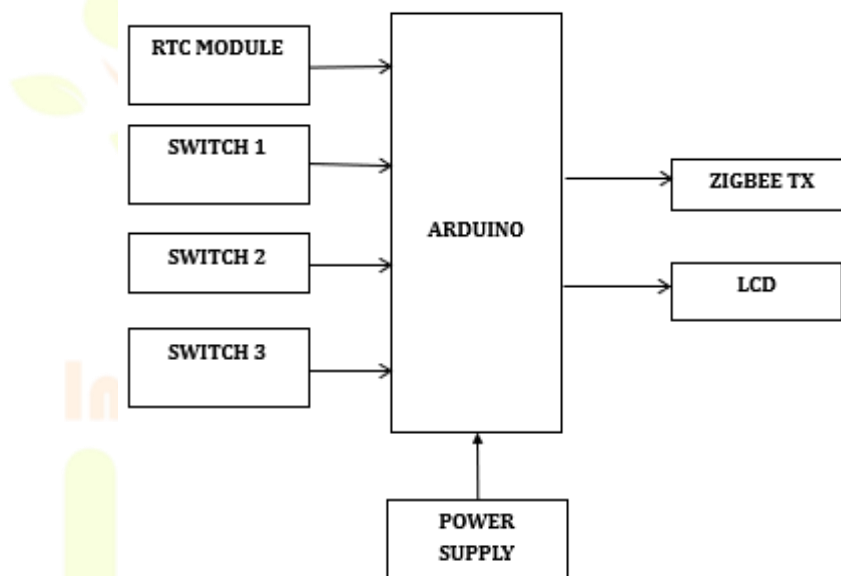


Fig 3.1: Block diagram of transmitter

RX:

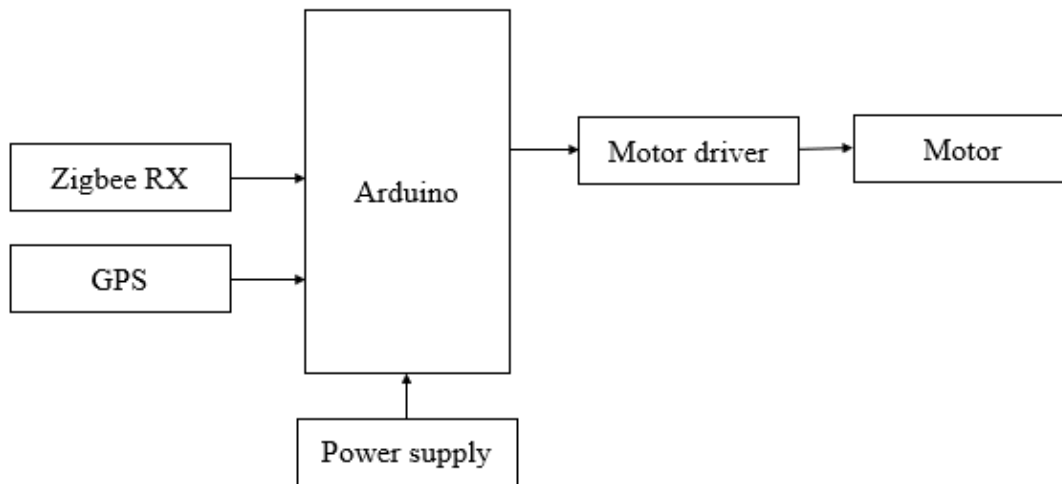


Fig 3.2: Block diagram of receiver

3.2 ADVANTAGES:

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

3.3 APPLICATIONS:

- 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.
- It can be implemented in automated systems for wireless control.

4.COMPONENTS DESCRIPTION:

4.1: HARDWARE COMPONENT REQUIREMENTS:

4.1.1: Arduino:

Arduino Uno is a very valuable addition in the electronics that consists of USB interface, 14 digital I/O pins, 6 analog pins, and Atmega328 microcontroller. It also supports serial communication using Tx and Rx pins. There are many versions of Arduino boards introduced in the market like Arduino Uno, Arduino Due, Arduino Leonardo, Arduino Mega, however, most common versions are Arduino Uno and Arduino Mega. If you are planning to create a project relating to digital electronics, embedded system, robotics, or IoT, then using Arduino Uno would be the best, easy and most economical option.



FIG 4.1: Arduino uno

4.1.2:GLOBAL POSITIONING SYSTEM:

Global Positioning System (GPS) is a satellite-based system that uses satellites and ground stations to measure and compute its position on Earth.GPS is also known as Navigation System with Time and Ranging (NAVSTAR) GPS.GPS receiver needs to receive data from at least 4 satellites for accuracy purpose. GPS receiver does not transmit any information to the satellites.



Fig 4.2: Global Positioning System

4.1.3: ZIGBEE MODULE:

Zigbee is the most popular industry wireless mesh networking standard for connecting sensors, instrumentation and control systems. Zigbee, a specification for communication in a wireless personal area network (WPAN), has been called the "Internet of things." Theoretically, your Zigbee-enabled coffee maker can communicate with your Zigbee-enabled toaster. Zigbee is an open, global, packet-based protocol designed to provide an easy-to-use architecture for secure, reliable, low power wireless networks. Zigbee and IEEE 802.15.4 are low data rate wireless networking standards that can eliminate the costly and damage prone wiring in industrial control applications.

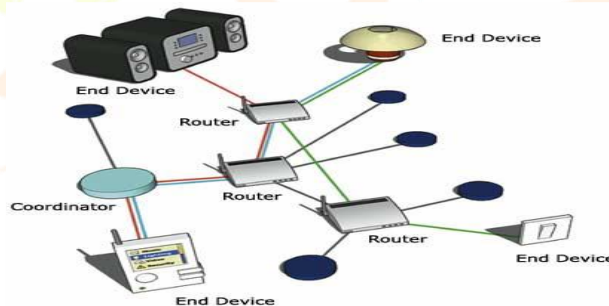


Fig4.3: zigbee module

4.1.4: MOTOR DRIVER:

A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Arduino and the motors. The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. We will be referring the motor driver IC as L293D only. L293D has 16 pins.

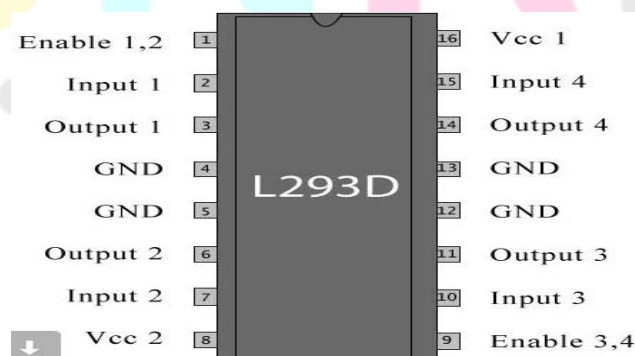


Fig 4.4: Motor Driver

4.1.5: LIQUID CRYSTAL DISPLAY:

LCD (Liquid Crystal Display) is the innovation utilized in scratch pad shows and other littler PCs. Like innovation for light-producing diode (LED) and gas-plasma, LCDs permit presentations to be a lot more slender than innovation for cathode beam tube (CRT). LCDs expend considerably less power than LED shows and gas shows since they work as opposed to emanating it on the guideline of blocking light.

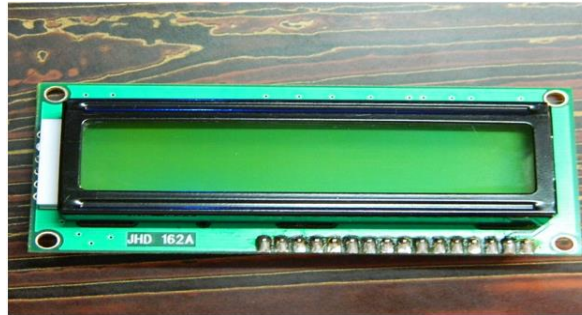


Fig4.5: LCD

4.1.6: POWER SUPPLY:

A power supply is a component that provides at least one electrical charge with power. It typically converts one type of electrical power to another, but it can also convert a different Energy form in electrical energy, such as solar, mechanical, or chemical.

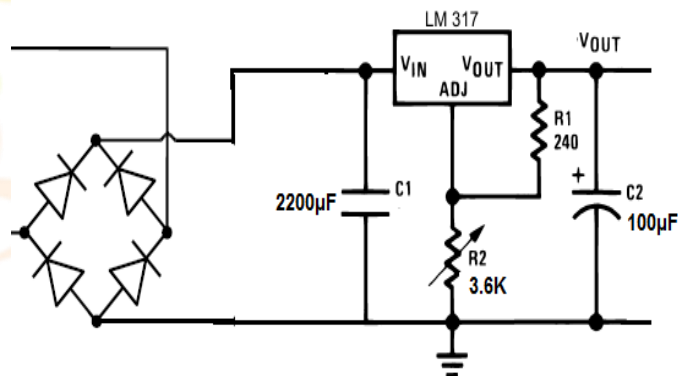


Fig4.6: Power Supply

4.2: SOFTWARE REQUIREMENTS:

4.2.1: Arduino IDE:

Arduino IDE where IDE stands for Integrated Development Environment – An official software introduced by Arduino.cc, that is mainly used for writing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.

Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module. It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process.

It is easily available for operating systems like MAC, Windows, and Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment.

5.RESULT AND DISCUSSION:

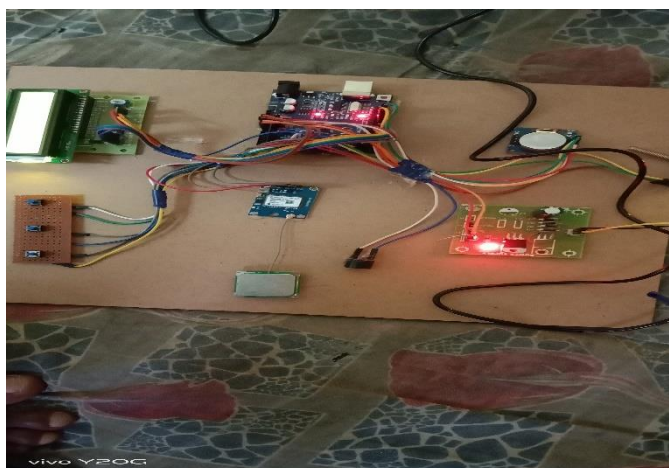


Fig5.1: Transmitter

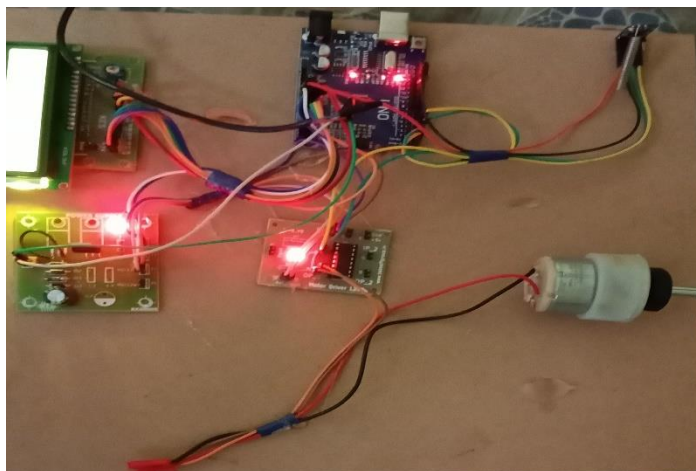


Fig5.2: Receiver

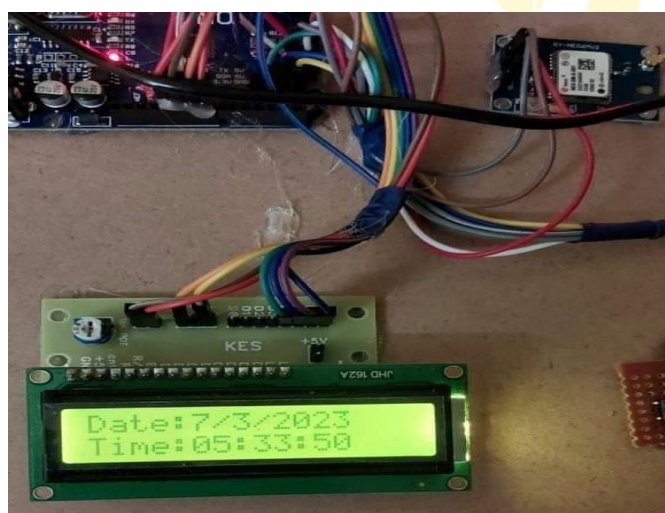


Fig5.3: Time Setting

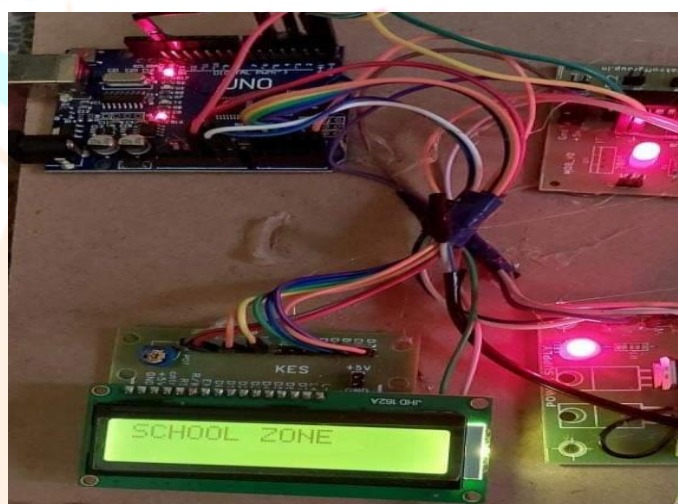


Fig5.4: Detects the School Zone



Fig5.5: Detects the Motion of the Vehicle

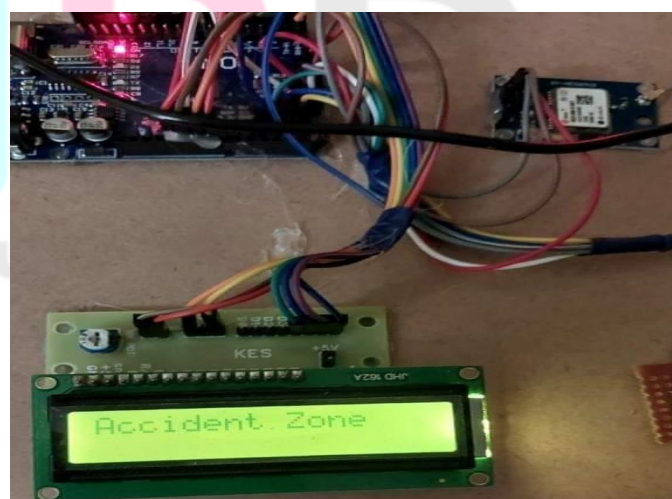


Fig5.6: Detects the Accident Zone

CONCLUSION:

The proposed system mainly designed in order to avoid accidents and to alert the drivers about the speed limits for safe traveling. An effective solution is provided to develop the intelligent vehicle which will operates on safest speed at critical zones

and monitor various parameters of vehicle in-between constant time period and will send this data to the base unit is explained in this project. Controlling the vehicle speed automatically in real time is very difficult. So, in order to avoid those difficulties, instead of controlling the vehicle speed automatically, this research paper succeeded in alerting the driver about the speed limits and detecting the critical area. The entire system is control and the advantage of small volume and high reliability.

