An Ethical Assistant for Automobiles

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Abstract

Road rash is a common problem that claims a considerable number of lives every year. According to a study conducted in India, about 77% of road accidents in the country are due to the driver not following the traffic rules and regulations. In the proposed model, we consider the speeding problem and rectify it with the help of a combined effect of Global positioning Systems via commercial navigation maps and automatic Speed control of electric vehicles. The location of the automobile is tracked periodically in real-time. This is achieved with the help of the commercially available online navigation maps. We have used the Google Maps here. The data from the navigation maps are intercepted by a microcontroller. We use the Node MCU ESP-12 in this presented model, owing to its simplicity in usage. The microcontroller accesses the required data from Google Maps by making use of its own Java library. The data thus obtained is used by the Node MCU ESP-12 to know the exact location of the vehicle and the speed limit of that place. The speed limit data can be gathered with respect to both roads and road segments. The microcontroller is also interfaced with the Motor Driver Controller Module (L298n). The Driver Module controls the speed of the DC Motors in the electric vehicle influenced by the commands from the microcontroller. The Node MCU ESP-12 sends out the commands to change the speed of the DC Motors based on the speed limit values previously acquired from the Navigation map. In this way, the suggested model makes sure that the rules for the speed limit are followed in every road segment and thus reducing the possibility of accidents and ensures safer automobile systems.

I. INTRODUCTION

The figure below gives information about the number accidents that has occurred over a period of 10 years. It is evident that, with the increasing number of road accidents each year, the number of people losing their lives is increasing as well. There might be a number of reasons for an accident to occur, but, one of the major concerns may be the driver not following the traffic rules.

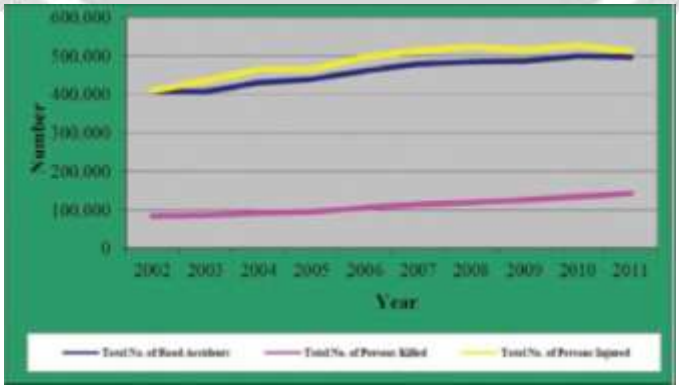

Fig 1: Statistics report on total number of road accidents

This even includes the neglection of safety boards and other instruction panels placed near the roadside. For example, road signs are indicated at places where there are bends, steep ascends etc. and speed instructions would be given at areas likes schools,

colleges, hospitals etc.

Speed control of vehicles can be implemented using a variety of techniques that has been developed to avoid road accidents. Some of the techniques include Cruise Control System(CCS), which maintains a pre-defined speed, and Adaptive Cruise Control System(ACCS) which maintains the vehicle at a safer distance from the preceding vehicle.Curve Warning systems(CWS) can detect curved roads.

The above said systems can control the speed of the vehicle only on drivers' response. In our proposed model,the speed of the vehicle is controlled automatically even when the driver fails to respond.

II. GPS MODULE (NEO 6-M)

GPS stands for Global Positioning System. We have used GPS Module Neo 6-M here. In general, a GPS module is used to determine the position, location, time and speed of the automobile while travelling.

The figure below represents the GPS Module Neo 6-M. it has got an external antenna with no header pins. This can be interfaced with any microcontroller to read the data.

The module must be wired to any microcontroller to get the raw GPS data. The data obtained is parsed to obtain the selected GPS information.Thus the location is determined by the GPS module.

III. NODE MCU ESP-12

The Node MCU ESP-12 is nothing but a microcontroller. It belongs to a Espressif Systems which is a company based out of shanghai. It is most commonly used for Wifi related activities and hence it is commonly called as Wifi module.

One of the important applications of this microcontroller is that it can be used as an intermediate for any device to get connected to the internet, which cannot get connected on its own.

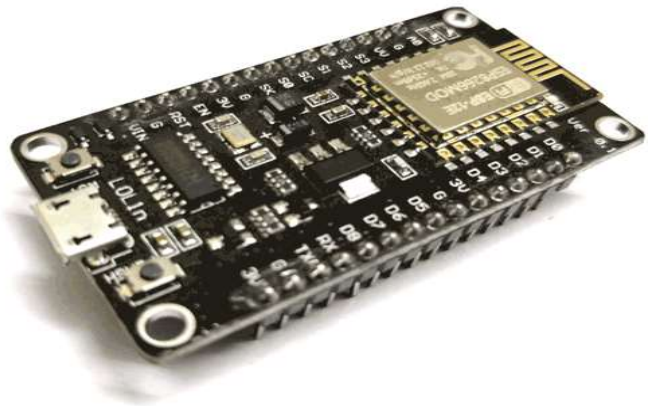

Fig 3: NODE MCU ESP -12

The pin configurations of ESP-12 consists of only two GPIO pins. It can also work as a standalone device and control 1-2 devices. It runs on 3.3 V. The pin configurations of the microcontroller is given below.

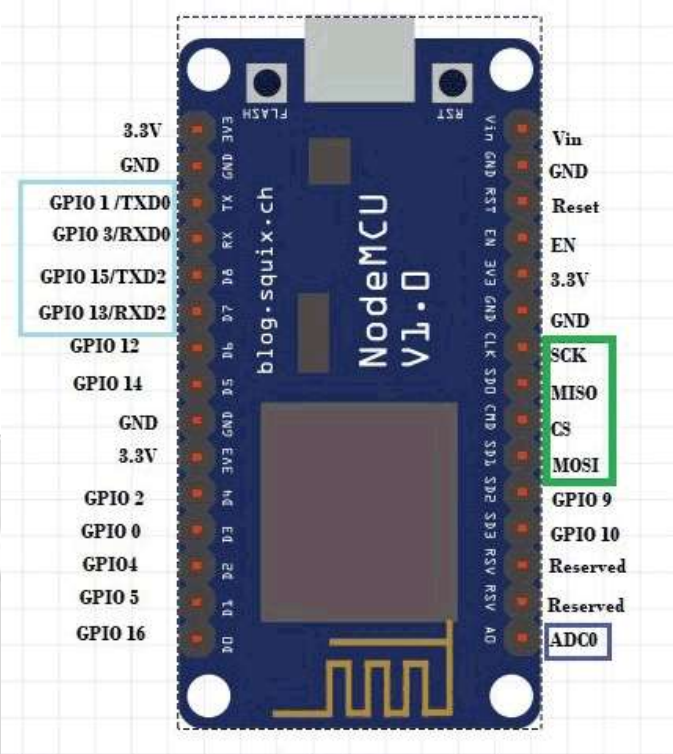

Fig 2 : Pin Configurations of Node MCU ESP-12.

IV. INTERFACING OF GPS MODULE NEO 6-M AND NODE MCU ESP-12:

The GPS module NEO 6M is interfaced with the Node MCU ESP-12 microcontroller to get information about the location, position, speed etc. of the automobile. This can be done by connecting the above two devices with a connecting wire.

A local web server is created by the microcontroller in such a way that users could view the location details of the automobile by clicking on the web server. This gives the information of the automobile travelling in real time.

The interfacing of these devices is a simple circuit. The interfacing is less complex compared to the interfacing of other complex modules to get information about the location and position of the vehicle.

The figure below gives an illustration on how the GPS module Neo 6-M is interfaced with the Node MCU microcontroller.

V. MOTOR DRIVER CONTROLLER L298N

The main application of a motor driver controller is controlling the speed and direction of DC motors. The L298N motor driver controller is a dual controller that can control the speed and direction of two DC motors or a bipolar stepper motor at ease.

The image below gives the picture of a motor driver controller L298N.

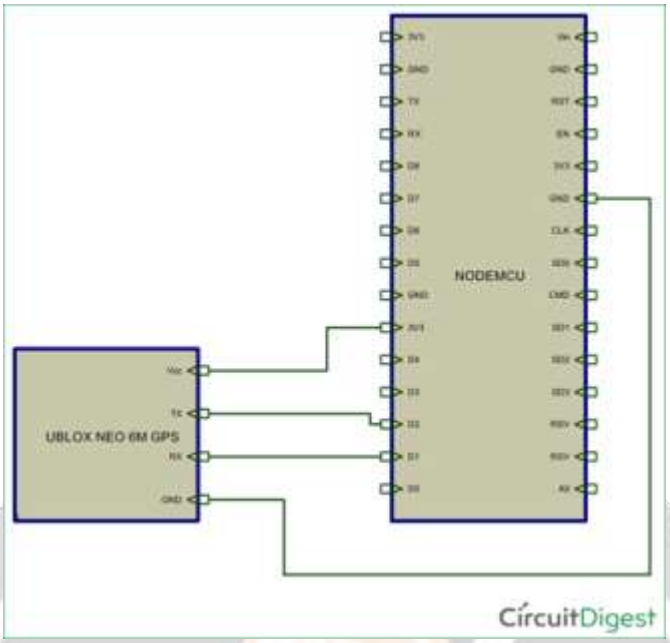

Fig 4: Interfacing of GPS module Neo 6-M with Node MCU ESP-12 microcontroller

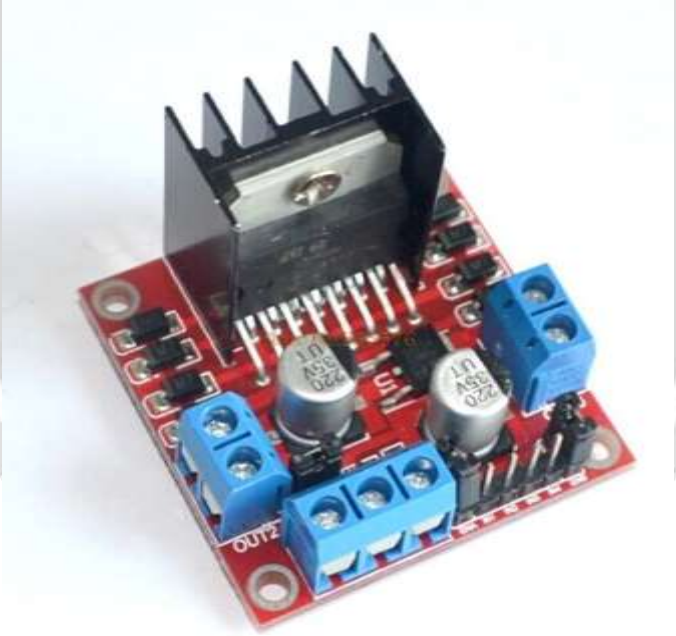

FIG. 5: Motor driver controller L289N

VI. INTERFACING OF MOTOR DRIVER CONTROLLER L289N WITH DC MOTORS

The motor driver controller can be directly connected to two dc motors. The pin configurations of L289n is in such a way that the two motors A and B are connected directly to the controller. By connecting the pins in this way, the speed of the dc motors is controlled accordingly. This in turn enables the driver to follow the traffic rules and accordingly not exceed the speed limits for a given area.

The pin configurations and the interfacing of the motor driver controller L289N and the DC motors is given below.

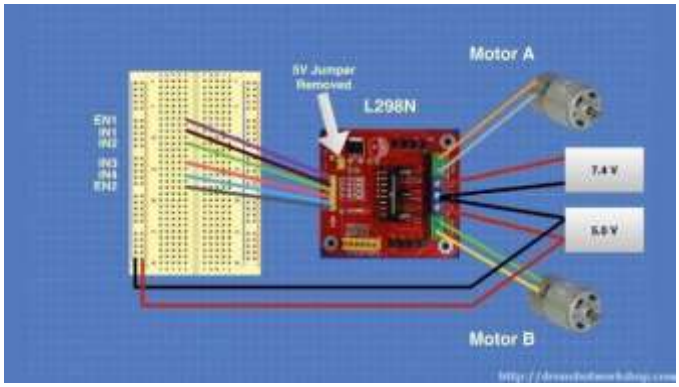

Fig 6: Interfacing of L289 motor driver controller with DC motors

VII. CONCLUSION

The ultimate aim of this project is to make the driver abide by the traffic rules. This might reduce the number of accidents caused and the number of losing lives each year as well. One of the main advantages of this method is that it can be implemented in a very simple manner. Without the need of complex circuitry and the investments for speed control, this method provides a safe and reliable solution for most of the problems caused due to accidents.

REFERENCES

Soni Kumari, Jamal Ahmed, Mimo Ghosh, Gautam Ghosh, "Review of Automatic Speed Control of Vehicle using RFID Technology" in

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