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Automated Vehicle Control Based On GPS

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Abstract

The paper aims about controlling the speed of any vehicle automatically in cities as well as in restricted areas such as schools, parks, hospitals and limited speed areas etc. At such locations, the electronic system is used to take control automatically. GPS is used to indicate the speed limited areas. This system not only controls speed, but also incorporates other features such as no horn in horn-restricted areas and automatic switching of vehicle headlights.

Keywords- GPS, Arduino UNO, HC-05, LDR sensor.

INTRODUCTION

When a vehicle travels on the road with the posted speed limit, the vehicle's adherence to the maximum posted speed is often appropriate. It doesn't have to be strictly adhered. Traveling within 5-10 miles / hour of the posted maximum speed is sufficient for the vehicle. The police road patrol usually enforces the maximum posted speed. It is well known in the prior art that the vehicle adheres to a route or schedule. Gray in the United States Pat. No. 4,651,157 discloses a surveillance and tracking system for a terrestrial or marine vehicle using navigational information to determine the vehicle's latitude and longitude. The United States Pat No. 4,814,711, issued to Olsen, discloses a survey system for collecting real-time data from a plurality of survey vehicles, each of which uses global positioning system (GPS) signals received from a plurality of GPS satellites to determine its current position. A central station periodically surveys each survey vehicle and receives coordinates from radio wave communication to survey the current location of the vehicle.

The central station compares the path of the vehicle with that vehicle's survey pattern. The central station also receives the geophysical data measured by a vehicle and is coordinated with the location of that vehicle when it was taken. The present invention is unique in that it allows one to control the speed of the vehicle using the Global Positioning System to determine the location of the vehicle and to use locally stored map database to match the location and speed of the vehicle with the maximum speed limit. The vehicle's speed is therefore controlled and the posted speed is enforced without the police patrol being used. One aspect of the present invention is aimed at a vehicle's maximum speed control apparatus based on the speed limits on the road the vehicle is traveling on.

The navigation computer for GPS includes a memory unit associated with GPS. The GPS navigation computer includes a port for downloading and updating and changing map data from the map database into the memory unit. The GPS navigation computer determines location and speed of the vehicle, inputs the maximum speed from the map database, and forwards the speed limit to the engine computer, wherein the engine computer uses the speed limit information contained in the map database to limit the maximum ground speed of the vehicle.

The device also includes a vehicle display of an electronic map connected to the GPS computer for electronic display of the map with the speed limit posted, the vehicle's current location on the map, and the vehicle's current speed. The device also

includes a sensor of speed and a sensor of heading. These sensors are connected to the vehicle odometer for the vehicle's read speed and heading, the GPS computer and the vehicle engine computer for transmitting the vehicle's read of speed and heading.

Furthermore, the vehicle engine computer includes an engine computer memory and an engine microprocessor in which the engine computer is connected to the GPS computer in order to receive the maximum map speed limit value from the map data. In one embodiment, the engine computer memory contains a predetermined speed value added to the maximum speed map limit to achieve the vehicle's true maximum speed value. To control the vehicle's true maximum speed value, the vehicle engine computer is connected to the vehicle odometer. To control the vehicle's true maximum speed value, the GPS computer is connected to the vehicle engine computer.

METHODOLOGY

When the vehicle enters the normal area, its speed will not decrease and it goes normally, there will be no action. By entering the restricted areas, the vehicle enters the speed limit. Whenever it enters, the server module simply sends information containing how much speed a vehicle can go within the limited region of speed. Then the receiver receives the signal or information and also gives the controller (Arduino UNO) the signal acquired from the speed meter. The signal is essentially analog in nature and will be converted into digital so that the signal can only be processed by the micro controller.

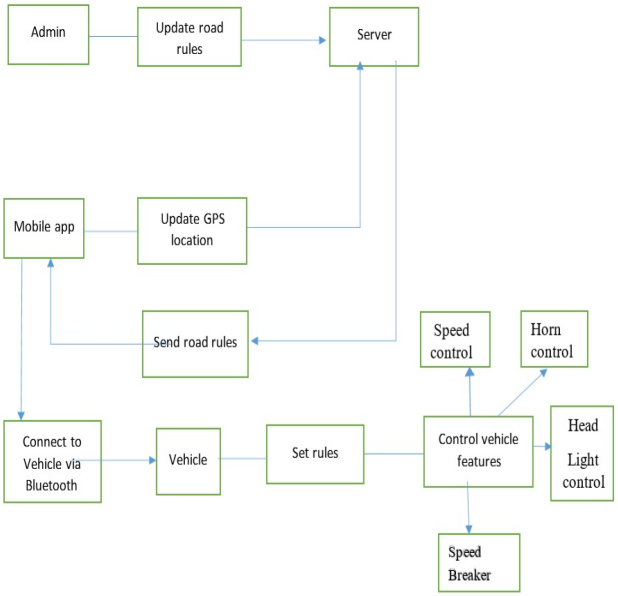

Fig. 1: Block Diagram

The controller compares the server signal and the speed meter. There are two cases in this: first, the current speed is lower than the speed that the vehicle normally does not require any action. Second, the speed meter information is higher than the server module speed. For a few seconds, the controller waits if the driver lowers the speed to the value below, if the driver does not lower the speed then it automatically takes control and lowers the speed accordingly. The information is conveyed to the nearest police station at the same time. The information includes the number and time of the vehicle. The time denotes that at which time the vehicle crosses that area. Then the nearest tollgate or check post collects the fine or penalty amount. After that at the end of the speed limit area, vehicle receives a stop information means the control releases by the controller to driver. If the vehicle enters in no horn zone then the horn of the vehicle stops working and gets released when the vehicle leaves the restricted no horn area. The LDR sensor connected with the vehicle keeps checking the light intensity. If the vehicle enters a tunnel, the headlights are automatically turned on.

RESULTS

The following results were successfully obtained after the completion of the project. They are mentioned below:

• The speed of the vehicle is automatically controlled according to the speed limits set.

• Horn doesn't work in horn restricted areas.

• Vehicle headlights are automatically turned on when dark.

CONCLUSION

India is the worst hit country, mostly caused by vehicle over-speeding. There is an urgent need to set up a system that can automatically restrict the top speed of vehicles in accordance with the speed limit regulations of a specific speed zone. We have developed a new design to automatically control vehicle speed. By using this system, we can avoid over-speed driving by reducing accidents. The method we have framed in this paper can be updated in many ways, but we believe that GPS makes it easy and efficient. We can reduce the number of accidents and save many lives if the system is made compulsory for all vehicles.

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