

Advanced Accident Prevention and Notification System

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Abstract

Dangerous road conditions may be the result of natural events, such as tropical rains and flooding, that make driving unsafe. Dangerous conditions can also arise from the poor physical condition of a road and its surroundings. It may cause road accidents. Also while driving in the night just the headlights might not be a sufficient assistance for driver. Unexpected hurdles on road may cause more accidents. Also because of bad road conditions, fuel consumption of the vehicle increases; causing wastage of precious fuel. We proposed this system 'Advanced Accident Prevention And Notification System' to inform the driver about the pothole and controlling the speed of the vehicle and also the information has been stored in cloud and the notification about pothole has been sent to the Road Maintenance department to take a remedy to maintain the road. This system uses ultrasonic sensor to sense the potholes and GPS to track the location and wifi module to transmit the data

1. Introduction

India is the world's largest democratic republic. With the advancement of Transport Systems, countries are identified on the basis of their "Roads". Now a days road accidents are major issue in most of the counties, one of the reason of road accident is due to irregularities of the road surface and high speed of driving. India has difficult road and traffic conditions. Traffic jam, safety issues, rash driving, lawlessness and increasing load of vehicular traffic are decreasing the quality of road. Roads normally have humps so that the vehicle speed can be controlled to avoid accidents. In order to eliminate the potholes on the road, several researches have been done.

In particular, road accidents guaranteed about 1.25 million lives for each year. It demonstrates that most street mishaps are caused by poor state of streets. Terrible streets are a major issue for vehicles and drivers; this is on the grounds that the decay of streets prompts increasingly costly support, for the street itself as well as for vehicles. As needs be, street surface condition checking frameworks are essential answers for enhance traffic security, diminish accidents and shield vehicles from harm because of awful road. Both street chiefs and drivers are keen on having adequate data concerning street foundation quality (protected or hazardous street). Solidified methodologies for checking road surface conditions include the selection of expensive and advanced equipment gear's, for example, ultrasonic with information securing frameworks.

These methodologies cause a high establishment and support cost and require huge manual exertion, which can actuate mistake while sending or gathering the information. Another option is to utilize detecting advancements to pick up this data to take care of the issue of street surface condition checking. Nowadays, cell phones are broadly used. Most of them is furnished with different sorts of sensors like accelerometer, GPS, and so forth. Accordingly, cell phone based street condition checking is one of such supportive applications to screen road conditions



Fig.1 Road with Potholes

2. Literature Review

The main reason for the accidents is the road conditions present nowadays, It is unnecessary to use an external devices to monitor the road conditions, Tough most of the persons using their smart phones. This system designed to implement the method to monitor the road condition using their Smartphone by the accelerometer sensor and vibration sensor present in it.

The fact of causing accidents during night time is non monitoring of pothole and humps present in road side. To overcome this problem The system is designed to identify the pothole and humps by using ultrasonic sensor and intimate the drivers by using LCD display

The pothole and speed breaks has been automatically detected using sensors like accelerometer, IR sensor, Ultrasonic sensor, vibration sensor and notification is transferred to driver by text message through GSM module to avoid accidents

The humps and potholes are detected using accelometer, ultrasonic sensor and information about the pothole is shared to drivers by message to alert them, They have to share the message to government authorities manually to intimate them about potholes. In the existing system, the pothole is detected using the accelerometer sensor in Smartphone. This system is not automotive in nature. The complaints if needed to be posted or to be informed to any governmental authority it will be done only with human intervention. This process may not provide the complete efficiency as many people may ignore the issue and will not post them. Even if people sends the complaint to an admin many pothole image may be repeated and thus it may cause a huge confusion. In this case, if prioritization has been done then it would be an optimized way to collect the frequent places that is being affected by potholes.

3. Proposed System

The proposed system design (prototype) could be implemented in real time by the automobile industries in their vehicles. The system will be linked to the cloud base which will be regularly updated. As it is cost effective and consumes lesser power, it is easier to implement on low-end vehicles as well. As we have been noticing, the amount of deaths or accident cases due to these potholes is increasing by the day.

People are usually distracted while driving on the roads and some sort of an alert system is needed to grab their attention in order to prevent them from facing the consequences of these potholes. Further we would expand our system by linking the database to a GPS system. This would tell the commuters and drivers of the potholes in their path well in advance.

This could also assist the government authorities to locate the faulty roads and help them reconstruct the roads efficiently. The cost factor would also have a positive aspect as no such complicated or delicate equipment are being used to implement this system.

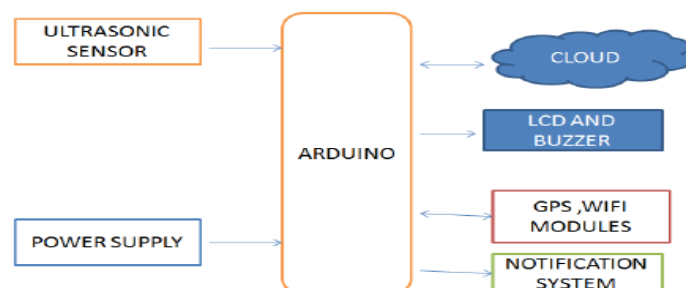


Fig 2: Proposed System

If the vehicle started , GPS starts tracking location and the system starts checking for potholes, If the pothole detected the alert has sent to driver using LCD and BUZZER. Also the notification has sent to cloud using WIFI module and data's are stored, and the

notifications has sent to Road maintenance department and help them to maintain the road properly.

Objectives of our project are

- To ensure safety of the commuters.
- To provide safety on highway while changing lanes.
- To inform the emergency contact in case of an emergency to the driver.
- To show the position of the potholes in android app for the knowledge of the commuters

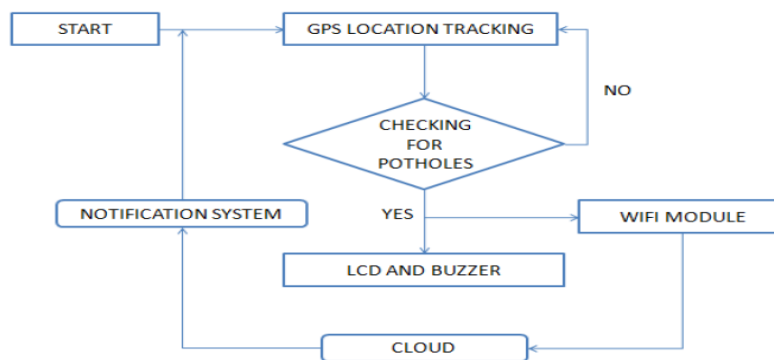


Fig 3: Flowchart of the Proposed System

Power the Sensor using a regulated +5V through the Vcc and Ground pins of the sensor. The current consumed by the sensor is less than 15mA and hence can be directly powered by the on board 5V pins (If available). The Trigger and the Echo pins are both I/O pins and hence they can be connected to I/O pins of the microcontroller. To start the measurement, the trigger pin has to be made high for 10µs and then turned off. This action will trigger an ultrasonic wave at frequency of 40kHz from the transmitter and the receiver will wait for the wave to return. Once the wave is returned after it getting reflected by any object the Echo pin goes high for a particular amount of time which will be equal to the time taken for the wave to return back to the sensor.



Fig 4: Output when pothole is detected

The amount of time during which the Echo pin stays high is measured by the MCU/MPU as it gives the information about the time taken for the wave to return back to the Sensor. Using this information the distance is measured as explained in the above heading. The proposed system has been successfully implemented in both Hardware section and Software section. The outputs and results and successfully recorded. This is shown in figure 5.

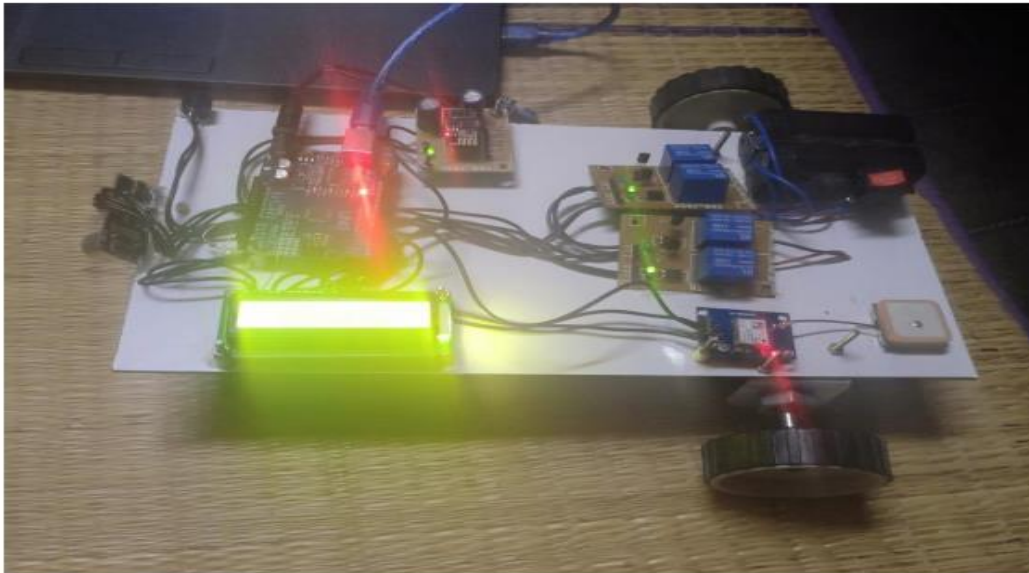


Fig 5: Hardware Model

4.Conclusion

In this we have proposed a system which will detect the potholes on the road and save the information in the server and reduce the vehicle speed if needed and also sends the notification about pothole to road maintenance department and helps them to maintain the road regularly. Due to the rains and oil spills potholes are generated which will cause the accidents. The potholes are detected and its height, depth and size are measured using ultrasonic sensor. The GPS is used to find the location of pothole. All the information is saved in the database. This timely information can help to recover the road as fast as possible. By controlling the rate of fuel injection we can control the rotation of the drive shaft by means of an Non-contact tachometer. This helps to reduce the vehicle speed when pothole is detected. Hence the system will help to avoid road accidents .So that it helps to save many lives.

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