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AUTOMATIC POTHOLE MONITORING SYSTEM USING GPS TRACKING

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ABSTRACT:
Most developing countries in the world like India have pothole-filled roads mainly because they are unable to allocate funds for road maintenance. In addition, there is no proper road maintenance in the local roads. Hence, in this paper we propose a basic and strong structure of a compact and reasonable gadget that is destined to be appropriate for all vehicles for detecting potholes. Afterstarting the vehicle the ultrasonic sensor present at the base of the vehicles will continuouslymonitor the way to identify the pothole, when the pothole was identified, the GPS module spare itslatitude and longitudinal position. Furthermore, when the vehicle moves along a similar way for the nexttime, the GPS module persistently tracks the vehicle position and contrast it and the spared pothole position on any way and demonstrate the distinction between the two positions and cautions the driver that the vehicle is close to pothole

Keywords:pothole detection,latitude and longitude, GPS, ultrasonic sensor.

1.INTRODUCTION:

Now-a-days, we ran over occurring of accidents because of inappropriate upkeep of roads.This inappropriate upkeep of roads results to formation of potholes.Potholes are usually caused by the presence of heavy traffic and water on roads..Every year, pothole-related deaths make it to the headlines especially during the monsoon season. According to official statistics, potholes claimed 11,836 lives and left 36,421 persons injured in India from 2013 to 2016. Several studies conducted in cities such as Chandigarh and Mumbai point to the lack of a proper drainage system and weak proportioning of aggregates for road construction as major reasons for pothole formationIn fact, it has become second nature for drivers to swerve through lanes to avoid potholes, which causes nearby vehicles to also panic.Unexpected hurdles on road may cause more accidents.In this project, pothole location framework was presented in the vehicles with the goal that the driver can recognize the pothole before the vehicle goes through it. Presently in this project we are performing two modes of operation namely training mode and testing mode. In these two modes the Ultrasonic sensor present at the base of the vehicle ceaselessly tracks the road condition and GPS module consistently check the vehicles latitude and longitude position . In training mode, Ultrasonic sensor ceaselessly examines the state of road, if the accelerometer axis values changes then the ultrasonic sensor detects the presence of pothole or overwhelming

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velocity breaker then the GPS module stores that latitude and longitude position of the pothole. In testing mode, when the vehicle moves along a similar way for some other time, the GPS module re-establishes the recently stored pothole location and persistently analyze it the moving vehicle position.This contrast is appear on the display.When the vehicle is nearing the pothole the alert system i.e., buzzer cautions the driver about the nearness of pothole.

The rest of the paper is organized as follows. Section2 and 3 describes hardware and software tools used in our system respectively. Section 4 and 5 describes the system architecture and flow chat. Section6 describes experimental results and section7 describes circuit .section 8 describes the conclusion and future scope.

2.HARDWARE COMPONENTS:

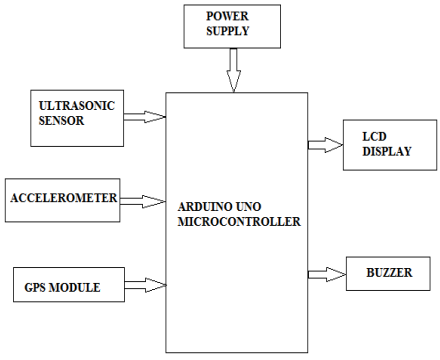
- Arduino
- IR Sensor
- Ultrasonic sensor
- Accelerometer
- LCD display
- Servo motors
- GPS module

3.SOFTWARE TOOLS:

- Arduino IDE

4.SYSTEM ARCHITECTURE:

The block diagram of proposed model is as follows:



5.1 POTHOLE DETECTION:

There are two modes in our proposed model:

1. Training mode
2. Testing mode

In the initially we have to set the mode switch that is either in training mode or testing mode.

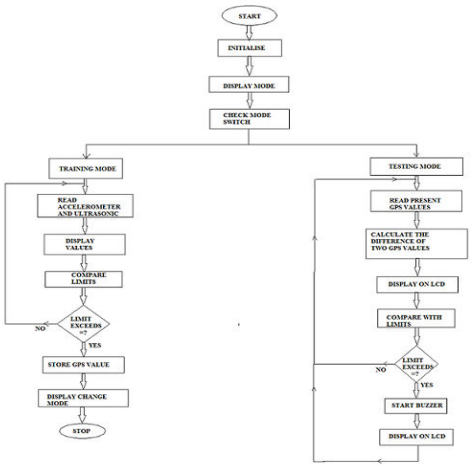
1. **Training mode:**

If we place in training mode read the distance from ultrasonic and the values from accelerometer and check for limits. If the detected values exceeds more than the limits then at that particular position the values of longitude and latitude given by the GPS are stored and it will also displayed on the LCD display. If pothole was detected then we have to switch for the testing mode. If the detected values does not exceed the limits and the same procedure will be repeated until it detects the pothole.

2.Testing mode:

If we place the mode switch in testing mode then the stored longitude and latitude are compared with the present longitude and latitude. If their difference is falls below certain threshold value then the buzzer activates and motors will slow and it will be displayed on the LCD display(that is we are nearing to pothole).

5.2 Flow chart:



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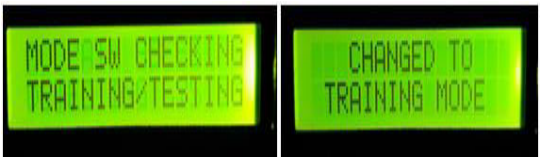
6. EXPERIMENTAL RESULTS:

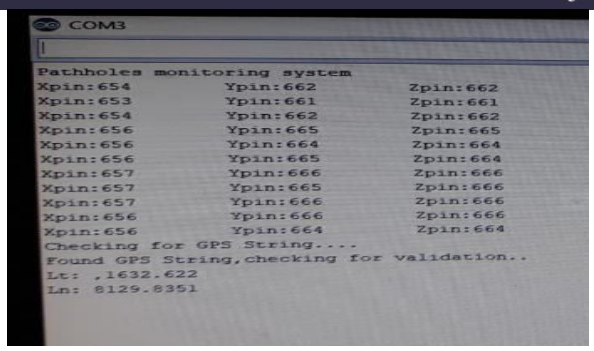
The working model of the proposed system is shown in figure 5. The model was also tested in real time by fixing it on a vehicle.In this project tests were carried out in two phases.This two phases are changed from one to other by using Mode Switch.In the phase 1(training), information about potholes and humps was recorded and store the values of latitude and longitude in arduino using global positioning system(GPS). In phase 2(testing), stored longitude and latitude are compared with the present longitude and latitude. If their difference is falls below certain threshold value then the buzzer activates and motors will slow and it will be displayed on the LCD display(that is we are nearing to pot hole).

PHASE 1 : In this phase firstly we train the vehicle by operating mode switch.



In Training mode potholes or humps are detected and their location will be stored using GPS module.Ultrasonic sensor ceaselessly monitors the level of road.And the accelerometer axis values are in constant range while moving on a plain road.This accelerometer axis values are shown in the LCD display at the same time on the serial monitor.

When there are potholes or humps on roads, the accelerometer axis values changes and the ultrasonic sensor receiving echo signal range also changes.From this, the presence of pothole or humps are detected.



When the pothole was detected the longitude and latitude values of that pothole or hump was stored and these latitude and longitude values are displayed on the serial monitor and on the LCD display.

Later by using mode switch change the mode from training to testing.

PHASE 2 : This phase is known as testing phase. After switching to training mode it is displayed on the LCD display.

In this phase, the vehicle moves along the same path for the next time in which a pothole or hump was detected. Ultrasonic sensor continuously monitor the level of the road as in the phase 1. GPS module ceaselessly monitor location of the vehicle and compare it with the previously stored pothole or hump location and the difference between them are displayed on the serial monitor. There is a cut off range for the difference of vehicle location and pothole or hump location. If this is cut off range was crossed then the alerting system i.e., buzzer alerts the driver about the presence of pothole or hump and also shows an alert on the LCD display as

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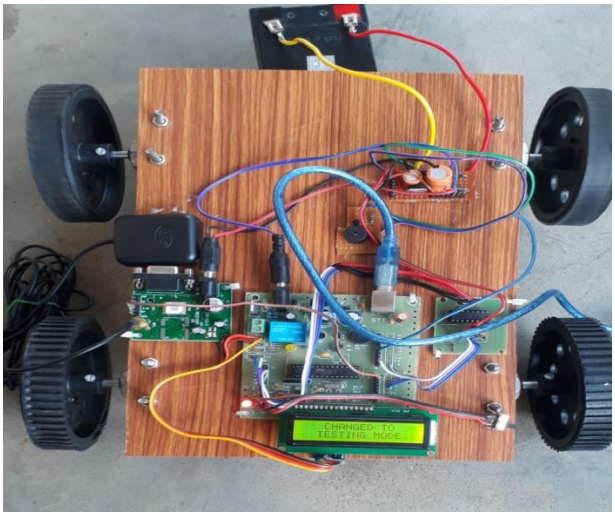
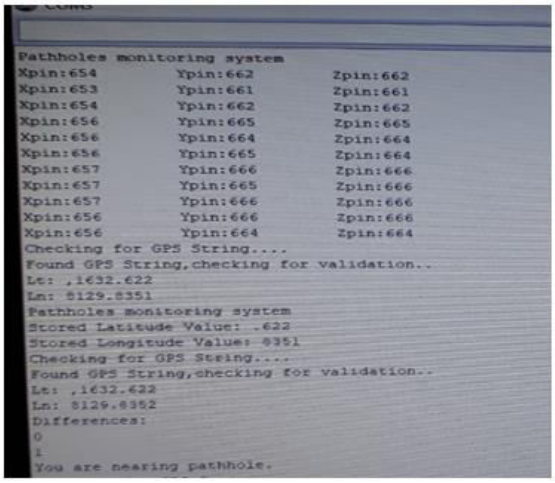
"YOU ARE NEARING POTHOLE/BUMPER"

LCD DISPLAY

7. CIRCUIT:





8.CONCLUSION AND FUTURE SCOPE:

The model proposed in this paper serves 2 important purposes; programmed recognition of potholes and humps and alarming vehicle drivers to avoid accidents. The proposed approach is a financial answer for identification of shocking potholes and uneven mounds, as it utilises low cost ultrasonic sensors and GPS modules. The arrangements additionally works in blustery season when potholes are loaded up with sloppy water as cautions are created utilising the data put away in the database. We feel that the arrangements gave in this paper can spare numerous lives and ailing patients who suffer from tragic accidents.

Presently our project is operating in two modes i.e., training and testing modes. If the same system like our project is induced in all other vehicles then there is no need to train the vehicle to detect the potholes or humps. When a vehicles detects the pothole or hump then the location of that pothole or hump are stored in the cloud. When other vehicles travels through that path in which pothole was detected then GPS module retrieve the location of pothole from cloud and alerts the driver.

REFERENCES:

[1] P. Harikrishnan and V. P. Gopi, "Vehicle Vibration SignalProcessing for Road Surface Monitoring," IEEE Sensors Journal,vol. 17, pp. 5192-5197, 2017.

[2] W. Devapriya, C. N. K. Babu, and T. Srihari, "Real time speedbump detection using Gaussian filtering and connected componentapproach," in Futuristic Trends in Research and Innovation forSocial Welfare (Startup Conclave), World Conference on, 2016,pp. 1-5.

[3] Crossbow Technology Inc. MPR-MIB users manual. http://www.xbow.com, 2006.

[4] Bret Hull, Vladimir Bychkovsky, Yang Zhang, KevinChen, Michel Goraczko,Allen K. Miu, Eugene Shih,Hari Balakrishnan, and Samuel Madden. CarTel: AMobile Sensor Computing System. In 4thACM SenSys, Boulder, CO, November 2006.

[5] Marcus Chang. Evaluation of accelerometers mountedon wireless sensor motes. Technical Report ISSN:0107-8283

(0602), Dept. of Computer Science, Universityof Copenhagen (Jointly with University of Cambridge),Copenhagen S, Denmark, January 2006

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