

Automatic Potholes and Humps Detection and Alerting through SMS



Manoj. A. Deshmukh, Pratiksha V. Sanjekar, Sayali S. Patil, Dnyaneshwari S. Maradkar

Abstract: Now a days we face such a lot of problems associated with road. To avoid this problem many methods has implemented but still problem is not fixed. In past days manual methods are used for inspection of road but due to traffic manual method does not work properly. Also manual method takes lot of time and still gives wrong output. To resolve all this problems we used this advanced techniques to detects the condition of road. Automatic detection of potholes and humps is used for sending the alert to government authority for maintenance of road. To find out the poor condition of roads such as potholes and unequal elevation to avoid accidents and damage of vehicles this projects is very much useful. Here, Ultrasonic sensors are used to analyze and calculate the depth and height of potholes as well as humps. Ultrasonic sensors uses ultrasonic waves to find out the distance between sensor and target object. To find out correct geographical position coordinates of the potholes and irregular humps we will be using the receiver of GPS. The data which is sensed by GPS includes pothole and hump location in the form of latitude, longitude, which is stored in the server. This gives information to the government authorities about the correct position. So that, government can take all possible decisions related to maintenance as early as possible and avoid accidents based on data provided by the GPS. Once the problem will be rectified the database updates accordingly and alerts or notification is given through short message service.

Keywords : Arduino-UNO, Ultrasonic sensor, GPS, GSM SIM

I. INTRODUCTION

Roads plays very important role in case of transportation. They covers almost 90 percent of countries traffic. However, most of the roads in our country are small and so much crowded with very poor surface rank and in case of road care because needs for this condition are not satisfy properly. In our India driving is very much essential and important in daily life and due to that there is very large increase in use of these vehicles. Due to these, large use of vehicles we all are facing so many problems in India. Poor condition of roads is a upgrade factor for traffic congestion and due to these many accidents are happening in India.

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Indian roads generally have speed breakers to help us so that the speed of vehicle and condition of road reduces and we can avoid accidents. However, these uneven speed breakers are present with irregular heights. Potholes are made due to rain as well as large vehicles. So, that now we are facing so many problems which is going to effect in human life. we should try to avoid this condition and for that we need cost effective solution which record the information about the potholes and irregular humps also helps drivers to drive safely. It will help government to maintain the condition of road on time.

II. LITERATURE SURVEY

Potholes Detection is the very great subject of investigation and many researchers have been studying on the same subject to discover it automatically with many techniques they have already developed the detection of Potholes and Humps using different techniques like IR sensor.

We have tried something different i.e. using the Ultrasonic sensor with Arduino so that the process is simple and fast as simultaneously we are giving alert to government for sending the information of potholes and humps on the server so that condition of road will be improve.

[1] Prof. R. M. Sahu, Mr. Mayank Kher, Nurul Hasan, Ms. Laxmi Panchal tells that In paper, system will detect the potholes on the road and the information is stored in the server. This gives information about this to the government authorities for maintenance and good improvement of roads.

[2] Mr. Tushar D. Patil, Prof. Archana B. Kanwade, This system is invented for answer for accurate position of potholes and uneven humps, and here easy and cheap ultrasonic sensors are used. This is an additional important things as it gives alerts about potholes and dangerous uneven humps on timely basis.

[3] Marimuthu B, Solaiyappan S, N. Gowthami, The system proposed in this paper gives two important things ie. detection of potholes and irregular humps as well as notify vehicle drivers so that it will help them to avoid accidents. This approach is very much useful and requires less cost for detection. Also it uses low cost ultrasonic sensor.

[4] Parag Kadale, Shivam Barde, Anand Pawar, In this paper, detecting the pothole and creating the database of the detected pothole. The ultrasonic sensor is used for sensing the depth of the pothole and humps. This will help the government to get alert of upcoming potholes or humps as well as this will help them to maintain the beauty of roads. Hence this proposed application will be helpful for a common man as well as Government.

III. METHODOLOGY

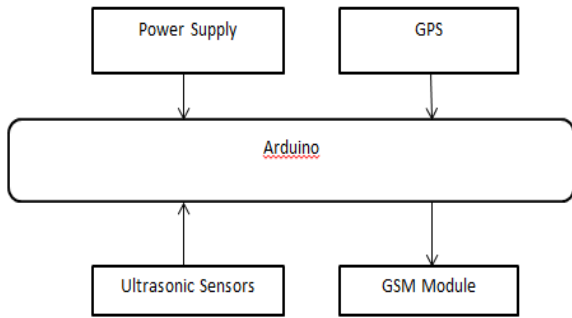


Fig 1: Block diagram of the system

Components used for this system :

In our proposed system we are using one ultrasonic sensor one GPS and another is GSM SIM 900.

Arduino:

Arduino is an open hardware development board. which will be very easy to get started. We connect it to the computer via USB cable. When we use USB then it will perform two functions that is supplying power as well as acting as serial port so that we can interface the Arduino with computer. It is very cheap and suited with all kinds of operating systems such as Linux,Windows.

GPS:

GPS is acronym for Global Positioning System. It is used for satellite navigation system and it is of very low cost. Also it is easy to use and important for safety. GPS is used for receive the real-time updates and allow us to monitor traffic.

Ultrasonic Sensor:

HC-SR04 module of ultrasonic sensor is of very low cost which will determine the space of the target object. The range of this sensor is 2cm to 400 cm. It measures the distance between sensor and target with help of ultrasonic waves.

GSM:

The GSM SIM 900 use to send the updates over telecommunication network. This is used for send and receive text messages. Also, used for make voice call as well as receive it when you are present in any country, any place. GSM uses TDMA technique for transmission of signal.

Algorithm used for proposed system :

potholes and humps detection input:
ultra sonic sensed data set h(in cm)
threshold value in t

output: get potholes and humps value

1. $t \leftarrow 10$
2. $height \leftarrow h$
3. if $height > t$
 $pothole \leftarrow height - t$
 return pothole
4. else if $height < t$
 $hump \leftarrow t - height$
 return hump
end if
end if

For Location Notification

Input: Get the situation value in data set L,

Output: location which has matched .

1. $y \leftarrow null$
2. For sample_values do
 If sample_values and x are matched
 then $y \leftarrow x$
 Return y
End if
End for
Return

IV. ADVANTAGES

1. Accidents due to pothole can be avoided.
2. GPS tracks the location of pothole and send it to control room.
3. Enhanced Safety and security provided.

V. RESULT

The model discovered in this paper considers two important facts that is detection of potholes and irregular humps and giving alert or notification to government authorities for maintain this condition of road. Also it is helpful to avoid major accidents.

This system is very cost effective. Ultrasonic sensor has sensed height of humps or depth of potholes effectively and has discovered the accurate position of them with the help of GPS and got this information in terms of latitude, longitude.

The GPS and GSM used during this system could also be an extra advantage because it notify to the government on time so that they will take necessary action as early as possible.

SR NO	TYPE OF OBSTACLE	HEIGHT/DEPTH IN CM	LATITUDE	LONGITUDE
1	P	18	12.92	77.50
2	H	3.1	12.93	77.53
3	H	4	12.96	77.60
4	P	15	12.98	77.62

Fig 2: collected information about potholes and humps

VI. CONCLUSION AND FUTURE WORK

In the proposed system we will get to know that where the potholes and irregular humps are present. However, it does not consider the real and most important thing that potholes and irregular humps are maintained by Government. This system can consider the above thing and improve and update data accordingly so that government get to know all things accordingly. Also, we used GPS in the proposed system to improve experience in.

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