International Journal of Advanced Technology in Engineering and Science
Vol. No. 10, Issue No. 06, June 2022
www.ijates.com
ijates
ISSN 2348 - 7550

POTHOLE DETECTION ROBOT

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ABSTRACT

The importance of the road infrastructure for the society could be compared with importance of blood vessels for humans. India is the vast country in the world which does not have proper maintenance of the road, over 95% of the people uses road transportation. Due to this peak usage of road transports, there are many possibilities of potholes on roads which lead to accidents. Other major reasons for accidents are due to the head-on-head collusions. This project aims to produce a Pothole Detection.

The main components of the project are the Arduino, Ultrasonic Sensor, Bluetooth. This project would be given to government road contractors to rectify the potholes and avoid accidents and help in traffic analysis.

INTRODUCTION

The roads in our country due to heavy load, climatic conditions, high population, poor quality of materials in construction causes frequent potholes in the roads. This semi-automated pothole detection and levelling robot detects the pot holes in the road as it moves on, then as soon as the porthole is detected in the road it stops moving action, after feeding the cement to the robot the flow sensor after detects the depth of the pothole then opens the valve and fills the pothole with the help of a stepper motor all this process is controlled by using a controller after levelling the pothole, the robot starts moving and made as safe roads.

Embedded system implementation: An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, and store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. Here we are placing Ultrasonic Sensor which detects the potholes on road. The robot will stop when it finds the Path holes and Servo Motor will rotate in order to level by pouring the cement and sand required. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in

our real life for several devices like microwave, calculators, TV remote control, home security and neighbourhood traffic control systems, etc.

LITERATURE RIVEW

The advent and emergence of sensor networks has enabled these devices to collect vital information about the environment and also to undertake context processing. Radio Frequency Identification (RFID) and Sensor Based Networks enable objects in the physical world to be fitted with network capabilities thereby enabling them to collect and process vital information about their environments. The term internet of things (IoT) was first coined by Kevin Ashton in 1999 at MIT during their study of using radio frequency identification and sensor networks for supply chain management. The global network of things provides a context aware processing and computations of objects in the world and their environmental conditions using network resources and also facilitates the sharing of data and information among various objects (Al-Fuqaha et al., 2015; Zanella et al., 2014). There have been several studies into the detection, reporting and maintenance of potholes. Pavan et al. (2014) explored the use of android smartphones to detect and report potholes.

Rohith V L The main objective of the project is to design and fabricate a Semi Automated Robot, which will detect the Pothole on the road and will discharge the required amount on concrete quantity, which is needed for the detected pothole and to do the levelling process on the discharged concrete

Vadiraj.R. S In this experiment, we are also providing manual control of the robot; if the user does not want to use the automatic, then he can monitor using an android application which has all control of robot applications, like forwarding, backward, left, right, roll, fill.

EXISTING METHOD

Existing methods for the monitoring of road conditions using mobile devices are mainly based on camera observations and vibration detection. Vision-based methods rely on mobile devices mounted on a driving vehicle to capture pictures of the road surface, and automatically analyse the road information contained in the pictures through image analysis algorithms.

Drawbacks:

By using this, that vibration Sensor should not give accurate output.

Image capturing and analysing may take time to detect whether it is path hole or not.

Process is long.

PROPOSED METHOD

The proposed real-time pothole detection approach can be used to improve the safety of traffic for transport. Here we are placing Ultrasonic Sensor which detects the potholes on road. The robot will

stop when it finds the Path holes and Servo Motor will rotate in order to level by pouring the cement and sand required. The robot can be controlled Using Bluetooth. Due to the rains and oil spills potholes are generated which will cause the accidents. The potholes are detected using ultrasonic sensor.

Block Diagram

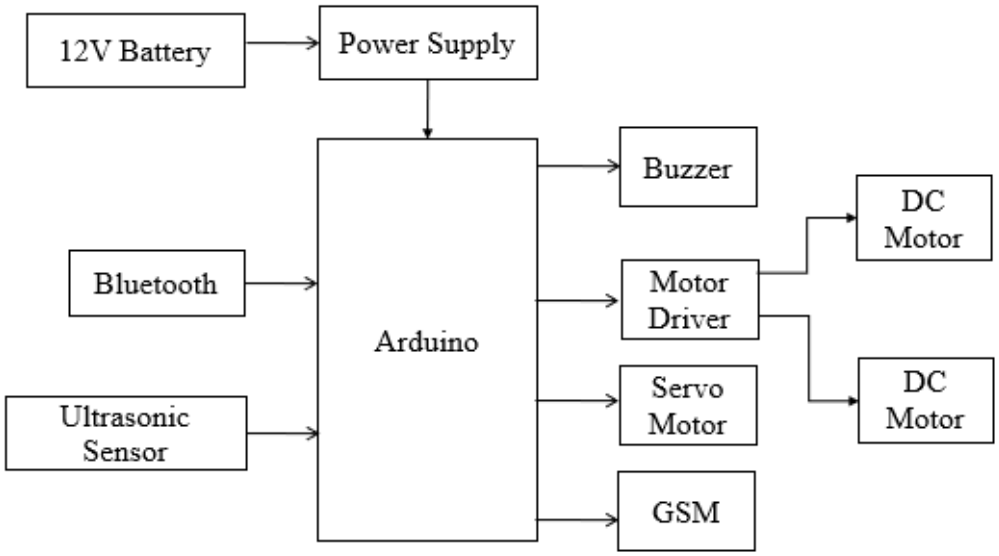

Fig 1: Block Diagram

It consists of Arduino, Bluetooth, Ultrasonic Sensor, Buzzer, DC Motors, Servo Motor, Motor Driver, GSM, Power Supply. Servo motor is used to rotate with great precision. Ultrasonic sensor to detect the pothole. Arduino consist of USB interface, which supports serial communication using Tx and Rx pins. Bluetooth is used for the wireless communication, with range <100m.Motor is operated by using DC is known as DC Motor.

METHODOLOGY

This paper used an open hardware device and a prototype vehicle to build an IoT enabled device to detect, report and manage potholes. Here we are placing Ultrasonic Sensor which detects the potholes on road. The robot will stop when it finds the Path holes and Servo Motor will rotate in order to level by pouring the cement and sand required. The car fitted with sensors moves along a road network. The car is setup to identify potholes and road obstacles

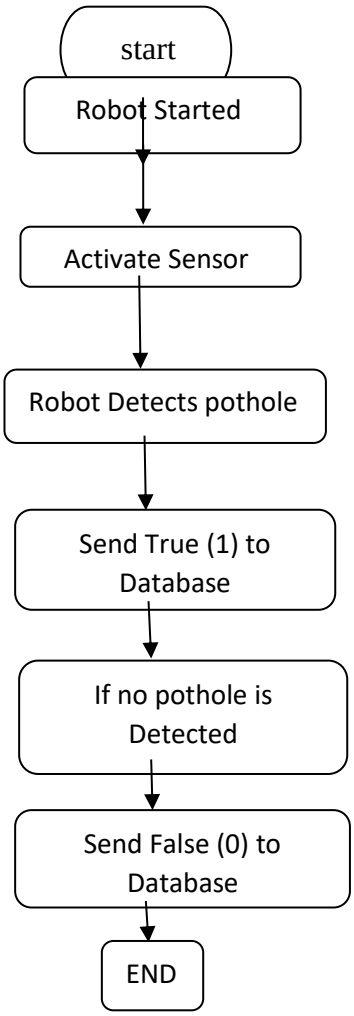

Fig 2: **Algorithm for Pothole Detection**

RESULT

The result shows pothole detection status of the robot. If a pothole is detected, the robot reports a true value of 1 and if no potholes are detected the robot sends a null or false value of 0 to the server. It can be seen from the results that some sections of the road are smooth without potholes or road surface obstacles. Also from the results, it was observed that some portions of the road had isolated potholes whiles other sections had multiple potholes at the same place which hampers a safe transportation and movement on the road network.

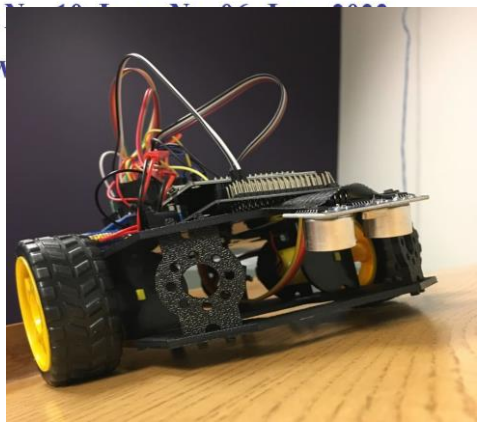

Fig 3: Pothole Detection Robot

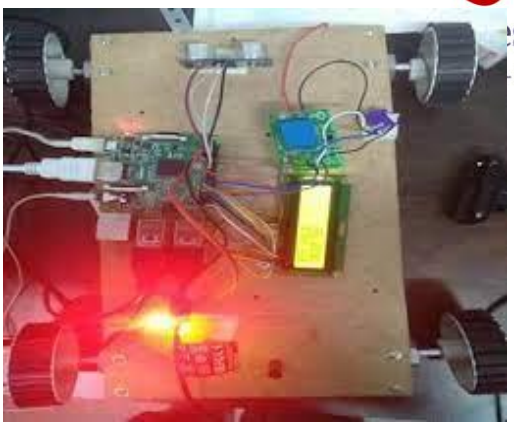

Fig 4 : Robot while detecting

APPLICATIONS

- Using this different configuration would be manufactured to maximize the benefit to state highways, districts, cities, and private contractors
- Roads and Highways

CONCLUSION

In this project, we have proposed a system which will detect the potholes on the road and send data to corresponding persons. Due to the rains and oil spills potholes are generated which will cause the accidents. The potholes are detected using ultrasonic sensor. This timely information can help to recover the road as fast as possible. The emergent of internet of things (IoT) has greatly contributed to the bringing together of the virtual and physical world. This enable objects in the physical world to have unique internet protocol addresses to be able to identify and interact with other objects in the virtual world using various technologies and systems. The study conducted an experiment by assembling an Arduino microcontroller board and sensors.

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