Automated Pothole Detection on Indian Roads using IOT

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Abstract : It is best-known that the technological advancements are increasing at a quicker pace. However, the use of technologies in varied sectors is extremely low. And that we additionally understand that the road accidents are increasing at a quicker rate. Most of those accidents are because of the improper construction and maintenance of roads. Thus, we propose a system of pothole detection using ultrasonic sensor. A sign is additionally provided using liquid crystal display. During this system, we even have an add-on that's we inform the govt. Officers concerning the detected road conditions by trailing the location of the hole using an IoT board which has inbuilt GPRS. Therefore, this technique is often used to avoid the majority of road accidents and to require more effective measures to reconstruct the improper roads as early as possible.

***IndexTerms* - Ultrasonic sensor, IoT board, Arduino Microcontroller, Speaker, LCD.**

I. INTRODUCTION

Driving has become one of the damaging experiences in our life. several drivers are losing their lives because of unsafe road conditions. within the current situation, maintenance of roads has become the most difficult factor. Over the last ten to twenty years, there's an enormous increase in population rate moreover as vehicle purchase rate. Nearly 90 % of India's population is implementing roadways to travel daily.

Fig 1. Condition of Indian roads with potholes.

So, safety is the major issue for the drivers who drive different vehicles on roads. Driving safely isn't the sole way to avoid accidents as a result of the accident might occur because of varied different reasons like an improper construction of roads, potholes, and humps present on the paved surface, etc. Potholes are largely formed because of serious rains or the run of heavy vehicles on the roads.

A Report taken in 2017 in India on Road Accidents, reported by the Transport analysis wing under the Ministry of Highways & Road Transport, has mentioned that several folks died on roads accidents in India in 2017, compared to the quantity of death s in 2016. The info has additionally reported that the states of Uttar Pradesh and Tamil Nadu have the utmost number of deaths. As per the info noted within the report, the country features a record of at least 4,80,652 accidents in 2016, that ends up in nearly 1,50,785 deaths. The quantity tells that a minimum of 413 folks died daily in nearly 1,317 road accidents because of potholes.

So, the remaining segments of the paper explain the planned system, related works, hardware and software parts utilized in the planned system, conclusion and future works.

II. PROPOSED SYSTEM

Our planned system consists of an ultrasonic detector. It senses the space between the vehicle and also the pothole. The detector provides the distance values to the PIC microcontroller. Based on the gap, an indication is provided to the server. The indication is provided after all the readings have been taken in and processed using the pothole filtering algorithm.

III. HARDWARE AND SOFTWARE COMPONENTS

Hardware:

1. Arduino microcontroller

The microcontroller is the heart of the planned system and is answerable for performing varied tasks beginning form processing all the detector inputs.

2. Ultrasonic sensor

In our system, this detector generates high-frequency sound waves and evaluates the echo that is received back by the detector. It calculates the time interval between transmitting the signal and obtaining the echo to work out the gap of an object. space is calculated using the subsequent formula: Distance = (Time x Speed of Sound in Air (340 m/s)) / 2
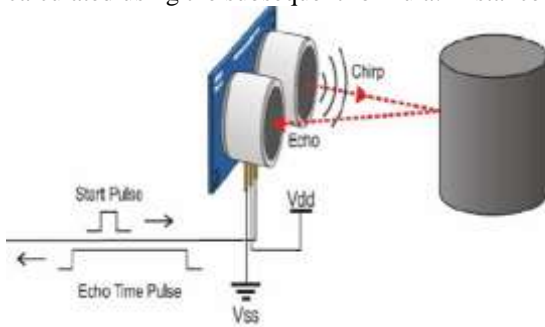

Fig 2. Working principle of ultrasonic sensor.

3. IoT Board

It is featured with WiFi model to activate internet connection. In our proposed system, it is also equipped with a controller to process all the input units. Data may be updated to an android application by which the user can able to access the data.

Software:

1. Embedded C

Here every module is coded using Embedded C as a result of it's dependent on hardware design like the microcontroller. Embedded systems are for microcontroller-based applications. Therefore, it's to deal with limited resources, like RAM, ROM, I/O on an embedded processor.

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