# Automatic Pothol Detection And Notification System

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*Abstract:*One of the major problems in developing countries is maintenance of roads. Well maintained roads contribute a major portion to the country's economy. Identification of pavement distress such as potholes not only helps drivers to avoid accidents or vehicle damages, but also helps authorities to maintain roads. This system provides previous pothole detection methods that have been developed and proposes a cost-effective solution to identify the potholes on roads and provide timely alerts to drivers to avoid accidents or vehicle damages. Ultrasonic sensors are used to identify the potholes and humps and also to measure their depth respectively. The proposed system captures the geographical location coordinates of the potholes using a global positioning system receiver. The sensed-data includes pothole depth and geographic location, which is stored in the database (cloud). This serves as a valuable source of information to the government authorities and vehicle drivers. An android application is used to update the information, location on the android application so that measures can be taken to evade accidents. Alerts are given to the driver and simultaneously information of are updated on application.
*Keywords*: *Pothol, Ultrasonic sensor, depth, geographical location, application*

## I. INTRODUCTION

In our country, road condition plays very important role. They carry almost countrys passenger traffic and good. Many factors are responsible for accidents that are potholes and humps. So, detection of potholes and humps on roads is important. The sensor is used to detect the depth of potholes . Global positioning system receiver is used to find position coordinates of potholes. The database consist sensor data and geographic location of potholes. This database is helps to assist drivers to avoid accidents. The system gives alert in the small LED with the help of android application. This database is useful for government authority also to assist the road condition. So that proposed system can be avoid accident and useful for maintainance of road .

One of the increasing problems the roads are facing is worsened road conditions. Because of many reasons like rains, oil spills, road accidents or inevitable wear and tear make the road difficult to drive upon. Unexpected hurdles on road may cause more accidents. Also because of the bad road conditions, fuel consumption of the vehicle increases; causing wastage of precious fuel. Because of these reasons it is very important to get the information of such bad road conditions, Collect this information and distribute it to other vehicles, which in turn can warnthe driver. But there are various challenges involved in this. First of all there are various methods to get the information about the road conditions. Then this information must be collected and distributed to all the vehicles that might need this information. Lastly the information must be conveyed in the manner which can be understood and used by driver. We in this project try to design and build such a system.If potholes are detected and reported in a timely manner, then the amount of damage that they cause wo+uld be reduced. If the city offices in charge of repairing potholes was made aware of potholes locations in a timely manner then they could be more quickly filled, resulting in less motorists driving over them and causing further damage to the road and their car. The system addresses this issues by passively detecting the existence of potholes and reporting them to a publicly accessible database. A city that is monitoring this database could be made aware of a potholes existence in real time, significantly reducing the delay between pothole formation and fix. The system also attempts to mitigate the issues of potholes causing road accidents. We predict that the accidents are caused by motorists swerving to avoid a pothole that they had just seen. If the driver had been made aware of the pothole well in advance, they would have had more time to maneuver around it. To provide this information to the driver we take advantage of the fact that there is a delta between when the system first detects a pothole and when it is fixed by the city. The system is aware that a pothole exists, and it is also aware of the cars movement. With these two pieces of information together the system warns the driver of upcoming potholes in the road.

To summarize, the motivation for creating a system like Automatic pothole detection system comes from the monetary savings of less damage to vehicles and roadways, as well as the live-saving potential of preventing pothole-related accidents.

## II. LITERATURE SURVEY:

**vibration-based method:**Vibration-based methods generally use gradient variation from accelerometer data. Accelerometers have been employed for pothole detection, owing to their low cost and relatively simple detection algorithms. However, the accuracy of detection is lower than that achieved with other sensors such as cameras and lasers, because potholes are detected

 

only when a vehicles wheels traverse a pothole. Moreover, false detections can occur with vehicles pass over manhole covers and speed bumps. Nevertheless, vibration-based pothole detection is advantageous given its low cost and simple methodology despite its limitations. Many studies have been performed in an effort to increase the accuracy of vibration-based detection by designing advanced algorithms and combining other sensor data. Recently, smartphones have been proposed to support mobile sensing, but these methods have the same problems as vibration-based methods.

**Vision-based method:**Vision-based methods, however, are appropriate for accurately detecting pot-holes over a wide area at low cost. Many approaches using 2D images and video data have been studied. Pothole detection using 2D images was originally introduced by Koch and Brilakis . Their method involved searching for specific pothole features and determining pothole regions. They used a remote-controlled robot vehicle prototype equipped with a webcam (an HP Elite Autofocus) installed at approximately 60 cm above the ground. Buza et al. introduced a new unsupervised vision-based method that does not require expensive equipment, additional filtering algorithms, or a training phase. Jog et al. presented a new approach based on 2D recognition and 3D reconstruction for detecting and measuring the width, quantity, and depth of potholes using a monocular camera mounted on the rear of a vehicle.

**Laser scanning method:**Laser scanning offers outstanding detection performance, compared to other methods. This approach is able to collect extremely detailed road-surface information using a technique that employs reflected laser pulses to create precise digital models. Accurate 3D point clouds measure elevation in the surface, and this information is captured with the laser and then extracted by filtering the data for specific distress features by means of a grid-based processing approach. However, whereas laser scanning is highly precise, the equipment needed is expensive. Furthermore, this method cannot be applied over a wide area for fast pothole detection.

## III. PROPOSED SYSTEM:

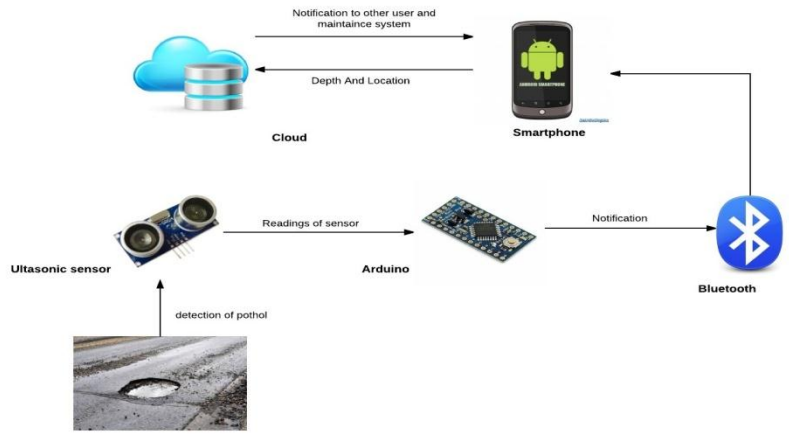


Fig:System Architecture

In proposed system the architecture shows a novel technique to extract data from PDF. The data extraction process is divided into eight steps. There are multiple steps involved in filtering the desired data and formatting in a format a database can accept. The HC-SR04 is an active ultrasonic sensor and contains a transmitter and a receiver. It is used to measure distance at which, objects are placed in front of it. The ultrasonic sensor transmits high frequency sound waves and waits for the reflected wave to hit the receiver. The distance is calculated based on the time taken by the ultrasonic pulse to travel a particular distance. There are different types of ultrasonic sensors with different transmission ranges and angles of detection. The HC-SR04 sensor work at a frequency of 40 KHz and can measure distances of the objects in the range 2 to 400 cm with a 15 angle of detection. Global Positioning System (GPS) is a satellite navigation system which is used to capture the geographic location and time, irrespective of the weather conditions. It is maintained by the US Government and is freely available to anyone who has a GPS receiver.The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market. The Arduino is opensource, which means hardware is reasonably priced and development software is free. This guide is for students in ME 2011, or students anywhere who are confronting the Arduino for the first time. For advanced Arduino users, prowl the web; there are lots of resources. The Arduino board, you can write

 

programs and create interface circuits to read switches and other sensors, and to control motors and lights with very little effort. Many of the pictures and drawings in this guide were taken from the documentation on the Arduino site, the place to turn if you need more information. The Arduino section covers more on interfacing the Arduino to the real world.

**CONCLUSION:**The System automatically detects the potholes and sends the information regarding this to the vehicle drivers, so that they can avoid accidents.This is a cost efficient solution for detection of humps and potholes. This system is effective even in rainy season when roads are flooded with rain water as well as in winter during low visibility, as the alerts are sent from the stored information in the server/database. The information can also be used by the Government authorities for the maintenance of the roads.

## I. REFERENCES

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