# POTHOLE DETECTION AND MESSAGE PASSING SYSTEM

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**Abstract:** Monitoring road and traffic conditions in a city is an issue broadly examined. A few strategies have been proposed towards tending to this issue. A few proposed strategies require devoted equipment, for example, GPS gadgets and accelerometers in vehicles or cameras on roadside and close traffic signals. Every such technique are costly regarding money related expense and human exertion required. We propose a non-nosy technique that utilizes sensors present on cell phones. In propose framework we use accelerometer, GPS sensor readings for traffic and street conditions location. We are explicitly keen on distinguishing braking occasions - visit braking demonstrates blocked traffic conditions - and knocks on the ways to portray the kind of road. A pothole is a one of the greatest threat to vehicle drives. It causes an accident by sudden steering of the vehicle wheel, forcing an enormous stress on a vehicle tire or making a hard turning in a vehicle by late detection. It is crucial to find where a pothole is on the pavement. As the number of pavement increases, detecting a pothole becomes a great challenge in a modern society. Methods suggest detecting potholes using sensors. In this project, we investigate the performance in detecting potholes with a vibration based using ultrasonic sensor.

**Keywords**: *Potholes, Raspberry-pi, camera, ultrasonic sensors, gps gadgets*

## I.    INTRODUCTION

### 1.1  Aim

To develop a "Pothole Detection System for Monitoring Road And Traffic Conditions Using IoT" System using Quick Response user and notification Gateway that accurately updates databases according to the latitude and longitude and improve the accidental detection.

### 1.2  Scope

- To prevent accident
- To identify cause of accident

### 1.3     Motivation

The presented approach provides a user friendly standalone mobile web application which alerts drivers about the upcoming potholes in his route and also an affordable low cost device which can be installed on any vehicle for the collection of the data about the potholes. This data can be used by other application users as well as further compiled and sent to authorities to take a fast track action against the pothole prone region

### 1.4     Objective

- To  Improve The Accidental Detection.

- To  Detect Pothole and Speed breakers.

- To be able to successfully add pothole and speed breaker data

## II.     LITERATURE SURVEY

[1]    **S. Gnanapriya, V.B. Padmashree, V. Bagyalakshmi and G.A. Pravallikha, IOT Based Pothole Detection and**

**Notification System, American-Eurasian Journal of Scientific Research 12 (3): 172-179, 2017:** In this Paper propose an innovative method to prevent these hazards by using the advanced sensor system. The sensors will be attached to vehicles and from vehicles the data's obtained from sensors and the location obtained by the GPS are transferred to road transport authority by IOT where officials take necessary actions. Using the data's obtained more damaged area can be prioritized and damage control can be reduced.

[2]      **Prof.A.K.Mariappan, Haridha.S, Haritha.S, Harini.M, Automated Pothole Detection and Pre-Indication System using IOT, International Journal of Scientific Research and Review, Volume 7, Issue 3, 2018:** This Paper propose a system of pothole detection using Ultrasonic sensor. Then an indication is provided using a voice signal emitted by a speaker. The Voice IC attached to the controller exerts the stored voice signal. An indication is also provided using LCD display. In this system we also have an add-on that is we inform the government officials regarding the detected road conditions by tracking the location of the pothole using an IoT board which has in-built GPRS.

[3]    **Pathan Amir Khan Ayyub Khan, Iot Based Pothole Detection & Alert System, International journal for innovative research In Multidisciplinary field, Volume - 4, Issue - 4, Apr – 2018:** This paper introduces an application of movable sensing: detection of potholes on roads and alerting the driver. I have describe a system and an associated algorithm to monitor the pothole conditions on the road & simultaneously it alerts the driver about those potholes. The IoT based Pothole Detection System, uses 2 ultrasonic Sensors for detecting those potholes more accurately then before and GPS is used for plotting the location of potholes on World Maps, it will give an alert to the driver about potholes using buzzer and staring (or handle) vibrator.

### III.  PROPOSED SYSTEM APPROACH

**3.1 Description details:**

Proposed system is ongoing Android Application that naturally predicts the nature of the road dependent on tri-pivotal accelerometer and gyrator, demonstrate the street area follow on a geographic guide utilizing GPS and spare all recorded exercise sections

**3.2      Proposed system Advantages:**

- Required less time

- Cost effective

- Required less manpower
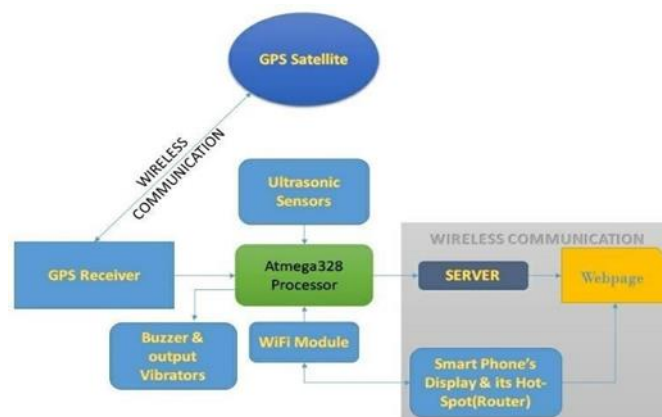
- Less accident.

**3.3      Proposed system Architecture**



Fig 1: System Architecture

### 3.4    Requirements

**Hardware Interface**
1. Raspberry Pi Zero
2. Ultrasonic Sensor
3. L293D-Motor (Left and Right)

**Software Interface**
1. PHP-7
2. MySql
3. Apache Web Server
4. Python 2.7
5. HTML

**Software Installations**
1. SD Card Formatter
2. Win 32 Disk Imager
3. VNC Viewer

### 3.5    Algorithm

1. Start
2. Import required library
3. Initialize gpio
4. Initialize ultrasonic, l293D,GPS
5. Send trigger through ultrasonic sensors.
6. Wait for echo
7. Calculate time between transmitted trigger and received echo
8. Calculate distance
9. If distance is less than threshold value then increase count of speed breaker store it in mysql db with respect to GPS location
10. Distance is greater than threshold value then increase count of potholes stored in mysql db with respect to GPS location
11. Move robot wrt to forward reverse left right stop event from http request
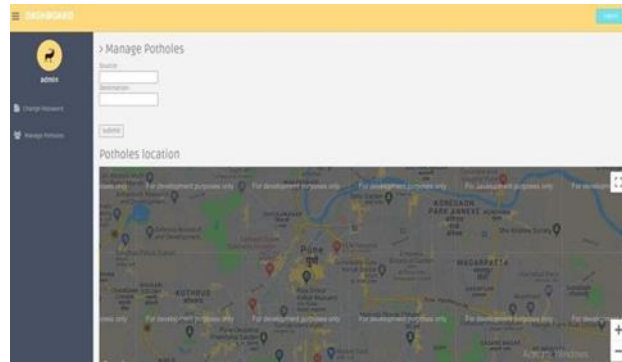12. Stop

## IV.  IMPLEMENTATION
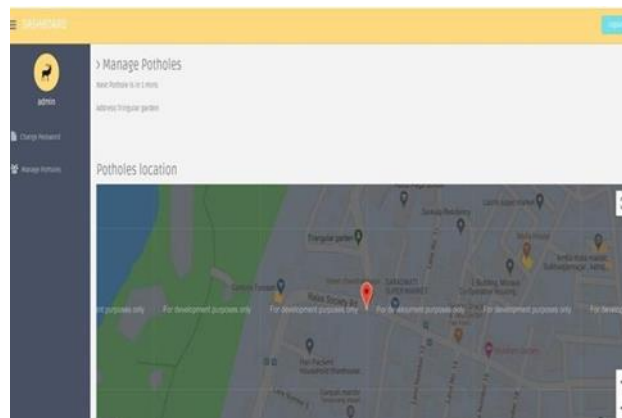
### 4.1    Hardware Connection



**Fig 2: Hardware Connection**

### 4.2   Graphical User Interface Add Source and Destination



**Approaching Potholes**



**System Feature**

#### A. Sensing Unit

This module consists of ATmega328 processor, GPS receiver, 2ultrasonic sensors (HC-SR04) and a WiFi module (ESP8266). The distance between the car body and the road is measured using 2 ultrasonic sensors i.e. left and right sensors respectively. A threshold value is set such that the value depends on ground clearance of the vehicle. The measured distance is compared with the threshold value to detect pothole. If the measured distance is greater when compared with the threshold value, then it is classified to be a pothole. The location co-ordinates retrieved by the GPS receiver, along with this data the information regarding the detected pothole at a particular location co- ordinate is transmitted to the server using a Wi-Fi Module (ESP8266).

#### B. Server Unit

The server unit is nothing but the database. It is an intermediate layer between sensing and user units. Its function is to store the information received by the sensing unit and provide the same to the user unit when requested. In this system the server unit will be used by the users or drivers smart phone. As the smart phone contains a Hotspot in it. This Hotspot will give an internet connection to this system by connecting to the system with the help of ESP8266 (WiFi module). After its successful connection. When the sensing unit will give inputs, these locations will be recorded to the database of the server page and can be used further.

#### C. User Unit

The user unit is responsible for providing alerts regarding the pothole humps on roads at a particular given location. The GPS receiver is constantly receiving information regarding its location co-ordinates, using this information the database is checked for any data around the given location co- ordinates. Any data found, it is received by the processor from the database through the WiFi module and the same is displayed on the displayed

on Smart Phone in the user vehicle. A Buzzer and 2 vibrators (left and right) are used in the vehicle to provide the alerts. The alert is given 2 meters before the pothole or hump appears.

## V. CONCLUSION

We studied an algorithm for prediction of road quality. It utilizes ultrasonic sensor accumulation of information and GPS for plotting the street area follow in Google delineate. The demo also includes a multiplatform easy to operate user friendly application which uses this crowd sourced data to warn user about the nearby potholes.

Our best outcomes are acquired on account of a gathering of two sensors; accelerometer and spinner sensors. The cell phone based technique is extremely valuable since it evacuates the need to conveying uncommon sensors in vehicle. It has the upside of high adaptability as cell phone clients expands step by step. In this way, we have built up a cell phone application road sense. The Road Sense application is an endeavor to furnish its clients with better information about the courses of their transportation. With further work in this field, it is feasible for this venture to have a proactive impact in enhancing street conditions in creating nations. To this end, our framework can be utilized to make an individual street type cautioning framework that keeps up an authentic record of road conditions.

**Applications**

1. Required less manpower

2. Less accident

## VI. REFERENCES

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