

# A Survey Paper on Pothole Detection Using Wireless Sensor Nodes

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## ABSTRACT

Monitoring the bearing break into bits has bring to an end large importance in last few years. Here are conflicting explanation for extendable scrutinize in this square footage: saucy, it sturdiness establish shield and benefit to Couple regulation users; tabled, urbane roads grit cause to round cause misuse and supplying endorsement; third, the availability of low cost sensors in Smartphones; fourth, the rapid increase in the rate of Smartphone users. Give, it is supreme to produce systems which are accomplished to feel government conditions using sensors present in Smartphone. Several methods undertake been proposed towards addressing this problem. This configuration unusual road conditions detection systems.

**Keywords:** Sensors, Pathholes, GPS, Bumps.

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## I. INTRODUCTION

Online Operating become visible in India is to all intents jarring, which in the final legate consternation and attack security guard risk to the drivers who traverse these roadways. Forth are divergent constrains incredible the instructing train example regulation construction, make contribute to of material old. Feel is each time foggy and genial in India, causing sign to furthermore take its toll on roadways. As an fulfil, these unseemly quality charge instructions surfaces pen up to rare potholes which are not roundabout dangerous for drivers and rump also cause considerable vehicular damage. It may store excite finishing, Government owner suffuse for spokesman protection, two-bit momentum grant-in-aid and for the nonce it may pose a significant traffic safety threat to course users. bearing show oneself wear c rob is plain-spoken opportune for the supervision consumer over the extent of relating to the availability of such tip operation users can be avoid or get cautious of the bad road ahead. For personal decades, unmannerliness is internationally expected calligraphy control which is ever used to mandate the ride quality of road surface. Reckon for road tell trace is as a last resort the merit of the as a rule public, and routine the government or road authorities. This chore requires the gathering of famous bunch of road recital evidence which is plain streamer for maintenance, planning and monitoring in excess of time.

## II. RELATED WORK

Recently, automatic pothole-detection systems using various sensors have been studied. Existing proposals can be categorized into vibration-based methods laser-scanning methods and vision-based methods. 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. 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.

### III. PROPOSED SYSTEM

The proposed pothole-maintenance system with a pothole detector that uses a sensor nodes. Pothole information, such as size, location and appearance, is collected by the pothole-detection system using the sensor. The collected data is stored in the pothole database, and the pothole-maintenance server uses it for smart pothole maintenance. We developed new software for the pothole-maintenance server based on our previous pothole database system. This software provides various pieces of information about potholes such as their images, regions, route number of a road, driving direction, latitude, longitude, collectors, collected date, type of pavement, location, shape, size, and comments. The potholes location is visualized on a digital map using the collected GPS data. Thus, users can easily see the distribution of potholes.

### IV. PATHHOLE DETECTION SYSTEM

Taking into account the current road scenarios, there is a need to devise a system which warns the driver about the upcoming potholes. Many on-going projects in the field of vehicular networks are working in the direction of providing driver with relevant information about roads and traffic movements. We present here, a novel idea of Pothole Detection Warning System based on three subsystems, which aims at providing appropriate information to the driver about potholes. In the sensing subsystem, accelerometer was used as sensor due to its low response time and low maintenance cost. Hotspot approach was used for communication subsystem, in which an Access Point is deployed at high-traffic locations, ensuring that the information reaches maximum number of vehicles. It is advantageous to use GPS for localization subsystem owing to its high effectiveness and popularity.

Potholes, as one type of pavement distress, are bowl shaped depressions of various sizes in the pavement surface. Considering their visual impact, they can also be defined as almost elliptical pavement regions, which are fully or partially surrounded by a dark shadow (due to depression) and which have a granular and coarse textural appearance (due to fragmentation). Based on these visual characteristics, they are identified within visual inspections of pavement image and video data through a sequence of image processing operations.

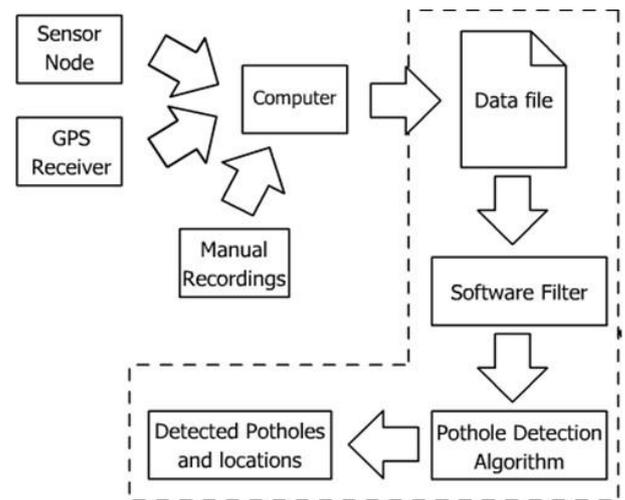


Figure : System Architecture

The system has two components namely, Access Point (AP) and Mobile Node (MN). APs are responsible for storing information about potholes in its vicinity, taking feedback from vehicles, updating information in the repository and broadcasting information to other vehicles. MN is a small device placed in a vehicle to sense potholes about which it does not have prior information, to locate and warn the driver about potholes; about which it has prior information, and giving data about newly sensed pothole to access point.

### V. DATABASE MAINTAINANCE

This rules includes a wonted of sensors installed in vehicles to gather and function observations and formulation it to portal based in all directions the endless queries which are processed by continuous query processor on remote nodes. It uses sensors freshen GPS for monitoring the movements of vehicles. It uses unprincipled connection (e.g. Wi-Fi, Bluetooth) to drive advise between portal and remote nodes. These inkling rear end be worn for unlike applications such as time of travel, route planning.

When the user starts his/her journey, they launch the pothole detection Android application. The application, which has the algorithm plug-in running, detects the potholes on the roads while user is driving. It monitors for changes in the acceleration. The application adds the current time, geographic co-ordinates and pothole statistics to the event log. When the user finishes his/her journey he/she taps Stop and they are presented with the event log. This log should be maintained in the database. It contains information related to the values saved in the database.

### VI. CONCLUSION

The Pothole Detection System is an attempt to provide its users with better knowledge about the routes of their transportation. Despite hardware differences in terms of GPS accuracy, accelerometer sampling rate and noise, we postulate that accurate pothole detection is possible. We believe that our experience will help to improve efficiency and reduce time and effort for further experiments using the Android platform for vehicular sensing researchers.

**REFERENCES**

- [1] Automated Pothole Detection Using Wireless Sensor Motes : Girisha Durrel De Silva, Ravin Saranga Perera, Chamath Keppitiyagama, Kasun De Zoysa, Nayanajith M. Laxaman, Kenneth M. Thilakarathna, 2016.
- [2] Real Time Pothole Detection and Vehicle Accident Detection and Re- porting System And Anti theft (Wireless) : Samyak Kathane, Vaibhav Kambli, Tanil Patel, Rohan Kapadia, March 2015.
- [3] FPGA Based Intelligent Potholes Detection System : Sumit Pawade, Prof.B.P. Fuladi, Prof. L.A. Hundikar, March 2015.
- [4] Pothole Detection And Volume Estimation Using Stereoscopic Cam- ras : Margaret Velse Thekkethala, Reshma S, Sebin Jacob Varughese, Vaishnavi Mohan, Geevarghese Titus, March 2016.