Survey on: Based on Ultrasonic Vehicle Sensor Pathole Detection System

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Abstract: *Pothole Detection system is a unique concept and it is very useful to whom which face the problem of pothole in their route. The technology is purely new and idea is generated a profile for pothole in your vehicle journey. It is an application which is Accessing to timely and accurate road condition information, especially about dangerous potholes is of great importance to the public and the government. We implement an effective road surface monitoring system for automated path hole detection. It is a unique concept where it a low cost solution for the road safety purpose. This will help to avoid accidents and can use to identify problem areas early. The authorities can be alerted to take preventive actions; preventive actions can save money. Poorly maintained roads are a fact of life in most developing countries including our India. A well maintained road network is a must for the well being and the development of any country. So that we are going to create an effective road surface monitoring system. Automated path hole detection is our focus in the system.*

Index terms: *Ultrasonic Sensor, Android, GPS, MVC.*

I.   Introduction

We are going to develop a effective road surface monitoring system for automated pothole detection. This is a low cost solution for the road safety purpose. In this we are using wireless sensor network[1].Pothole in the Dark: Perceiving Pothole Profiles with Participatory Urban Vehicles", Over the past few years, there has been a large increase in vehicle population. This increase in vehicle population has led to increasing road accidents and also traffic congestion. According to Global Road Safety Report, 2015 released by the World Health Organization (WHO), India accounts for more than 200,000 deaths because of road accidents[1].From aggregated vehicle retrieving data and information is challenging due to sensor ability to move freely, sensors asynchronous operation, noise of sensor, vehicle and road analoy, and position error by GPS.[1]The maintenance of paving is useful and beneficial to save cost and ensures security of driving, due to which paving situation analysis is important for developing maintaining and repair methodologies. The process of paving condition assessment can be divided into three parts: data collection, distress identification, and defect assessment[2]. A pothole detection and segmentation method based on wavelet energy field is proposed.The system which is based on vehicle driver and automating systems would useful from the informative knowledge of pathole areas. An automated detection and analyzing system would abetment for megacities in planning. They propose a system to detect and localize patholes in multiple times overlane environmental area using cloud vehicle accelerating data, given the raw data/slice and network conditions of vehicles and the Intelligent Transportation System (ITS).[1]In the maintenance of roads in huge countries some major problems are faced in developing roads. Well maintainance of roads contribute a major part to the country's economy. Finding of paving problems such as patholes and humps it just not only helpful drivers of Vehicle to ignore accidents or damages of vehicle due to pathole and humps, but also helps priorities to maintaining roads condition.[4] It is very necessary to gather data and information related these damage road situations and divide and distributes the same to other vehicles that helpful to decrease and avoid accidents which is caused

due to patholes and humps occurred in roads. Due to this, system they have proposed a system that would gives notiofications to the drivers related any hurdles such as patholes and humps.This information can be used by the Government to correct these roadseffectually workful to develop a system based on IOT to detect Patholes in the road.[5]

II.   Literature Survey

The main focus of literature survey is to study and contrast the existing models to protect from pothole using manual methods.

This chapter highlights the succinct research contributions in developing automated pothole detection based on the various detection techniques.

"Multi-lane Pothole Detection from Crowdsourced Undersampled Vehicle Sensor DataAndrew Fox, Member, IEEE, B.V.K. Vijaya Kumar, Fellow, IEEE, Jinzhu Chen, Member, IEEE,and Fan Bai, Fellow, IEEE"

As smart vehicles have become more familier, the ability now exists to detect environmental road features (e.g., potholes, road incline angle, etc.) from their embedded sensor data. By merging information and data from multiple vehicles, crowdsourcing can be leveraged to detect environmental information with correctness.[1]

X. Jianfang,Q. Hanxing, Z.Wei,H. Youquan andW. Jian, A research of pavement potholes detection depends on three-dimensional projection transformation in Proc. 4th Int. Congr. Image Signal Process (CISP), Oct. 2011,

pp. 18051808

This paper was developed a model where using optical imaging principle of 3-dimensional projection transformation to precisely collect cross-section pictorial information of potholes in pothole detection.[6]

Rajeshwari Madli, Santosh Hebbar, Praveenraj Pattar, and Varaprasad Golla, Automatic Detection and Notification of Potholes and Humps on Roads to Aid Drivers IEEE Sensors J., Vol. 15, No. 8, August 2015.

In this paper author proposed a method of pothole system based on Support Vector Machine. It is a texture measure which draw Histogram is extracted as the features of the image region.[7]

III. Material And Methods

We implement this system for avoiding the obstacle in our route for safe journey and maintain a vehicle proper condition. In this paper we use the following algorithm for implementation the detection system

Algorithm details:
Input: Sensor Value
Output: According to the system the of output is positive that is one when the proposed pothole detection system face

the pathole in car journey. Following code shows, how operations performed within the system and the sequence in

which they are performed.
Sensorreadingarray [ ] //depth parameter
for (k=0 ; k isgreater noofsensor ;k++)
x=Sensorreadingarray[k]; //values will be check
y=Sensorreadingarray[k+1]; // through threshold
if(abs(x-y) isgreater patholethreshold) //make sure hardware if function is not malfunction
pathole
ag = true;
timestamp =currenttime;

IV. Procedure methodology

To generate a generalized pathole detection system they need information from different vehicles that are get driving over patholes in diverse scenarios, along with ground-truth pothole locations. Such data can be obtained from either real-world driving or from simulations.[1]

Pathole Detection system is a unique concept. This system is very useful to whom whichfaces the problem like pathole in their route.

Technologies like ZigBee, RFID and GSM can be used in traffic control to provide cost effective solutions. RFID is a wireless technology that uses radio frequency electromagnetic energy to carry information between the RFID tag and RFID reader.[3]

The technology is completely new and conception is created a profile for pathole in their vehicle journey. It is an application which is capturing within given duration and correct road situation data and information.

That are specially about hazardous patholes is of good importance to the public peoples and the government. They implement an efficient road surface monitoring system for automating path hole detection. It is a idiomatic concept where it a less cost solution for the road protection purpose. This will help to avoid and ignores accidents and can useful to finding problem areas early.[5]
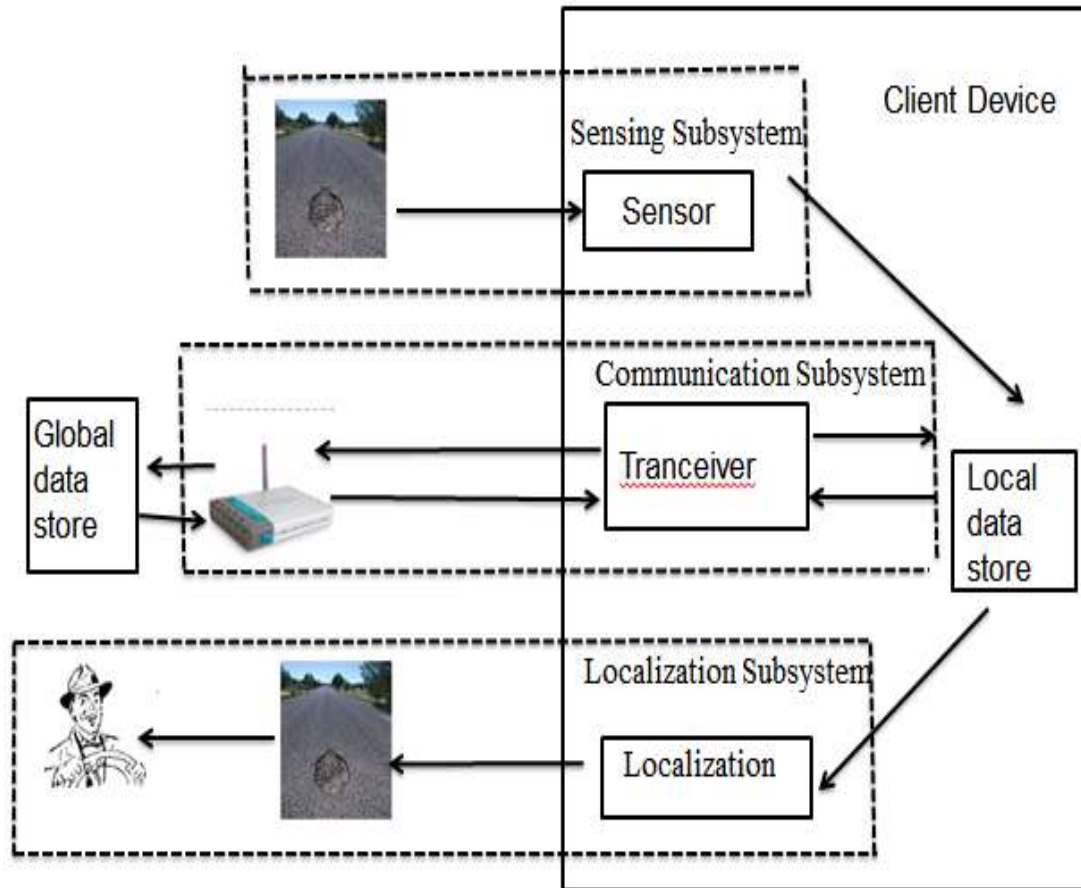
Fig. System architecture

Implementation Modules:
A. Mobile Application Module:
User can gather the pothole notification from the system for the securetravelling.[5]

B. Server Module:
The server module contain database for system. It is an middle level between sensing and mobile application module. Its function is to store the updated information received by the sensor and provide to the requested user whenever needed. This module can also be updated frequently for information related to the potholes and humps.[5]

C. Microcontroller Module:
The Module is liable for coordinating the hardware and server.[5]

D. Sensing Module:
This model contains GPS receiver, ultrasonic sensor (HCSR04) and GSM SIM 900 modem. The distances in between the car physical body and the road surface area is calculated with the help of an ultrasonicsensor. A threshold value is set such that the value based on ground clearance of the transport vehicle. The calculated distance(depth parameter) is compared with the threshold value to detect pothole or hump.[5]

Statistical analysis

V. Result

Taking into account the current road scenarios, there is a need to devise a systemalerts the driver regarding the upcoming pathole in vehicle journey. In our proposedsystem which aims at providing appropriate information to the driver about potholes.It is a low cost solution for the road safety purpose.

VI. Conclusion

System gives correctness and accurate result regarding to patholes and humps to the vehicle driver by using this important information dangerous accident will get avoid. .This will help to avoid accidentswhich can useful to finding pothole problem location as early. In countries where updated economicgrowth and excellent technology have increase to gives impact on the qualityof traditional transport system over Intelligent transportation system. This systemcan be further improved to consider the above fact and update server database accordingly.

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