DETECTION AND NOTIFICATION OF POTHOLES AND HUMPS ON ROADS USING PIC-MICROCONTROLLER

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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 and humps not only helps drivers to avoid accidents or vehicle damages, but also helps authorities to maintain roads. Previous pothole detection methods that have been developed and proposes a cost-effective solution to identify the potholes and humps 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 and height, respectively. The proposed system captures the geographical location coordinates of the potholes and humps using a global positioning system receiver. The sensed-data includes pothole depth, height of hump, 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 alert drivers so that precautionary measures can be taken to evade accidents. Alerts are given in the form of flash messages with an audio beep.

Keywords: Pic-microcontroller, Ultrasonic sensor, GSM, GPS, Mobile app.

INTRODUCTION

Roads are currently the main mode of transportation in India. They transport 65 percent of the nation's freight as well as over 90 percent of the nation's passenger traffic. The majorities

of Indian roads, however, are crowded, tiny, and have subpar surfaces. Furthermore, the requirements for road maintenance are not fully met. Driving in India is always a breath-holding, multi-mirror involved and sometimes fatal activity. [1] Vehicle production has significantly expanded during the past 20 years.Issues like traffic congestion and a surge in traffic accidents are results of the growth in automobiles. Accidents and traffic delays are sometimes caused by bad road conditions. On Indian roadways, speed breakers are frequently employed to reduce vehicle speed and lower the risk of collisions. [2] However, the placement of these speed bumps is haphazard, and their heights are chosen at random. Tragic accidents and fatalities are frequently caused by potholes that are caused by prolonged periods of heavy rain and the movement of huge cars.

LITERATURE REVIEW

Autonomous Pothole and Humps Detection and Notification on Roads for Driver Assistance, by Santosh Hebbar Utilizing ultrasonic sensors, the potholes and speed bumps are discovered as well as their depth and height measured. The proposed approach finds exact location of the potholes and humps using a global positioning system receiver. Beeping sounds and flashing messages are used to send alerts.

According to Santosh Hebbar's article, "Automatic Detection and Notification of Potholes and Humps on Roads to Aid Drivers," The speed bumps and potholes are located using ultrasonic sensors, which also assess their depth and height.Beeping sounds and message flashes are used to send alerts.

Authors A. Carullo and M. Parvis developed an ultrasonic sensor for use in automobile applications. The Smart Hear smartphone-based hearing aid system is employed in this study to boost speech recognition for a range of target users who might benefit from enhanced classroom listening clarity. The Smart Hear system consists of transmitters and receivers. There are two devices (a smartphone and a Bluetooth headset) for speech transmission in addition to an Android mobile application that links and manages the different devices through Bluetooth or Wi-Fi.

A. Mednis, G. Strazdins, R. Zviedris, G. Kanonirs, and L. Selavo were successful in utilizing the accelerometers on Android handsets to identify potholes in real time. The SSMS delivers end-to-end security built on the initial solution. It provides a public key solution based on elliptic curves that use public keys to determine the secret key for symmetric encryption. Also included are public verification and forward secrecy.

Potholes identification using SVM in the pavement distress picture, Y. Li and J. Lin Liu Short messaging services (SMS) are the most widely used, quickest, and least expensive textual communication method (SMS). Several algorithms are available to guarantee the security of the messages that are delivered. This paper suggests an effective cryptography technique based on static look-up tables and dynamic keys. It employs symmetric encryption and decryption. It is simpler to use and more secure to use the proposed method. The SMS Manager and native Android Intents are used by this application to send and receive messages. When used on the messaging app, it provides security for messages sent between Android mobile devices.

ARCHITECTURE & IMPLEMENTATION:

The suggested approach uses low-cost ultrasonic sensors to offer a practical way to detect dangerous potholes and unlevel humps. This system also has a smartphone app that notifies users when there are potholes or speed bumps, which is a further advantage. The technology works even in the rainy season when muddy water fills potholes since notifications are created using the data stored in the database.

We think that a lot of people who have been hurt in horrifying incidents might benefit from the approach described in this study. Potholes and speed bumps are taken into consideration in the recommended method. However, it does not include how frequently relevant authorities rebuild speed bumps or potholes. This strategy may be further enhanced to take into consideration the aforementioned fact and update the server database properly. To improve user experience, the suggested method may also leverage Google Maps. The recommended system's architecture is shown in Fig. 1. Table 1 contains details on the pothole and hump. Figures 2 and 3 illustrate real-world picture and hump detection.

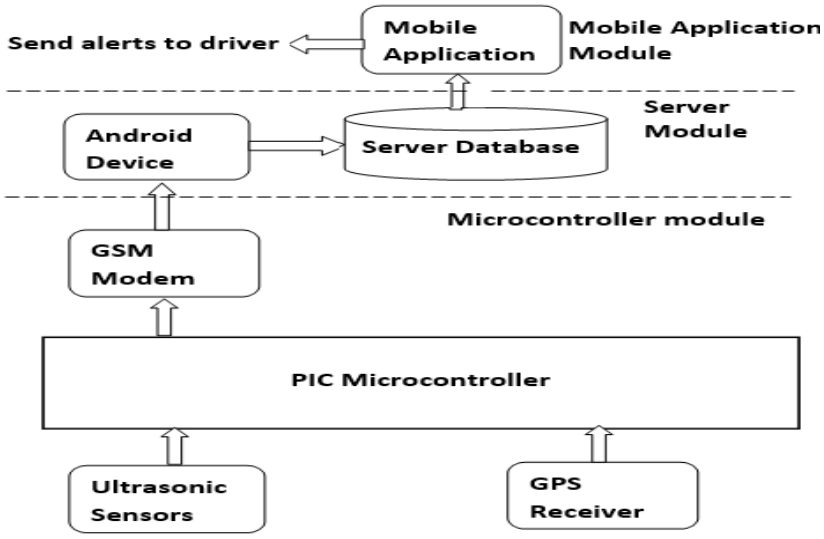

Fig1: Architecture of themain system.

SL.NO	OBSTACLE TYPE	DEPTH/HIGHT IN CM	LATTITUDE	LONGITUDE
1.	Pothole	15.35	11.9567	75.5789
2.	Hump	4.1	11.9126	75.5671
3.	Hump	4.8	11.9423	75.5143
4.	Pothole	12.2	11.9765	75.5981
5.	Pothole	7.7	11.9543	75.5125
6.	Pothole	5.3	11.9543	75.5125
7.	Hump	3.3	11.9532	75.5762

Table1: Information about the pothole and hump detected.

Fig2 and fig 3: pothole and hump detection practically.

CONCLUSION

The model proposed in this study performs two essential tasks: it alerts drivers to probable crashes while also automatically spotting potholes and speed bumps. The smart phone app for this system, which promptly notifies users of potholes and speed bumps, is another advantage. We think that a lot of people who have suffered injuries in horrifying incidents might benefit from the approach described in this study.

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