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POTHOLE DETECTION 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 and humps not only help drivers to avoid accidents or vehicle damages, but also helps authorities to maintain roads. This paper discusses 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 machine captures the geographical place coordinates of the potholes and humps using a worldwide positioning device 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 update the pics of location on the android application named "meri sadak" so that measures can be taken to evade accidents. Alerts are given to the driver and simultaneously pics are updated on application.

1.INTRODUCTION

India, the second most populous Country in World with fast growing economy, is known to have a gigantic network of roads. Roads are the dominant means of transportation in India today carrying almost 90 percent of country's passenger traffic and 65 percent of its freight. but, maximum of the roads in India are narrow and congested with bad surface satisfactory without protection. irrespective of wherein you are in India, riding is a breath holding, multi-mirror concerning, probably life-threatening affair. Over last two decades, there has been a tremendous increase in the vehicle population leading to problems such as traffic congestion and increase in number of road accidents. Pathetic condition of roads is a boosting factor for traffic congestion and accident. Researchers are working in the area of traffic congestion control, an integral part of vehicular area networks, being need of hour today. roads in India commonly have velocity breakers so that the car's pace can be controlled to keep away from injuries. however, those speed breakers are erratically allotted with uneven and unscientific heights. potholes, shaped because of heavy rains and movement of heavy cars, also end up a major cause for demanding accidents and lack of human lives. to deal with the above-mentioned issues, a price powerful solution is needed that collects the facts approximately the severity of potholes and humps and also allows drivers to drive safely. Current pothole detection systems often ignore obstacles for wheelchair users, relying on expensive or cumbersome solutions. This project aims to address this gap by developing a system that alerts drivers to avoid potholes and hazardous slopes, potentially saving lives through real-time location sharing in emergencies. While drivers maintain control, the system empowers them to navigate safely.

2.OBJECTIVES

1. The IoT-based pothole detection system aims to enhance road safety by promptly identifying and addressing road defects.
2. By optimizing maintenance operations, the system reduces costs and ensures efficient allocation of resources for timely pothole repairs.
3. Improved public services and heightened satisfaction result from the system's contribution to creating reliable and secure road infrastructure.
4. Cost savings accrue from early pothole detection, preventing the need for extensive road rehabilitation and minimizing expenses related to vehicle repairs.

3. LITERATURE SURVEY

[1]: Automatic Pothole and Humps on Roads Detection and Notification Alert

An ultrasonic sensor-based method effectively detects road potholes and humps, relaying their positions to registered mobile numbers and enabling data sharing

with government agencies. Various technologies like IR sensors and LiDAR can also be employed for identification

[2]: Internet of Things-Based Pothole Detection System Using Kinetic Sensor.

The accuracy of the system using kinetic sensor is great with compared to other systems using 2d LiDAR, camera, stereo vision and android systems

[3]: Smart IOT Based Pothole Detection and Filling System.

Canny Edge detection identifies them (87.5% accuracy!), ultrasonic sensors warn of bumps, and plastic trash fills them preemptively. This not only saves lives and money but also reduces plastic waste and promotes durable roads. Future plans include an Android app for pothole reporting via Google Maps, paving the way for smoother, safer roads nationwide.

[4]: An Advanced IoT-Based System for Real-Time Pothole Detection, Tracking, and Maintenance.

Smart Pave tackles potholes effectively with AI and sensors, offering real-time data and promising road safety improvements. While limitations exist, further research can refine it for broader impact, making it a valuable tool for managing and maintaining safer roads.

[5]: Sensor-based espial of potholes and humps on roads with instant notification alert using IoT.

This research delves deep into an ultrasonic sensor-based system for real-time pothole detection. Its goal: smoother roads through quicker fixes and smarter infrastructure management. Buckle up for a technical journey into obstacle avoidance!

[6]: pothole detection system using ultrasonic sensor.

Budget-friendly ultrasonic sensors in this pothole detection system alert drivers via mobile app, boosting road safety. But watch out, it lumps all bumps, including animals and rocks, as humps! Integrating with maps for smarter alerts could be the next bump-smoothing upgrade.

4. PROPOSED SYSTEM

In the Proposed system, the image is captured into frames by video processing and the captured image is preprocessed so that the dangered Pothole is identified and segmented. After segmenting the pothole, the latitude and longitude of the pothole with the Recorded with Top Screen Recorder exact time and date is updated on the webpage of the Transportation department. This data sharing is done using an IOT device where the data of the detected pothole is transmitted to the TTL board and the Location to the webpage Roadway.

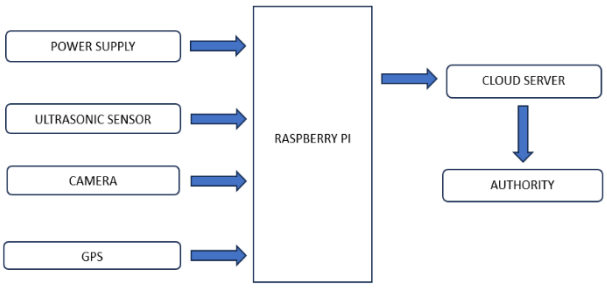

Fig.4.1: System Architecture

3. CONCLUSIONS

In developing countries, poor road conditions like potholes and humps pose a major threat to both drivers and the economy. To address this, a cost-effective solution using ultrasonic sensors and GPS has been proposed. This system identifies potholes and humps, measures their depth and height, and tracks their location using GPS. Real-time alerts are sent to drivers through a dedicated "meri sadak" app, while the data is stored in the cloud for road authorities to use for maintenance planning. This innovative approach not only improves driver safety by preventing accidents but also optimizes road maintenance efforts, ultimately contributing to a stronger economy.

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