Speed Breaker And Pathole Detection

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Abstract :

Recent studies have shown that road surface monitoring is essential for the municipal corporations as well as for travelers for choosing the best road possible. Such schemes provide the comfort and security to the vehicle travelers. This paper presents a vibration based approach for automatic detection of potholes and speed breakers along with their co-ordinates.
Recent studies have shown that road surface monitoring is essential for the municipal corporations as well as for travelers for choosing the best road possible. Such schemes provide the comfort and security to the vehicle travelers. This paper presents a vibration based approach for automatic detection of potholes and speed breakers along with their co-ordinates.

Introduction :

Road surface monitoring is essential for municipal corporations for quick detection and maintenance of potholes, detecting the other abnormalities of the road such as speed breaker rail road crossing etc and making them accessible to the travelers will provide a better driving experience. If such information of all roads is put on a central server which could be accessed by anyone freely, the drivers can choose the best possible road from source to destination.

Road surfaces can be classified into different categories such as smooth roads, potholes, bumps, contraction joints, man holes, expansion joints etc.The surfaces where one has to slow down his speed are potholes and bumps (also known as speed breakers). So to detect a speed breakers and putting them on to the server can provide the driver prior information about the roads so they could be able to roughly figure out what time would be taken to complete the journey. Currently road surface monitoring is carried out manually by means of employing persons for this purpose only, or by volunteer drivers locating any pothole and reporting it to the concerned authorities. But this approach of road condition monitoring is slow as well as costly. Alternative to this there are two approaches

for automatic detection of potholes, one is a responsive system and other is unresponsive system. The unresponsive system makes use of optical and acoustic sensors. These sensors are costly and they also need a complex algorithm to detect the potholes. Special purpose vehicles would have to be employed because devices have to be mounted over the vehicle so the condition of road is clearly visible. Another approach is responsive system which uses inertial sensors (like accelerometer and gyroscope) to access and analyse the irregularities. To make the system of road monitoring attractive to the users, this has been implemented as a service similar to Waze which makes use of little system resources and does not add extra overhead to the volunteers. This service of Road monitoring would run on devices operated by Android OS. Android OS is extensively used system now a days, which makes our system attract more volunteers for the better road monitoring.

This paper discusses about the monitoring of road condition using android's built-in accelerometer, which records 3-axis acceleration. The data obtained by the accelerometer is processed with suitable approach to detect the type of event along with their severity. Location co-ordinates of the place where the pothole or the speed breaker has been detected recorded using android's built-in GPS system.

Problem statement :

The problem statement involves developing an Android system that can detect potholes and speed breakers using sensor data and image processing. The system should aim to enhance road safety by providing real-time alerts to drivers about the presence of potholes and speed breakers, helping them navigate more safely. This involves integrating various sensors, such as accelerometers and cameras, to collect relevant data and employing algorithms to analyze this data for the identification of road anomalies. The end goal is to create a user-friendly application that contributes to a safer driving experience by actively identifying and notifying users about potential road hazards

Advantage :

1. Improved Road Safety : Pothole and speed breaker detection through an Android system enhances road safety by alerting drivers in real-time, allowing them to navigate these obstacles more cautiously.

2. Reduced Vehicle Damage : By identifying potholes and speed breakers, drivers can take preventive measures to avoid sudden impacts, leading to decreased vehicle wear and tear.

3. Enhanced Driving Experience : The detection system contributes to a smoother driving experience by providing timely notifications, reducing the likelihood of abrupt stops or jolts caused by unexpected road irregularities.

5. Data Collection for Infrastructure Improvement : The Android-based system can collect data on road conditions, aiding authorities in identifying areas that require maintenance or improvements for overall infrastructure enhancement.

4. Cost Savings : Drivers can save on potential repair costs associated with vehicle damage caused by potholes, as the system helps them navigate roads more safely.

6. Real-time Feedback : Drivers receive immediate feedback about road conditions through the Android system, fostering a sense of awareness and allowing them to adjust their driving behavior accordingly.

Disadvantage :

1. Accuracy Concerns : Pothole and speed breaker detection using an Android system may not always be highly accurate, leading to false positives or negatives, which could impact road safety.

2. Dependency on Sensors : The effectiveness of detection relies heavily on the sensors in the Android device. If these sensors are not calibrated or malfunction, it can result in inaccurate detection.

3. Battery Consumption : Constantly monitoring for potholes and speed breakers can consume a significant amount of battery, potentially leading to reduced device usability and the need for frequent recharging.

4. Limited Coverage : The detection system may not cover all road conditions or types of speed breakers, especially if they are unconventional or not well-represented in the training data.

5. Data Privacy Concerns : Gathering data for detection may raise privacy issues, as the system needs access to device sensors, potentially capturing information beyond road conditions.

6. Cost of Implementation : Developing and maintaining a robust pothole and speed breaker detection system can involve significant costs, both in terms of software development and ensuring the compatibility of the Android system with various devices.

Application :
- The concept can be implemented in military vehicles.
- It can be used in railways for identification of cracks.
- It can be used in highways in usual transportation of cracks.
- It can be used in bridges and flyovers.
- It can be used by the government authorities to monitor the road conditions effectively.

Objectives :
- ➢ Our system to protect the users from accidents by sending information to the authorities which will simply maintain the roads.
- ➢ No damage to humans and vehicles.
- ➢ All the information saved in data base.
- ➢ Timely information helps recover the road as fast as possible.
- ➢ This system measures distance between two vehicles to avoid road accidents

Conclusion :

    In conclusion, the Pothole and Speed Breaker Detection system utilizing Android technology proves to be a promising solution for enhancing road safety. By leveraging the capabilities of smartphones, this system efficiently identifies and alerts drivers to potential road hazards, mitigating the risk of accidents and vehicle damage. The real-time data collection and analysis contribute to proactive road maintenance. As technology continues to advance, integrating such systems into smart infrastructure holds the potential to create safer and smoother road experiences for all.

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