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POTHOLE DIMENSIONS AND GEO LOCATION CALCULATION APP

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INTRODUCTION:

Roads make a crucial contribution to economic development and growth and bring important social benefits. They are of vital importance in order to make a nation grow and develop. In addition, providing access to employment, social, health and education services makes a road network crucial in fighting against poverty. Roads open up more areas and stimulate economic and social development. For those reasons, road infrastructure is the most important of all public assets.

It helps in generating employment and guaranteeing a better dispersal of wealth. For improved growth in the economy, the transport investments are essential. It is not only facilitating inexpensive and more efficient movements of goods and people but also affects the delivery of commercial activity across the cities

If a bad patch remains unattended to, water seeps in through the cracks during the monsoon. If the water gets accumulated, the strata beneath the road weakens and subsequently the size of the pothole widens

Water gets through those cracks and weakens the soil under the road. That leads to even more cracking and eventually a pothole So treating and filling them at the earliest is of utmost importance.

So in order to cater to this need we analysed various existing methods, measured accuracy of each one and finally came up with our idea of measuring Potholes.

RELATED WORK:

This is the list of the most common methods currently employed

1**)** Vibration based methods (using smartphone accelerometer and gyroscope)
2) Various kind of sensors and modules
3) Black box cameras (using video data)
4) Using raspberry Pi
5) Laser scanning methods

EVALUATION:

While evaluating accuracy we first physically measured Potholes and then compared it with the readings obtained from machine learning algorithms

LITERATURE SURVEY:

pothole repair has long relied on manual detection efforts. Recently, automatic pothole-detection systems using various sensors have been studied. Existing proposals can be categorized into vibration-based methods, laser-scanning methods [9,10], 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 vehicle's 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. Accurate 3D point clouds measure elevation in the surface, and this information is captured with the laser and then extracted by filtering the data for specific distress features by means of a grid-based processing approach. However, whereas laser scanning is highly precise, the equipment needed is expensive. Furthermore, this method cannot be applied over a wide area for fast pothole detection.

Vision-based methods, however, are appropriate for accurately detecting potholes over a wide area at low cost. Many approaches using 2D images and video data have been studied. Pothole detection using 2D images was originally introduced by Koch and Brilakis. Their method involved searching for specific pothole features and determining pothole regions. They used a remote-controlled robot vehicle prototype equipped with a webcam (an HP Elite Autofocus) installed at approximately 60 cm above the ground. Buza et al. introduced a new unsupervised vision-based method that does not require expensive equipment, additional filtering algorithms, or a training phase. Jog et al. presented a new approach based on 2D recognition and 3D reconstruction for detecting and measuring the width, quantity, and depth of potholes using a monocular camera mounted on the rear of a vehicle

Most existing vision-based pothole-detection algorithms use 2D images collected from the internet and specific high-resolution cameras. Moreover, these algorithms must be implemented on powerful desktop computers. Indeed, existing methods cannot support pothole detection using an embedded black-box camera

Limitations in Existing system:

As mentioned earlier, vision-based methods have the potential for application as a suitable pothole detection system. Video data can be obtained at low cost using commercial cameras. Moreover, cameras can scan the road's surface, covering a wide area. Recently, the resolution of black-box cameras has become sufficiently high for capturing details of a road's surface. However, detecting potholes using video data has not been developed in the automotive industry, and most proposed models were implemented on desktop computers. Real-time pothole-detection systems using black-box cameras have yet to be tested in the field.

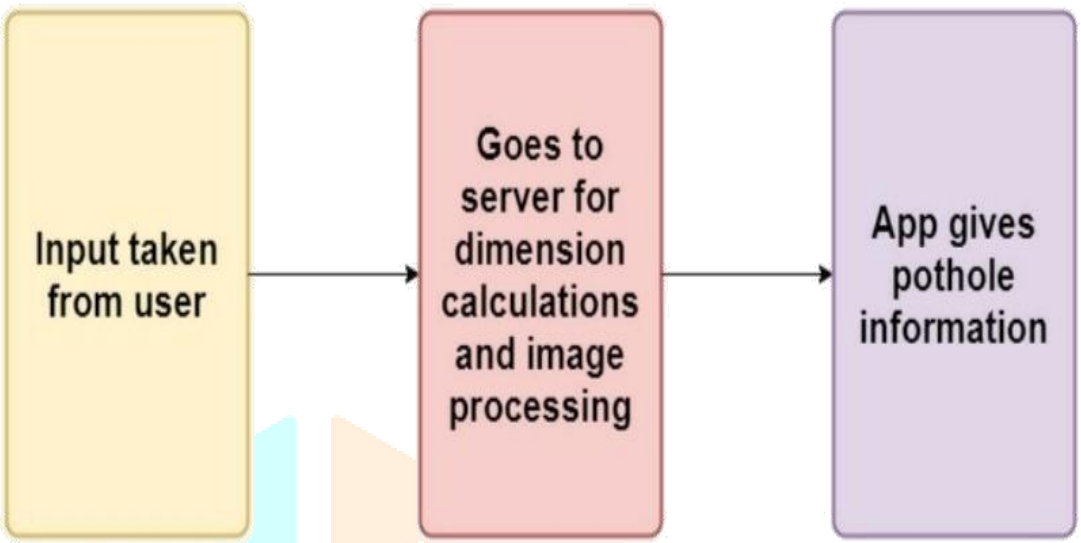
OUR APPROACH:

In a nutshell what our app proposes to do is take image from user, run machine learning algorithms on it to get an estimate of size (length, breadth) of Pothole, and geo location of the Pothole. In order to calculate the size (length, breadth) of Pothole we use

Foot of user as a benchmark and divide entire image into virtual tiles of same size and on that basis give an estimate of Pothole size.

The benefit of this app is that it provides local authorities with the location and the severity of the potholes which they can repair and ultimately will result in a more safer and enjoyable driving experience.

DATA FLOW DIAGRAM



CONCLUSION:

1.the web app performs well within the expectations

2.interactions of the stakeholders outside the client and server side are reduced to bare minimum or until necessity arises

3.from pothole detection to pothole fixing teams can maintain a smooth chain of communication via the web app

4.web app fulfil all the objectives for which it is developed

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