Automatic detection of Pothole and Repairing Robot

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ABSTRACT:

This idea offers a semi-automated robot capable of effectively identifying and filling potholes. The robot uses ultrasonic sensors to detect and measure potholes, as well as a dispensing mechanism to provide the necessary quantity of cement for filling. A levelling mechanism guarantees a smooth finish after filling. This novel technology promises to increase road safety, shorten repair times and costs, and decrease human interaction in the repair process.

KEYWORDS: Pothole detection, Cement dispensing, Robot, Road maintenance

INTRODUCTION

Roads are essential to economic growth and provide significant social benefits. They play an important role in a country's growth and development. Roads increase access and promote economic and social growth. For these reasons, road infrastructure is the most critical of all public assets. However, continual loading and weathering on roadways may develop a pothole, which can have serious consequences for human life.

A pothole is a structural failure in a road surface produced mostly by failure in asphalt pavement owing to the presence of water in the underlying soil structure and traffic passing through the affected region.

So, our objective is to create a robot that will assist society in improving road safety, reducing the difficulty in identifying potholes, and reducing the use of human power, so saving time.

We created a Semi-Automatic Robot that detects potholes on the road, discharges the necessary quantity of concrete to fill the pothole, and then levels the released concrete using a slider. Hence, the pothole on the road

DESIGN AND COMPONENTS

This section details the design and components required for constructing a Pothole Detection and Cement Dispensing Robot using ESP8266.

**Hardware Components:** ESP 8266, ULTRASONIC SENSOR, ON/OFF BUTTON Power supply,12 V motor, Motor Driver.

Software Components: Arduino IDE, Proteus

Problem Statement

The abundance of potholes on highways is a considerable difficulty. They not only harm automobiles, but also lead to traffic accidents and injuries. Traditional techniques of pothole identification and repair are often labor-intensive and time-consuming. This project seeks to overcome these issues by creating a pothole identification and cement distributing robot for a more efficient and automated approach to road repair.

BLOCK DIAGRAM & DESCRIPTION
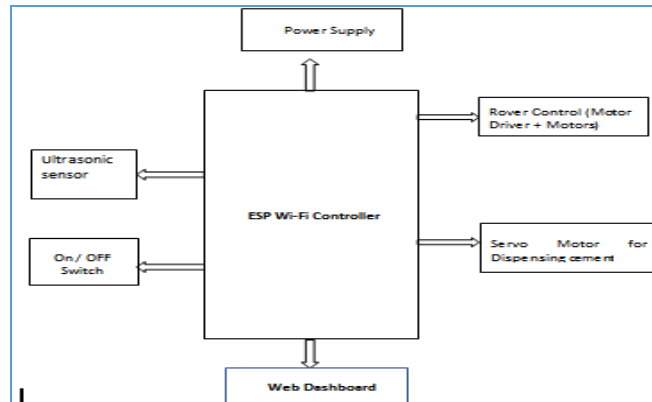
When the Robot is powered on, it will begin to move in a straight line. The Ultrasonic Sensor is mounted towards the ground and will continually detect the region from the robot's height.When the height of the sent and received ultrasonic waves changes, the pothole's depth is automatically calculated. The microcontroller instructs the servo feeder to switch on for a specified duration based on the depth of the pothole. After pouring the Cement, the Robot will move forward, and the Cement poured on the road will be levelled by the passive Roller connected to the rear of the Robot.

REAL-WORLD APPLICATIONS AND FUTURE DIRECTIONS

Improved road safety: By automating pothole identification and repair, the robot may help minimise the number of incidents caused by potholes.

Enhanced efficiency: The robot may greatly decrease the time and labour necessary for road repair, resulting in cost savings.

Reduced traffic disruptions: Automating pothole repair may reduce lane closures and traffic congestion caused by human procedures. modern pothole detection: The use of modern sensors such as LiDAR and thermal imaging allows for more accurate pothole identification in a variety of weather   situations.
Self-learning capabilities: Machine learning algorithms allow the robot to automatically decide the best repair approach for various pothole kinds and sizes.

Improved material dispensing: Create self-healing or fast-curing cement formulations to increase repair durability and minimize repair time.

RESULT

The Result system uses sensors that are economically less costly and can be implemented on a large scale, such as shopping malls and baby carts for safety. Sensors can be mass implemented directly on government vehicles or at an attractive subsidized scheme on private vehicles to create a mass collection of information on potholes and humps, for which a density map can be created to for effective and quick analysis of poorly, constructed roads, which further can help government By reviewing the statistics on traffic accidents.

CONCLUSION

As a result, our Automated Robot contributes to society by boosting road safety, reducing problems in identifying potholes, and reducing the use of human power, therefore saving time. Therefore, by repairing the potholes, accidents on the road may be minimized.

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