

Automatic Detection of Potholes and Humps on the Road

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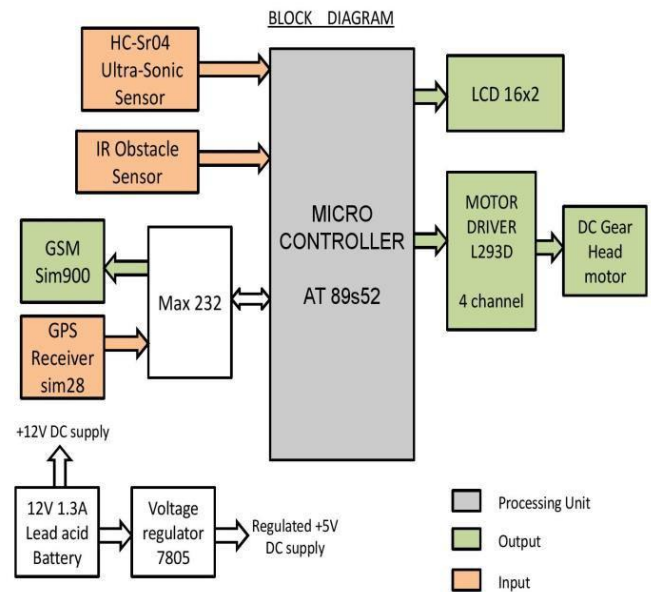
Abstract— one of the major problems in developing countries is maintenance of roads. Identification of pavement distress such as potholes that helps drivers to avoid accidents and vehicle damages. This project discusses methods that have been developed and proposes a cost effective solution to identify the potholes on roads and provide timely action to avoid accidents or vehicle damages. Ultrasonic sensors are used to identify the potholes and obstacles on the road. When the pothole is detected its depth is displayed on the LCD.

Keywords— Ultra Sonic Sensor, LCD, Potholes

I. INTRODUCTION

Millions of dollars are spent in maintaining and repairing potholes by municipalities around the world. A pothole refers to a shallow pit on a road's surface, caused by activities like erosion, weather, traffic and some other factors. These anomalies when accumulated in the transportation system, constitutes to major problems. These problems, even though they appear to be less significant at an individual level, constitute to major problems when taken in cumulative, collective and large scale manner. The problems constituted by these potholes result in low fuel economy, accidents, traffic coagulations etc., which have an adverse impact on the Economy of a country and day to day life of citizens. The number of reported accidents is exponentially increasing due to poor road conditions. The roads are deteriorating with more usage and lesser maintenance. Due to the poor road conditions drivers find it difficult to ascertain the manholes,

It is hazardous to travel by road without any warning sign, especially during night. In order to avoid this accidents, a maintenance system is required which will detect the potholes, manholes, bumps etc. on road surface before it is encountered with so that the driver gets enough response time. For this a system should be developed which will detect the defects on the road. The prime motivation behind making a pothole detection method is to aid drivers in various aspects and thus assist them in avoiding a possible accident. All these reasons urge the need to get information of such bad road conditions and its remedy. The system detects such potholes and automatically fills them in order to maintain the road condition. Potholes are depressions rather than protrusions. Other obstacles like people, speed breakers will not be taken into account.



BLOCK DIAGRAM OF POTHOLE DETECTION SYSTEM

II. DESCRIPTION

A. Ultrasonic Sensors Hc-Sr04:

The HC-SR04 is an active ultrasonic sensor and contains a transmitter and a receiver. It is used to measure distance at which, objects are placed in front of it. The ultrasonic sensor transmits high frequency sound waves and waits for the reflected wave to hit the receiver. The distance is calculated based on the time taken by the ultrasonic pulse to travel a particular distance.

B. IR Sensor:

IR (infrared) sensors detect infrared light. The IR light is transformed into an electric current, and this is detected by a voltage or amperage detector. The IR Sensor consists of two IR LEDs, the first IR LED is wired to emit LED and the second LED is wired to transmit a signal when it receives an IR input.

C. Max 232:

It is an interfacing block between the controller and communication module and between communication module and PC.

D. LCD:

Liquid crystal displays (LCD) is an alphanumeric display used to display numbers, characters and graphics. Here 16*2 LCD is used to display the parameters of ultrasonic and IR sensors.

E. Dc Motor Driver:

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16- pin IC which can control a set of two DC motors simultaneously in any direction.

F. GPS Receiver:

Global Positioning System (GPS) is a satellite navigation system and is used to capture geographic location and time, irrespective of the weather conditions. It is maintained by the US Government and is freely available to anyone who has a GPS receiver. It obtains the GPS information from satellites in National Marine Electronics Association (NMEA) format. The NMEA has defined a standard format for the GPS information. This is followed by all the satellites. The standard defines various codes such as GLL- Latitude/Longitude data, GSV – Detailed satellite data and RMC- Minimum Recommended Data

III. ACKNOWLEDGMENT

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IV. CONCLUSION

Roads are needed to be monitored continuously for roughness and other anomalies to avoid inconvenience to the road users. The developed system will serve as a useful approach to detect the potholes in the roads and maintenance of it in an automated way. The entire design is composed of 3 main sub- systems Design of robotic cover, sensor modules and interfacing of transceiver circuit with PC for transmitting the controls to the robot. The mechanical design of the robot consists of wheels controlled by the DC motor. It is a helpful approach for the government authority. The use of robots significantly expands the potential of surveillance systems.

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