INVOLUNTARY DETECTION AND ALERTING OF POTHOLES AND HUMPS ON ROADS TO AID DRIVERS

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Abstract: Spotted potholes and speed bumps are among the main causes of car accidents. One important factor in the economics of the nation is its well-maintained road network. One may draw a comparison between the significance of blood veins for humans and the relevance of road infrastructure in society. The quality of the road surface should be regularly inspected and fixed as needed. This research uses a combination of cutting-edge computer vision algorithms and sensor technologies to create an extensive system for automatic identification and alerting of roadway potholes and humps. The concept entails equipping cars with a variety of sensors, including as GPS units and accelerometers, in order to gather data on road conditions in real time.

I. INTRODUCTION

India is planning to cut traffic accidents by up to 50% by 2022 as part of the Brasilia Declaration. The goal of the Motor Vehicles Act is to increase safety by lowering traffic accidents. In India, the number of operating cars has climbed by up to 157% compared to a 39% increase in road networking since 2000. There is a significant risk of traffic accidents as a result of the sharp rise in the number of vehicles on the road and the state of undeveloped road networks. The Ministry of Road Transport and Highways' "Road Accident in India 2018" report states that there were 4,67,044 road accidents in 2018 compared to 4,64,910 in 2017, a 0.46 percent rise in road accidents nationwide. The deaths that occurred in the same time frame have risen. In 2018, 1.94% of the nation's total road network, 30.2% of all accidents, and 35.7% of all fatalities took place there.

II. PROBLEM STATEMENT

Compared to wealthy nations, road accidents are more common in emerging nations, particularly in the country of India, where the quantity of vehicles has grown far beyond the length of the roads. One of the things that causes traffic accidents is potholes. In order to prevent this mishap In addition to discussing several current and past techniques for locating potholes and humps, the research suggests a technique that is robust, reasonably priced, simple to apply, and adaptable.

III. LITERTURE REVIEW

In transportation engineering, pavement discomfort and deterioration identification are crucial. Potholes and various cracks develop as a result of deterioration; these must be found and fixed as soon as possible. Calculating how much filler material is required to fill a pothole is very important to avoid shortages or excesses, which would squander filler material that typically needs to be delivered from another place. In this context, the metrological and optical characteristics of a pothole are crucial. Images of the pavement depth are gathered from concrete and asphalt roadways using an inexpensive Kinect sensor.

A technique for pothole identification based on a support vector machine (SVM) has been proposed by Jin Lin et al. [1]. Using this technique, potholes are distinguished from other flaws like cracks. Partial differential equations are utilized for image segmentation. The method uses a set of pavement photos to train the SVM to detect potholes. If the photos are not well-lit, the training model is unable to identify the pavement flaws.
A pothole and pitfalls spotter has been proposed by Sudish Surandharan et al. This approach uses a sensor to record the vehicle's acceleration both vertically and horizontally as it travels, while the device with GPS records the GPS coordinates of each location independently.

IV. METHOLOGY

The upkeep of roads is very difficult in India, Our Project is to reduce the road accident because of potholes in the roads, two wheelers are more affected for the potholes so we need a system to reduce the potholes.
Initially we will do the vehicle part that is the L293D Motor driver is connected to raspberry pi to the motor driver DC Motor are connected for vehicle movements .With the utilization of Ultrasonic Sensor we can Find the pothole's depth and using micro controller ,GPS and GSM and the location of the potholes to driver as well as Municipality and also it sent the alert for the driver like the pothole is ahead or the pothole is at some meter distance from your vehicle like this for the driver mobile phone.

WORKING: Ultrasonic sensors identify the potholes and hump. An open source Android program that can provide a user interface with graphics (GUI) similar to a joystick is used to both operate and monitor the robot via LCD. The wifi module that connects the robot is embedded within the microcontroller utilized in the proposed system. The controller receives the incoming data for detecting potholes from the IR and ultrasonic sensors, and it displays the information on an LCD. The geographic location of this data can be further sent to the government or to a specific server.

BLOCK DIAGRAM:
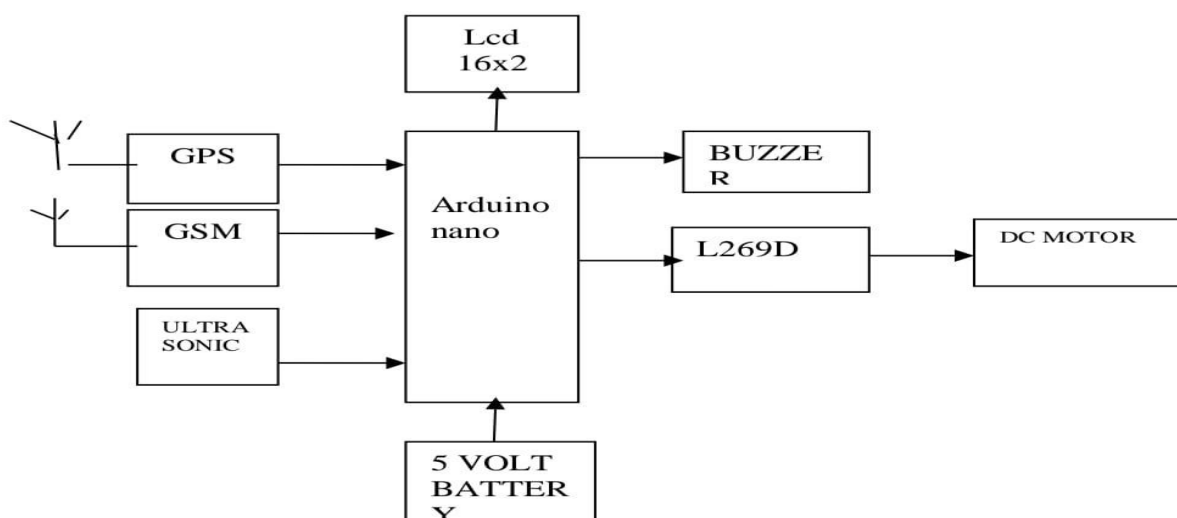
COMPONENTS:

1.   Arduino: Nano is a small, complete, flexible and breadboard-friendly
Microcontroller board, based on ATmega328p, developed by Arduino.cc in Italy in 2008
and contains 30
male I/O headers, configured in a DIP30 style. Arduino Nano Pinout contains 14 digital pins, 8 analog Pins, 2 Reset Pins & 6 Power Pins.

Fig.2 Arduino Nano

2.   Relay: It is a electromagnetic apparatus that is utilized for driving the load connected across the relay andthe output of relay can be connected to controller and load for further processing.

Fig 3.Relay

3 . DC motor: A direct current (DC) motor operates on the principle that unlike and similar magnetic poles are attracted to one another. An electromagnetic field that is oriented toward the coil's center is produced by a wirecoil that has current flowing through it.

Fig 4. DC motor

4. Ultrasonic Sensor: HC-SR04 is an ultrasonic sensor module. It consists of two ultrasonic transmitters, a receiver, and a control unit. This sensor works with a regulated +5V supply and the frequency of 40 Hz. The ultrasonic waves are used to measure the distance of the object in the range 2 to 400 cm. The measuring angle of detection is less than 15 degrees, and the ranging ac curacy can reach to 3 mm.

Fig 5. Ultrasonic Sensor

5.   **GPS:**The highly effective GPS module Neo-6M comes with a built-in 25x25x4 mm ceramic antenna. This antenna has a strong capacity for satellite searching. On-board memory is another feature.

Fig 6. GPS Module

6.   **GSM**: The highly effective GPS module Neo-6M comes with a built-in 25x25x4 mm ceramic antenna. This antenna has a strong capacity for satellite searching. On-board memory is another feature of it.

Fig 7.GSM

Battery: A 12-volt battery is a common type of battery used in numerous uses, such as solar power, marine power,   and automobiles systems. It typically consists of six cells, each providing around 2 volts, connected in series to produce a total voltage of 12 volt.

1.**Embedded C**: Nowadays, embedded processors are widely used in consumer electronics like video recorders,televisions, dishwashing machines, and cars. They are also used in medical equipment, defense systems, aerospace systems, and automobiles. Due to the severe budgetary constraints faced by most embedded applications, low-cost processors such as the 8051 family of chips discussed in this book are typically used. These widely used processors have very little RAM; the majority of these devices contain 256 bytes, not gigabytes. As compared to a desktop processor, the available processing capability is roughly 1000 times lower. Consequently, creating embedded software has noteworthy novel difficulties, even for proficient desktop programmers. If you have any prior C or C++ programming experience.
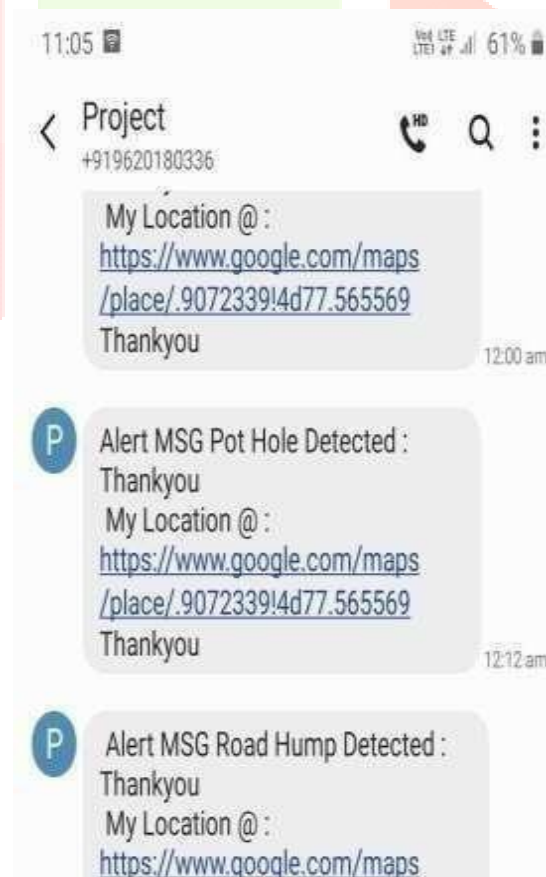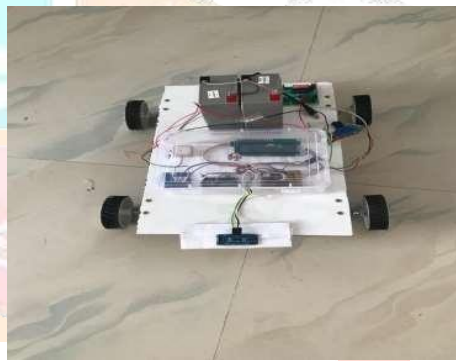
V.   ADVANTAGES

•   To control & clean house hold appliances
•   In industries and factories for remote sensing & cleaning
•   Long distance remote sensing.
•   Cleans without Human Interference.
•   Eco friendly towards environment.

VI.   APPLICATION

1.   Vehcles   Alert
System 2.Municipal and Government use
3.   Road Safety
4.   Traffic Efficiency

VII.   RESULT

CONCLUSION

The suggested system revolves around a bot with two uses. 1. Identifying potholes and hump 2. Email notifications are used to share the road's status. The vehicle's bottom houses the ultrasonic sensor, which is aided in spotting potholes by an infrared sensor. The sensor data is contrasted with the typical road surface's threshold values. A GPS receiver is used to locate the pothole, and the location data is communicated via email and an Internet of Things application to the servers and authorized individuals. In summary, the system notifies the right authorities right away if it notices any irregularities in the road surface caused by potholes or bumps.

VII.   REFERENCES

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