

Detection of Potholes Using Intellectual Transport System

V.Meenakshi, J.FemilaRoseline, M.L.Bharathi,
AssistantProfessorDepartmentof Electrical and Electronics Engineering,
Sathyabama Institute of Science and Technology, Chennai-119, India.

Article Info

Volume 83

Page Number: 5846 - 5849

Publication Issue:

May - June 2020

Article History

Article Received: 19 November 2019

Revised: 27 January 2020

Accepted: 24 February 2020

Publication: 17 May 2020

Abstract

In growing countries roads are the principle approach of transportation. There is a chance of having injuries if the roads aren't top. So we completed this device to alert drivers. This paper goal at by giving earlier warnings to motive force to avoid potholes on the ways. Accidents can be prevented by creating a robot which will spot the pothole and send message to the nearer vehicle from that point it is shared to nearer automobile so that accidents are reduce. Ultrasonic sensors are used in the proposed device especially to find out the faultson roads respectively. Sensed records incorporate pothole intensity, top of the hump, and geographic place, which is transmitted through GSM to server and statistics stored inside the database (cloud) VIBRATION sensor for detecting the limitations on the roads. LDR sensor used to manipulate the beam of head slight in night time journey. When the ultrasonic sensor and Vibration sensor senses robotically the velocity of the vehicle is decreased. The pace of the automobile reduces mechanically via using PWM.

Keywords: GPS, GSM SIM800, LDR, Ultrasonic sensors, Vibration sensor.

I. INTRODUCTION

Millions of dollars are used to maintain and repair potholes by way of municipalities around the arena. A pothole refers to a low pit on a road's floor, because of sports activities like attrition, climate, web site visitors, heavy rains and a few different elements. These anomalies whilst accumulate inside the transportation system, constitute to essential issues. When taken in cumulative, collective and massive scale way. The problems constituted with the aid of those potholes bring about low fuel financial system, accidents, site visitors and many others. Those have an unfavorable impact on the economic system of a country and on a daily basis existence of citizens. It may be proved that the visitors' device can be bettered to an extra extent while these problems are checked and taken care of. Detecting Potholes on roads with the assist of smart structures is a very low fee effective machine. Detecting and for this reason keeping off potholes may additionally reduce the gas intake, put on-tear and upkeep price of a car. Also, averting. Potholes increases road protection and indirectly decreases the overall travel time. The existing systems of pothole detection and humps make use of as a centralized facts base in advance. Some of the answers included to setting up pothole hot-lines, maintaining contests to document

especially bad potholes, and asking readers to make a contribution pictures of potholes. We attempt to find more systematic technique to the hassle, but desire that this public hobby might also purpose convey this machine in their automobiles.



Fig. 1. Potholes on roads [1]

But, the cars visiting on these damaged roads finally take damages. We attempt to reduce this trouble via offering device. Where the detection, avoidance and upkeep of potholes are taken care of to a great possible quantity. Our device accounts for a better, faster and dependable method in detection, avoidance and preservation of potholes, thus this architecture, while hired brings about a thorough exchange in existing roadways transportation system.

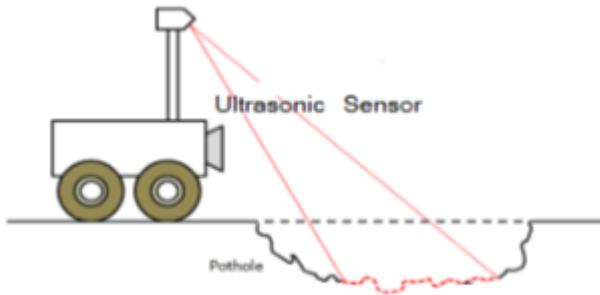


Fig. 2 .Detection of potholes

When a car slow down due to potholes, the following vehicle will get accidents. By using ultrasonic sensor to detect the damages at the roads. So it may calculate the distance and top of the potholes and indicators the motive force through sending a message to them. And now we also are manage the speed of the automobile by the usage of pulse width modulation. Roads in India normally have humps to sluggish down the vehicle’s velocity may be managed to avoid injuries. When there is a hump detected then the automobile runs slowly. If there are no pothole or hump the car runs at ordinary pace. The vehicle can set the velocity mechanically by using PWM technology.

II. RELATED WORK

Intensity and altitude of the pothole are measured using Ultrasonic sensors .GPS system will monitored the location of pothole ,its altitude and information is stored in cloud database .Then Information stored in database is given to vehicle driver so that accident can be avoided ,the information is given as sms to vehicle drive as an alert [1]. In [2], Android Smartphone with accelerometers is used to find fault in road. Data processing methodology is used and limits are well defined and used for certain application. Via harnessing ATMEGA 2560, we have applied a avenue floor tracking gadget which wouldconstantly screen the floor of street, stumble on the damaged road circumstance, seize picture of the spot, come across thehardware’s region and send the facts to the server aspect. We’ve describes the running, the hardwarerequirements, the software requirements in addition to the set of rubrics are used to run system [3].GPS system is used to detect potholes [4]. In [5], a uniquemethod is used to find pothole automatic. In [6], a stereo imaginative and prescient based completely fault finding device is

proposed. The quadratic street floor version permits for camera orientation model, street drainage and hill gradients. Experimental effects display robust detection in numerous situations.

III. PROPOSED METHOD

In our future device, ultrasonic sensor, Vibration sensor are used to hit upon the potholes and humps on the roads .To find the size and location Ultrasonic sensors are used and this sensor additionally uses to lessen the speed of the vehicle.Vibration sensors are also used in this system to detect some obstacles while travelling.Additionally LDR sensor used to control the beam of Head light while travelling in nights to avoid accidents.In this system we are using arduino board instead of microcontroller.The GPS will detect the position of potholes and humps and alerts are given through the GSM by a flash message. Here two DC motors are connected to run the vehicle by using PWM

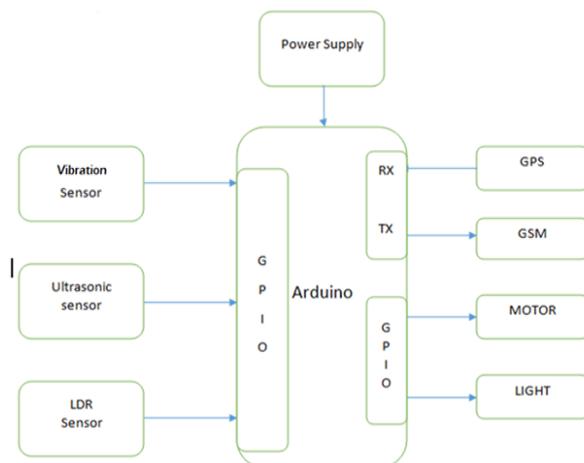


Fig.3. block diagram of proposed system

generation. L239 motor drive is used to control the motor speed.

IV. COMPONENTS USED IN THE PROPOSED SYSTEM

Arduino: The Arduino microcontroller is a smooth to apply but effective board laptop that uses accelerometer which finds the pothole by means of acceleration, if theacceleration exceeds the threshold limits means pothole is identified and information is stored in cloud .From the cloud information is taken and sends to vehicle driver.

Ultrasonic Sensors: The HC-SR04 is used in this proposed method. It consists of two parts: receiver and transmitter. The transmitter converts the input electrical energy into high-frequency sound energy, and this sound energy hits the receiver, and the distance between the signals between the transmitter and receiver gives the distance between the object. There are unique varieties of ultrasonic sensors with different communication ranges and angles of recognition. The HC-SR04 sensor works at a frequency of 40 KHz and may detect distances of the devices within the range of 2 to 4 hundred cm with a one hundred fifty millisecond time of detection.

GSM SIM 800: SIM800A component that connects to the particular software program and the mid-air interface. As SIM900A may be involved with a tremendous change of packages, all determined additives of SIM800A. Values for Mobile Communication (GSM) is a fixed of supplies for Second time (2G) mobile systems.

GPS Receiver: Global Positioning System (GPS) is used to find weather, region and time. It is conserved through way of the Government and is given to public free whoever is having GPS receiver.

Vibration sensor: Vibration sensor is used based on the vibration in the force, temperature, gravity, and object in distance. If the object is near the vibration sensor activates and send signal to microcontroller and microcontroller activate.

LDR sensor: A mild structure resistor additionally referred to as a LDR, image resistor, photoconductor or photocell, is a resistor whose resistance will boom or decreases relying on the amount of slight depth. LDRs could have a spread of resistance and features. For instance it can be used to expose on a mild whilst the LDR is in darkness or to show off a mild while the LDR is in moderate. It may additionally paintings the other way spherical so while the LDR is in mild it activates the circuit and even as it's in darkness the resistance increase and disrupts the circuit.

Motor Drive L293D: Motor Drive L293D is used in this proposed method and interface microcontroller.

V. SIMULATION & HARDWARE

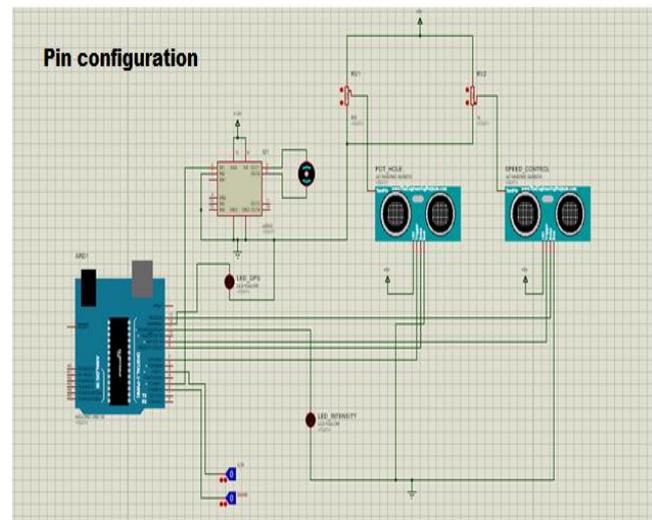


Fig . 4. Simulation diagram for intelligent scheme.

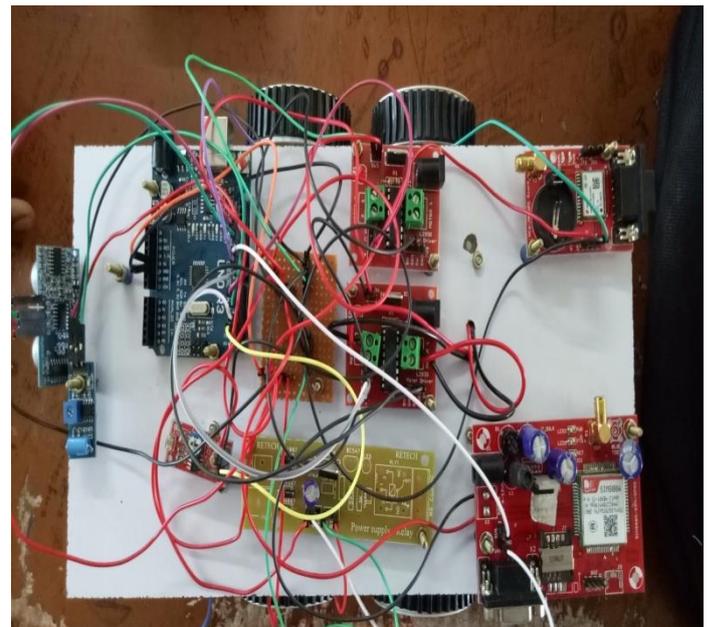


Fig.5. hardware module

In our proposed device we are going to hit upon the potholes and humps to alert the drivers by giving indicators to them. The drivers observe that messages and takes care approximately the auto. On this gadget we are going to use ultrasonic sensor to detect the pothole and humps on roads. Ultrasonic sensor detects the pothole at which longitude, range it changed into placed through GPS module and depth of the pothole respectively. When sensor detect the

hump the speed of the vehicle reduced automatically by using PWM technology. The location of hump captures and intimates to the driver by giving a message. In this system we are using vibration sensor to detect some obstacles on roads. Here LDR sensor used in night travelling it is used to reduce the intensity of the head lamp of the vehicle it is used to pass the vehicle easily in nights. The motor drive L239D is used to reduce the speed the vehicle when the detection of humps. The L239D driver control the two DC motors. The power supply given to them system is 12v.

VI. CONCLUSION

By using this system when there is a pothole or hump on roads we will get a notification to phone. Vehicle speed also will be automatically reduced. By this we can avoid speed accidents and damages to the vehicles. It is a cost effective system. The GSM helps in sending and receiving messages. GPS helps in getting longitude and latitude of the location. LDR sensor helps in night travels to automatically reduce the intensity of the light. The proposed system done in prototype for further implementation it can be done in real time applications for better improvements.

REFERENCES

- [1] Rajeshwari Madli, Santosh Hebbar, Praveenraj Pattar, and Varaprasad Golla, "Automatic detection and notification of potholes and humps on roads to aid drivers", *IEEE SENSORS JOURNAL*, vol.15, pp.4313-4318, Aug.2015.
- [2] Mednis, G. Strazdins, R. Zviedris, G. Kanonirs, and L. Selavo, "Real time pothole detection using Android smartphones with accelerometers," in Proc. Int. Conf. Distrib. Comput. Sensor Syst. Workshops, Jun. 2011, pp. 1–6.
- [3] Prachi More, Sudhish Surendran, Sayali Mahajan and Saurabh Kumar Dubey, "Potholes and pitfalls spotter", *IMPACT:IJRET*, Vol 4, pp. 69-74, 2014.
- [4] Mircea Strutu, Grigore Stamatescu, Dan Popescu, "A Mobile Sensor Network Based Road Surface Monitoring System", In Proceedings of IEEE Conference on System Theory, Control and Computing, pp.630–634, 2013.
- [5] C. Koch, I. Brilakis, "Pothole detection in asphalt pavement image", *Advanced Engineering Informatics*, Vol. 25(3), pp. 507-515, 2011
- [6] Z. Zhang, X. Ai, C. K. Chan, and N. Dahnoun, "An efficient algorithm for pothole detection using stereo vision," in Proc. IEEE Int. Conf. Acoust., Speech Signal Process., May 2014, pp. 564–568..

AUTHORS PROFILE



V. Meenakshi is an Assistant Professor at the Department of Electrical and Electronics Engineering, Sathyabama University, Chennai. She has received her B.E in Electrical and Electronic Engineering in 2002 from Bharathiyar University and M.E in 2004 from Sathyabama University. She has research interest towards the space vector modulation techniques particularly extended to PMSG. She is well versed in the modeling, simulation and analysis of wind electric generators using Simulink/Matlab.