

LIFE SAVER AT RAINY SEASON

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Abstract— Nowadays, accidents due to broken, missing manhole covers and pits are high in Rainy seasons. Pits and Manholes are not monitored properly in developing countries, especially in rainy seasons. These accidents can lead to severe injuries and also death if there is heavy water flow. Hence, here we need to propose a system to overcome this problem. We need to include an array of sensors including a sonar concept where it can identify and also calculate the distance of the manhole or pits and the same will be alerted to the person who is in the driving seat, this problem generally raises with 2 wheelers

Keywords-

I INTRODUCTION

Road accidents are one of the most horrific unfortunate events we hear about on an almost daily basis. In developing countries like India where roads are filled with manholes and deep pits, it is very difficult for one to identify these manholes and pits on a rainy day which is a concerning issue leading to deadly accidents. Thus, this project uses sonar radiation and laser imaging to identify these pits and alert drivers about the nearby pits and manholes to prevent such accidents. Traffic congestion has been increasing in India due to economic growth, urbanization, and a rapid increase in vehicles. 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, bumps, etc. which leads to major accidents. During the rainy season, potholes get filled with water and the driver is unable to distinguish their presence or depth which can lead to life-threatening calamities. Traveling by road without any warning signs is hazardous, especially at night. To avoid these accidents, a warning system is required which will detect and distinguish the potholes, manholes, bumps, etc. on the road surface before it is encountered so that the driver gets enough response time. For this, a system should be developed to detect the road's defects. 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 on such bad road conditions that can warn the driver. A system that warns the driver about potholes in its path, well in advance so that the driver gets a reasonable response time is being proposed here.

II LITERATURE REVIEW

[1] Image processing and Proximity sensors (2019). This paper proposes pothole detection system design with proximity sensor to provide motorcycles with a warning system and increase road safety driving.

^[2] Pothole Detection Using Arduino and Ultrasonic Sensors (2014). This paper presents a novel method to project an automated Pothole identification and detection system which helps the motive force in fending off route holes on the roads, with the aid of giving earlier warnings.

^[3] Role of Ultrasonic Sensor in Automatic Potholes and Hump Detection System (2017). This paper present a system that will detect the potholes on the road and save the information in the server and reduce the vehicle speed if needed.

^[4] IOT-based Manhole Detection and Monitoring System (2022), the system that has been presented identifies the sewer water level and thus detects the obstruction quickly present on the inside It also identifies the foul gas produced because of sewage contaminated water.

^[5] IOT based detection (2022), This paper proposes a model to detect the volume and depth and delivers information via alerts.

III DESIGN

ULTRA SONIC SENSORS

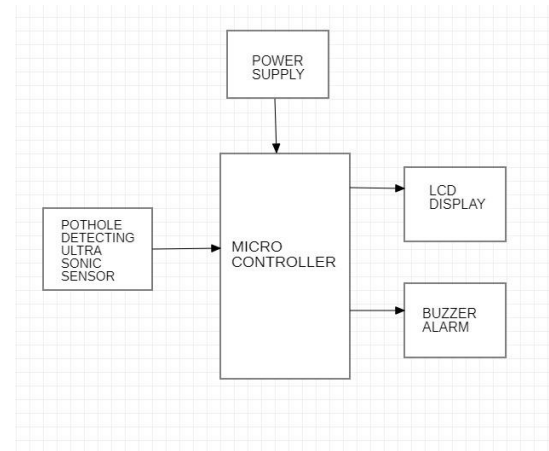
An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

SWITCH

A switch is utilized to determine whether the rider is wearing the helmet or not. This switch has two modes, ON and OFF. It activates when the rider puts on the helmet and weight is detected on the switch and remains OFF otherwise.

ARDUINO UNO

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digitals input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.



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Architecture

BUZZER

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren

LCD DISPLAY

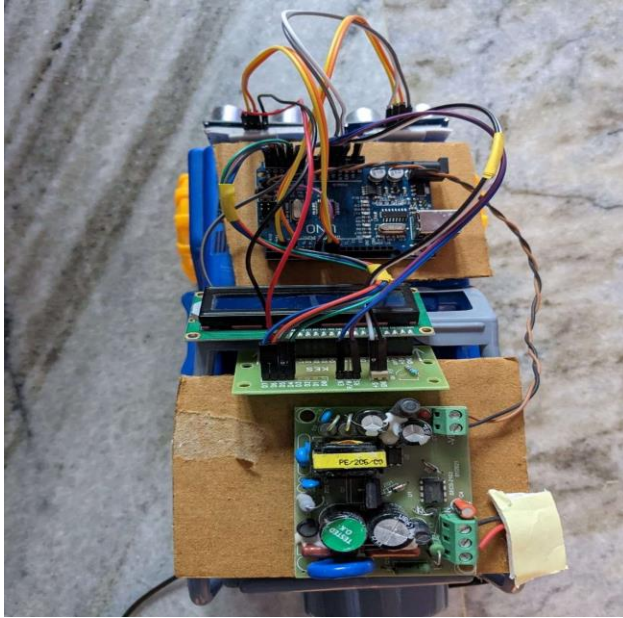
LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors and instrument panels.

VEHICLE

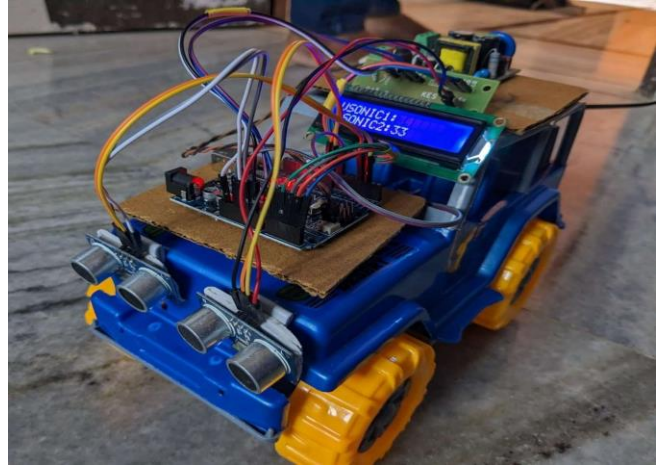
In the primary module to which the sensor is attached, the user drives the vehicle and gets feedback upon detection of potholes.

VI RESULTS

◆ DEVICE SET-UP

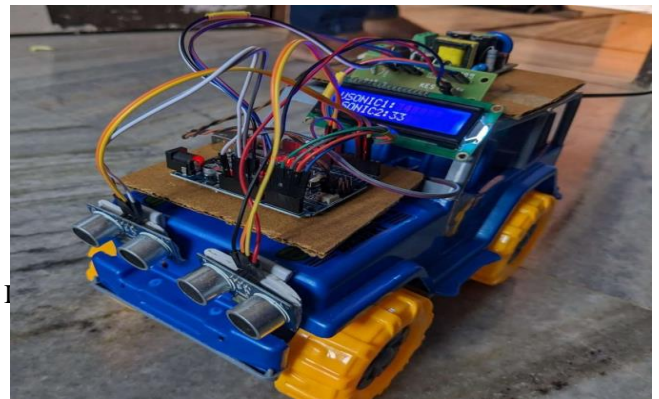
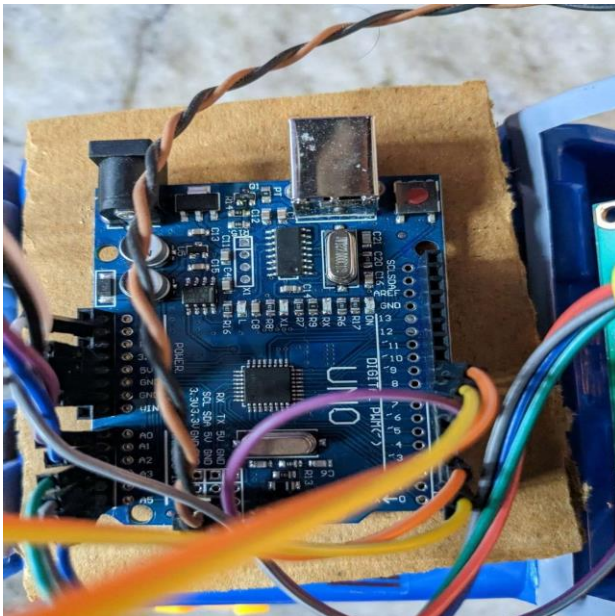


◆ ULTRASONIC RESULTS



◆ ULTRASONIC RESULTS

◆ INTEGRATING



ADVANTAGES:

Helps common people and government by localizing the potholes and pits with the severity, also helps in improving the health and safety of people and vehicles. Since the sensor is placed at the front of the vehicle the detection and identification of the potholes and pits is better and efficient

Device and sense potholes totally covered up with water and can sensing ranges up to 400cm to 500cm i.e (4-5Mtrs).

DISADVANTAGES:

Beyond 5Mtrs the sensor can't sense and detect as the ultra-sonic sensor used has the distance limitation upto 5 Mtrs.

The sensors are sensitive to the temperature conditions.

VI REFERENCES:

- [1] Stephena Joseph, "ROLE OF ULTRASONIC SENSOR IN AUTOMATIC POTHOLE AND HUMPS DETECTION SYSTEM", International Journal of Scientific & Engineering Research Volume 8, Issue 7, July 2017.
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- [3] Hadistian Muhammad Hanif, Zener Sukra Lie, Winda Astuti, Sofyan Tan, "Pothole detection system design with proximity sensor", Published under license by IOP, 13– 14 November 2019, Solo, Indonesia.
- [4] Himanshu Shriwas, "IOT-based Manhole Detection and Monitoring System", *International Journal for Research in Applied Science & Engineering Technology*, Volume 10 Issue VI June 2022.

V CONCLUSION

The thesis presented two models for the detection of dry and water-filled potholes. The two model works well for detecting pothole and giving warning. The circuit for the functioning of the ultrasonic sensor is fabricated and by using a microcontroller the sensor calculates the distance and depth of the pothole. It gives a warning to the driver in the presence of a pothole. The experimental results show that the algorithm works to detect and warn the driver regarding potholes. By using an array of detectors, we can get more information about the pothole i.e., we will get the profile of the pothole along with the range and depth. So, by using an array we can acquire the 3D image of the pothole. The array means multiple detectors receiving pulses and by adding up these outputs, we can obtain the profile of the pothole. The reflected signals from the different regions can be added up thus obtaining the exact information about the pothole. So, to detect the pothole and to image it, an array of detectors needs to be used. It has been shown that the proposed feature extraction algorithm works for the laser module for the detection of water-filled potholes. The experimental results show that the algorithm is highly reliable and accurate in detecting the potholes, obtaining the maximum depth, and generating the depth profile of the pothole.