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# **WRECKWATCH: Automatic Prior Detection of Accident and Potholes in Roads to Aid Drivers Enhanced With IEEE 802.11 Module**

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**ABSTRACT:** Pothole is one of the significant factor for the motorist. It can cause car accident and decrease the lifetime of the motorist. One of the major problems in the developing countries is maintenance of roads. The main reason for accident is due to pothole and humps. Our proposed system introduces a GPS based system which actively and continuously sends vehicle location coordinates (Latitude /Longitude) to the eye in the sky server, which processes and analyses data from all such vehicles and predicts potential collision and send back alert to the vehicle to raise visual/sound alert via WIFI. If both the vehicle crosses the same location the alert will be sent to both the vehicles from the server through WIFI module. This will help the drivers to get aid of potholes in the road.

**KEYWORDS:** Pic-Peripheral Interface Controller, SMPS-Switched Mode Power Supply, GPS-Global Positioning System, LCD -Liquid Crystal Display.

## **I. INTRODUCTION**

The pavement condition is one of the significant factor the causes trouble to the drivers. There are many types of pavements such as potholes, humps, crack, rust, and fog regions also another factor that causes accidents. Bad pavement can cause accident, shock to the drivers and unwanted traffic in the roads which leads to heavy problems. It is because when the car wheel touches the pothole can mislead the driver to occur accident. Hence the major problem is potholes the roads which decreases the car lifetime and human's life also. It is require to design and develop a system which is helpful to reduce such accidents. To overcome this problem the proposed system is used to aid the drivers. This system collects the location of potholes and sends the data to the server. The sensor finds the depth and height of potholes. GPS is used to find the location of the potholes and that location is sent to database which is nothing but server. By using that location the drivers get alert signal through WIFI module in either LCD display or through buzzer alert. GPS continuously sends the location to the server database. Recent studies have shown that road surface monitoring is essential for the municipal corporations as well as for travelers for choosing the best road possible.

A vibration based approach for automatic detection of potholes and speed breakers along with their co-ordinates. Potholes and speed breakers are detected along with their severity using android's built-in accelerometer. The proposed approach are tested over a 4 km flat road and compared to manual inspection of pothole and speed breakers on the same considered road [1]. The pothole is one of the significant factors for the motorist. It can cause a car accident, the decrease of car lifetime and a decrease of the motorist concentration. There are 3 kinds of the pothole detecting methods, such as using a 3-axis acceleration sensor, a camera sensor and, a laser sensor. All of 3 have the cons and pros. System is based on an image processing method with the camera sensor. Detecting the potholes based on the potholes characteristic. The characteristics of the potholes are the dark region, the round shape and the rugged texture [2]. Pothole are the primary cause of accidents, hence identification and classification using image processing techniques is very important. K-Means clustering based segmentation is preferred for its fastest computing time and edge detection based segmentation is preferred for its specificity. The main goal is to identify a better method which is highly efficient and accurate compared to the conventional methods. Different image pre-processing and segmentation methods for

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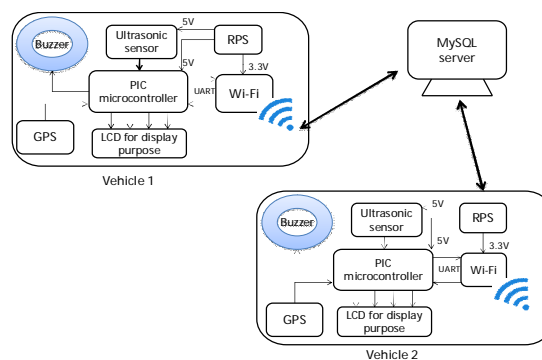
pothole detection where reviewed using performance measures.

Understanding the condition of paved surface is extremely helpful for road users as a result with the supply of such data road users will avoid or use caution if what coming ahead. The proposed system mainly concentrates on potholes in the road that will help the drivers to be safe while driving. When a pothole is detected by sensor the GPS will detect the location and sends signal to the satellite through which the data will be stored in the server. Whenever any vehicle crosses the road signal will sent through WIFI module via GPS to the use. The signal may be either LCD display or through buzzer alert. If two vehicles crosses the same location both will get signal via WIFI module. This can give signal before limited location. By the system the drivers can be safe and accidents can be reduced. we are using two hardware setup that has some location difference which will aid the users to aid of potholes.

## II. DESIGN AND IMPLEMENTATION

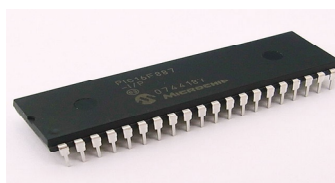
GPS based system is introduced which actively and continuously sends vehicle location coordinates (latitude/longitude) to the eye in the sky server, which processes/analyses data from all such vehicles and predicts potential collision and sends backs alert to the vehicle to raise visual/sound alert via WI-FI. If both the vehicle crosses the same location, the accident alert will be sent to both the vehicle from the server through WI-FI module. Ultrasonic sensors are used to detect the potholes and the information will be updated in the server. If any car travels in the same location, the potholes wherever present in the road will be intimated to the corresponding vehicle from the server via WI-FI technology.

**SOFTWARE REQUIREMENTS-Proteus(Simulation and circuit design),Microsoft visual studio in(Web application),SQL server (Database),CCS (Custom Computer Service),Embedded C,ASP.Net(C#).**



### A.16f887 Microcontroller

Peripheral Interface controller(PIC) was originally introduced by General Instruments. In the late 1970s GI introduced PIC 1650 and 1655 RISC with 30 instructions. PIC was sold to microstrip features-low cost self-contained, 8 bit, Harvard structured, pipelined, single accumulator with fixed reset and interrupt vector. The features of this microcontroller are High performance, high operating speed, Power saving sleep mode.



### B. Ultrasonic sensor

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate

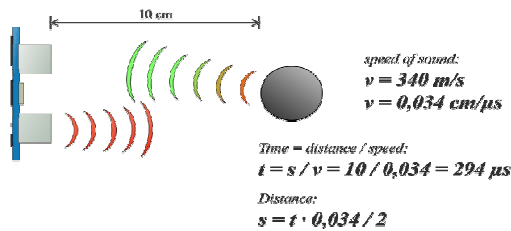
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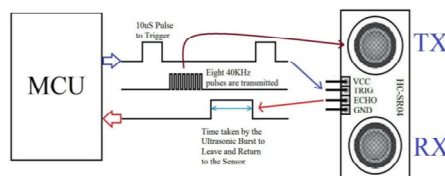
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the distance between the sonar sensor and the object. Accuracy is 3mm. Detection range is 2-400cm. Arduino library ready: HCSR04Ultrasonic. The module automatically send eight 40khz square wave and automatically detect whether receive the returning pulse signal



**TRIG**-A Pulse is sent here for the sensor to go into ranging mode for object detection.  
**ECHO**-The echo sends a signal back if an object has been detected or not. If a signal is returned, an object has been detected. If not, no object has been detected.

### WORKING OF ULTRASONIC SENSOR



### C. WIFI

The ESP8266 WI-FI module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WI-FI network. ESP8266 is a 3.3V WI-FI module very popular for its IOT applications. It is low cost and can be used as station or Access point or both combined. It supports Deep sleep (<10uA).

ESP 8266 Pinout



ESP8266 has 8 pins, namely:

- RX
- VCC
- GPIO 0
- RESET
- CH\_PD
- GPIO 2
- TX
- and GND

### D. GPS

The SKG13BL is a complete GPS engine module that features super sensitivity, ultra low power and small form factor. The GPS signal is applied to the antenna input of module, and a complete serial data message with position, velocity



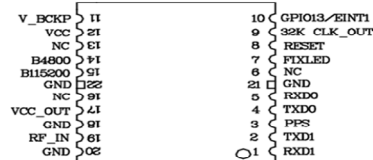
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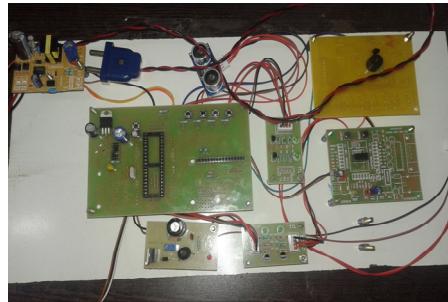
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and time information is presented at the serial interface with NMEA protocol or custom protocol.



## HARDWARE SETUP



## III. CONCLUSION

Vehicle less are important way of transportation all the world. There are many cases of road accident now a days due to the inability of drivers and roads. In India, roads are important for transportation purpose .They carry weight as well as country's passenger traffic. Road condition is major reason to happen accidents in today's life.Potholes formed due to heavy loads as well as movement of vehicles. Hump on roads are different due to size and height. These parameters are responsible for accidents.Recent studies have shown that road surface monitor is essential for the municipal corporations as well as for drivers for choosing the best road possible.Our Paper introduces a GPS based system which actively and continuously sends vehicle location coordinates (latitude/longitude) to the eye in the sky server , which processes data from all such vehicles and predicts potentials collisions and sends back alert, to the vehicle to raise visual/sounds alert via WI-FI. If both the vehicle from the server through WI-FI module.So we can avoid more accident in future by this device and it also helps to government to detect potholes and recover those for neat roads and can also use for object detection, Measuring the distance, Parking Aid System, Industrial applications .This system will have accurate and speed and cost efficient and due to automation it literally reduces the efforts taken by human. It gives the forecasting information about the affects to the end user.

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