ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Drivers Safety For Alerts On Pot Holes and Humps on Road a Cloud Based Approach.

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ABSTRACT

The problem of developing country is the maintenance of road. The country economy is based on the major development of well maintained road. Potholes and humps found as pavement distress to avoid accidents and maintained the roads.This paper discuss about the detection of potholes and humps. It is developed to identify the potholes and humps on roads to alert the drivers to avoid the accidents and vehicle damages. To establish the potholes and humps the ultrasonic sensor are used to measure the height and the depth relatively. It captures the geographic location and the position of potholes and humps by GPS receiver. The potholes, height of hump and geographical location are the sensed data it is used to store in the cloud database. This provides the estimate acquire of information to the government authorities and to vehicle drivers. A LCD monitor is used to awake drivers so that the precaution measures to be taken to get away from accidents. Alert are given in the form of audio with latitude and longitude.

Keywords: Ultrasonic sensor, GPS, LCD, Voice synthesizer, PIC16F887.

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ISSN: 0975-8585

INTRODUCTION

All over the world India ranks second place in te population and it has the fast growing economy. India is also having a huge network of roads. The most dominating transportation is roadways. Almost the carry 90% of passengers and 65% of freight. In India most of the roads are narrow and conjusted with poor surface quality and road maintenance is also not satisfactory. However all over the India driving is the breath holding and potentially life threating affair.

Over the past two decades there has been huge increase in the vehicle population. This will lead to the traffic conjunction and increase in more number of accidents. Now a days the traffic conjunction plays a vital role in vehicular area network .

In India most of the road having the speed breakers.So that the speed can be controlled to avoid accidents.However the speed breakers are unevenly distributed with uneven and not in uniform height.

Potholes are formed due to heavy rains and due to the movement of heavy vehicles. It also becomes a vital role for traumatic accidents and lose of human life. According to survey report in 2014 the 11398 people died due to the presence of potholes and humps. India has the highest number of road accidents in the world. With over the 1,30,000 death the country has overtaken china and now has the worst road traffic accident rate world wide. Every hour 40 people under the age of 25 died due to road accidents around the globe

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Fig 1. Condition of road with potholes

Figure1 portrays the condition of roads with potholes. To overcome this problem the cost effective solution is needed. Allthe collection of potholes and humps it helps the driver to avoid to accident and also help the government authorities for maintenance of road.

The remaining sections of this paper are as follows. Section-II prominence on the related field of deduction of potholes and humps. Section3 discusses on various component used in the system. Section4 describes the architecture and implementation of the proposed system. Experimental results are present in the section v. Section VI talks about conclusion and future scope.

RELATED WORK

Pavement distress detection is an intriguing topic of research and researchers have been working on pothole detection techniques. This section gives a brief description about the existing solutions for detecting potholes and humps on roads.

D. Xu; P. Zhao; W. Gui; Ch. Yang; Y. Xie,,et al In this paperwe develop a power model of the Free runner device and analyse the energy usage and battery lifetime under a number of usage patterns. We discuss the significance of the power drawn by various components, and identify the most promising areas to focus on for further improvements of power management. We also analyse the energy impact of dynamic voltage and frequency scaling of the device's application processor.

S. Guha, K. Plarre, D. Lissner, S. Mitra, B. Krishna, P. Dutta, and S. Kumar.et, alWe present AutoWitness, a system to deter, detect, and track personal property theft, improve historically dismal stolen property recovery rates, and disruptstolen property distribution networks. A property owner embeds a small taginside the asset to be protected, where the tag lies dormant until it detects vehicular movement. Once moved, the tag uses inertial sensor-based dead reckoning toestimate position changes, but to reduce integration errors, the relative position is reset whenever the sensors indicate thevehicle has stopped. The sequence are logged in of movements, stops, and turns compact formand eventually transferred to a server using a cellular modem after both sufficient time has passed (to avoid detection) and RF power is detectable (hinting cellular access may be available). Eventually, the trajectory data are sent to a server which attempts to match a pathto the observations. The algorithm uses a Hidden Markov Model of city streets and Viterbi decoding to estimate the most likely path. The proposed design leverages low-power radios and inertial sensors, is immune to in transit cloaking, and supports post hoc path reconstruction. Our prototype demonstrates technical viability of the design; the volume market forces driving machine-to-machine communications will soon make the design economically viable.

H. Lu, J. Yang, Z. Liu, N. D. Lane, T. Choudhury, and A. T. Campbell**.**We present the design, implementation and evaluation of the Jigsaw continuous sensing engine, which balances the performance needs of the application and the resource demands of continuous sensing on the phone. Jigsaw comprises a set of sensing pipelines for the accelerometer, microphone and GPS sensors, which are built in a plug and play manner to support: i) resilient accelerometer data processing, which allows inferences to be robust to different phone hardware, orientation and body positions; ii) smart admission control and on-demand processing for the microphone and accelerometer data, which adaptively throttles the depth and sophistication of sensing pipelines when the input data is low quality or uninformative; and iii) adaptive pipeline processing, which judiciously triggers power hungry pipeline stages (e.g., sampling the GPS) taking into account the mobility and behavioural patterns of the user to drive down energy costs. We implement and evaluate Jigsaw on the Nokia N95 and the Apple iPhone, two popular smartphone platforms, to demonstrate its capability to recognize user activities and perform long term GPS tracking in an energy-efficient manner R. Sen, B. Raman, and P. Sharma **et,al**In this paper we will determine the mechanical condition of vehicle by using acoustic or sound signals. Here we will determine weather mechanical condition of vehicle is good or bad. As well as we can estimate the traffic density on road also. Cumulative sound signals consist of various noises coming from various part of vehicles which includes rotational parts, vibrations in the engine, friction between the tires and the road, exhausted parts of vehicles, gears, etc. Noise signals are tire noise, engine noise, engine-idling noise, occasional honks, and air turbulence noise of multiple vehicles. These noise signals contains spectral content which are different from each other, therefore we can determine mechanical condition of vehicle. For example, under a good condition of vehicle, the vehicles typically having the smooth audio and very less engine noise. Here we uses SVM and ANN classifiers

R. Sen, P. Siriah, and B. Raman.et,alMonitoring traffic density and speed helps to better manage traffic flows and plan transportation infrastructure and policy. In this paper, we presenttechniques to measure traffic density and speed in traffic, prevalent indeveloping countries, andapply those techniques to better understand traffic patterns in Bengaluru, India. Our techniques, based on video processing of traffic, result in about 11% average error for density and speed compared to manuallyobserved ground truth values. Though we started with intuitive and straight-forward image processing tools, due to a myriad of non-trivial issues posed by the heterogeneous and chaotic traffic in Bengaluru, our techniques have grown to be non-obvious. We describe the techniques and their evaluation, with details of why simpler methods failed under various circumstances. We also apply our techniques to quantify the congestion during peak hours and to estimate the gains achievable by shifting a fraction oftraffic to other time periods. Finally, we measure the fundamental curves of transportation engineering, relating speed vs. density and flow vs. speed, which are integral tools for policy makers.

COMPONENTS USED IN THE PROPOSED SYSTEM

The proposed system offers a cost effective solution for detecting potholes and humps on roads and notifying drivers about their presence. Components used in the proposed work are as follows:

ISSN: 0975-8585

PIC 16F887 Microcontroller:

FIG 2 PIC Controller

The microcontroller acts like the brain of the control system. The microcontroller chip that has been selected for the purpose of controlling Microchip. This chip is selected based on several reasons.PIC microcontroller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality and ease of availability. It is ideal for machine control applications, measurement devices, study purpose and so on.

LCD Display:

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

APR33a3:

Fig 3 Voice Recorder

The analog-to-digital converters (ADCs) and digital-to-analog converters (DACs). The aPR33A and increase series C2.0 is specially designed for simple key trigger, user can record and. The aPR33A series are powerful audio processor along with high performance audio playback the message averagely for 1, 2, 4 or 8 voice message(s) by switch, It is suitable in simple interface or need to limit the length of single message, e.g. toys, leave messages system, answering machine etc. Meanwhile, this mode provides the power-management system. Users can let the chip enter power-down mode when unused. It can effectively reduce electric current consuming to 15uA the using time in any projects powered by batteries.

RFM70:

RFM70 is a GFSK transceiver module operating in the world wide ISM frequency band at 2400 - 2483.5 MHz. The embedded packet processing engines enable their full operation with a very simple MCU as a radio system. Auto re-transmission and auto acknowledge give reliable link without any MCU interference.It is an 4-pin SPI interface with maximum 8 MHz clock rate 8pin Package.

ISSN: 0975-8585

ULTRASONIC SENSOR:

Fig 4 Ultrasonic Sensor

The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work:Using IO trigger for Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mmat least 10us high level signal, The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back IF the signal back, through high level , time of high output IO duration is the time from sending ultrasonic to returning

GLOBAL POSITIONING SYSTEM:

The Global Positioning System (GPS) is a satellite based navigation system that can be used to locate positions anywhere on earth. Designed and operated by the U.S. Department of defence, it consists of satellites, control and monitor stations, and receivers. GPS receivers take information transmitted from the satellites and uses triangulation to calculate a user's exact location. GPS is used on incidents in a variety of ways, such as To determine position locations; for example, you need to radio a helicopter pilot the coordinates of your position location so the pilot can pick you up. To navigate from one location to another; for example, you need to travel from a lookout to the fire perimeter. To create digitized maps; for example, you are assigned to plot the fire perimeter and hot spots. To determine distance between two points or how far you are from another location.

ARCHITECTURE AND IMPLEMENTATION

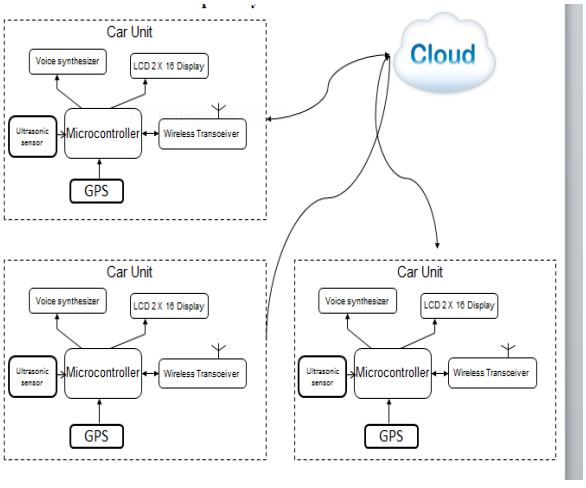

Fig 5 Architecture Proposed System

In the proposed system we are building a road and bump and dips monitoring system using sensors. The application of the system is tocollect road and bump and dips data, use it to produce valuable informationregarding road conditions to the$_{\text{cloud server}}$ and roadupcoming vehicles, to avoid the bumps hear we

ISSN: 0975-8585

proposed advance techniques such as GPS,ultrasonic sensor, Vibration sensors and it was interconnected with the cloud server is nothing but Internet of things.So that hearwe attaches a time and location tag to this event data, and sends it across to the web server for further processing.Due to automation it literally reduce the efforts taken by human. It gives the forecasting information about the affects to the end users.The car unit consists of microcontroller, GPS, ultrasonic sensor, voice synthesizer, LCD and wireless trans receiver.The ultrasonic sensor is to detect the humps and potholes in road as well as measure that obstacle.GPS (Global Positioning System) is to position the object.LCD is used for display purpose.Voice synthesizer is to produce the voice that to indicate about the presence potholes or humps.For trial a car is allowed to go on the road, if there is presence of potholes means the ultrasonic sensor will sense, measure the distance and get stored in cloud.Same in case of humps, the information is get stored in cloud.Hence, if another car uses that road means then the information about the presence of potholes and humps were given to the car through cloud via wireless trans receiver.The information of how much obstacle it founds are displayed in LCD and voice synthesizer to produce the voice to assure the presence of it.

EXPERIMENTAL RESULTS

The working model in the proposed system is used to avoid accidents and there by giving alert to drivers.And this model is tested by using 2 car unit and a testing car.And the information about the potholes and humps is passed from vehicle to vehicle and the potholes are detected and shown in a LCD screen.And a voice synthesizer gives alert to drivers.The whole setup is controlled by the cloud and the information is stored in the cloud.

Fig 6 Working model of proposed system

Thus the potholes information are stored in the cloud are shown in the below diagram:

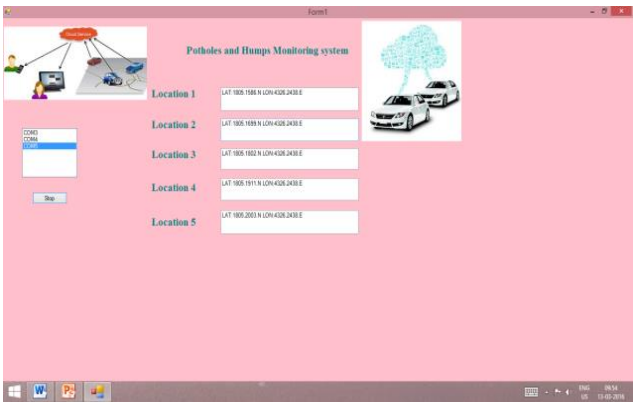

Fig 7 Front End Interface

ISSN: 0975-8585

I. TESTING AND VALIDATION:

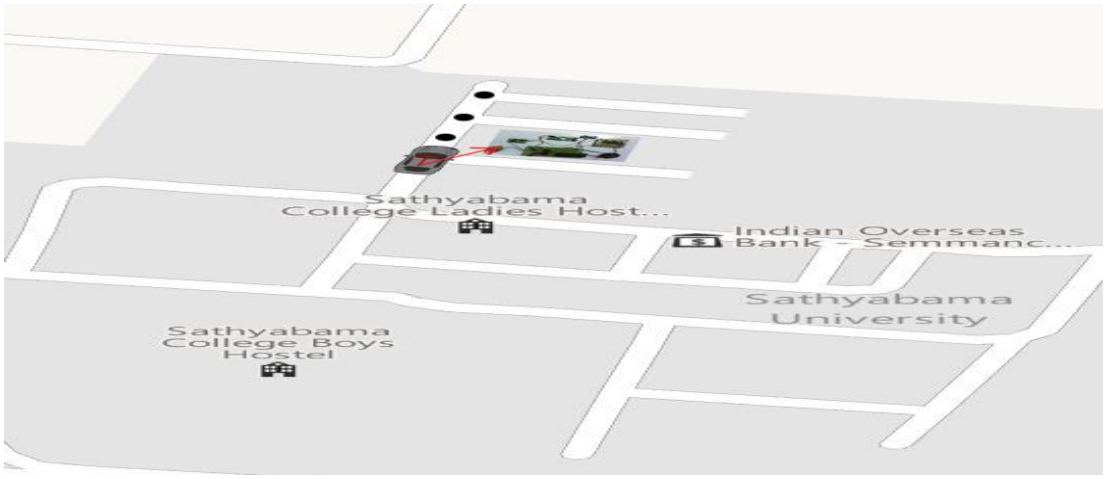

Fig 8 Sathyabama University Campus – Map

We have tested our project in Sathyabama campus by using a car.The kit is kept under the car and the potholes were detected using ultrasonic sensorsin the kit.The potholes were indicated in black dots and the potholes were detected before 100 metres and gives information the cloud and also gives alert to drivers using LCD display and voice synthesizer.And all the information are give to the cloud and with the help of that information we can avoid accidents and we are giving those information to the government.And thereby the government will the take necessary action to clear the potholes and makes the road smoother which is safer for the people to drive their vehicles on roads.

CONCLUSION AND FUTURE WORK

The model proposed in this paper serves 2 important purposes; cloud based detection of potholes and humps andalerting vehicle drivers to evade potential accidents. The proposed approach is an economic solution for detection of dreadful potholes and uneven humps, as it uses low cost ultrasonic sensors. The LCD display and voice synthesizer used in this system is an additional advantage as it provides timely alerts about potholes and humps. The solution also works in rainy season when potholes are filled with muddy water as alerts are generated using the information stored in the database. We feel that the solution provided in this paper can save many lives and ailing patients who suffer from tragic accidents. The proposed system considers the presence of potholes and humps. However, it does not consider the fact that potholes or humps get repaired by concerned authorities periodically. This system can be further improved to consider the above fact and update server database accordingly. Also we can implement this concept in upcoming new cars..

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