RESEARCH ARTICLE OPEN ACCESS

REVIEW PAPER ON VEHICAL TRACKING ,COLLISION DETECTION AND PARAMETER CONTROL USING RASPBERRY PI

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Abstract:

The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people under high risk. This is because of the lack of best emergency facility available in our country. This paper will help to provide location tracking and collisiom detection.It will also provide parameter control ,sending of image with the help of dash camera to rescue team. In this system having use of IOT concept. The data will be stor in cloud system. By this paper safty environment of transportation is possible.

Keywords — **Raspberry pi3 model B,GSM+GPS, Pi Camera, Accelerometer Module ADXL345,DS18b20 Waterproof temperature sensor.L293D Motor driver module.IOT.Accident detection. Parameter control. Tracking.Ultrasonic**

I. INTRODUCTION

In today's world as the population increases day by day the numbers of vehicles also increases on the roads and highways. This result in more accident that interns leads to the traffic jams and public get help instantaneously. This module provides information about the accident to the hospital and police station. As a result sudden help level of supervision and management for cargo transport vehicles, especially trucks carrying coal it is important to develop transport vehicles remote monitoring module [2].A server computer at the (remote) monitoring station, that is continuously waiting for data from the system, should record the actions of the vehicle into a database. This contains the information regarding Vehicle velocity, position, identity and temperature in two fashions. The information given to monitoring station is in continuous manner and when the accident occurs. The development of vehicular design brings public many convenience in life but also brings many problems at the same time, for example, traffic congestion, difficulty in monitoring dispersive vehicle, theft and other series of problems[4]. We are intended to made this monitoring wireless using RASPBERRY PI hardware platform ported with real time operating system Linux operating system.. II. THE HARDWARE SYSTEM Micro controller:This section forms the control unit of the whole project. This section basically consiThe high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people under high risk. This is because of the lack of best emergency facility available in our country. An automatic a

Alarm device for vehicle accidentt is introduced in here. The proposed design of the system which can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinates, the time help in saving the valuable life. Switch is

also provided in order to terminate the sending of massage in rare case. Where there no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert massage is sent automatically to the rescue team and to the police station. The massage is sent through the GSM with dash camera module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of accelerometer and ultrasonic sensor.

The raspberry pi will use for with Linux operating system and python language. For parameter control there are three parameter RPM sensor, Accelerometer with ultra violet rays, digital thermometer sensor GPS/GPRS/GRI with SIM 908, Dash camera. In the proposed work ultrasonic

sensors are employed to detect the motion of the object [10]. The sensor measures the distance between the object and vehicle and relays the information to the driver who can act accordingly in order to avoid collision. The sensors are implanted in such a way that it can efficiently detect objects in the front side as well as in the rear side of the vehicle. Mainly the ultrasonic sensors are incorporated to detect objects in blind zone [6] of the vehicles. The work is proposed by analysing the Indian road conditions [1] and densely populated areas which the main factors contributing to this theory. For example, when the vehicle is traversing through a narrow street the factors like population i.e. people moving around acts as an obstacle as well as stationary objects present on the path. These obstacles are alerted to the driver for easy navigation. Previously various obstacle detection system in automotive systems employed infrared sensors [7] widely as proximity sensor for obstacle avoidance. Since IR sensors have a non linear behaviour and its basic concept depends on the reflection from surrounding object, some error always creeps in thereby making it unsuitable for applications which demand acute precision. Thus these sensors are recommended only for short distance measurement up to 25 cm. The table image/vision technology used to detect the presence of pedestrian is a most challenging task. In this fast processing is quintessential to alert the driver as soon as possible. But the system using image/vision sensing technologies have some drawbacks. The system fails in unfriendly weather conditions like foggy, harsh and extreme rainy environment. Sometimes this system produces error in differentiating between shadows and pedestrian. This system requires high resolution cameras and implementation of such system is a difficult task as it produces error due to damping and vibrations of the vehicles. Recently ultrasonic sensors and downward looking radar sensors are used for obstacle detection system in automobiles. Obstacle detection techniques based on RADAR are used in advanced driver assistance systems due to its advantages in longer detection range and higher readability. But it has high implementation cost associated with it. Moreover measurements obtained from ultrasonic sensors are usually adulterated with vibrations which thereby depreciate the result. As a result of which image based obstacle detection technique is adopted here which is a cost effective methodology and consumes less power.

II] SYSTEM REQUARMENT

1] RASPBERRY PI3 MODEL B

Just recently, the Pi Foundation has approved and licensed The Stadium Group as a qualified builder of the Raspberry Pi 3 Model B. The Stadium Group has been building the Raspberry Pi branded power supplies for the Pi Foundation.for some time now

with great success. With The Stadium Group adding its capacity to Allied Electronics and RS Components supplicant; we can look forward to never running low on Raspberry Pi.

The Raspberry Pi Foundation is a registered educational charity (registration number 1129409) based in the UK. Their foundation's goal is to advance the education of adults and children, particularly in the field of computers, computer science, and related subjects. Raspberry Pi is a ARM based, credit-card sized computer that plugs into a monitor or TV, and uses a standard keyboard and mouse. It is a capable device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It is capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.

Features:

·Quad Core 1.2GHz Broad com BCM2837 64bit CPU

·1GB RAM

·BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board

·Full size HDMI

·40-pin extended GPIO

·4 USB 2 ports

·4 Pole stereo output and composite video port

·Full size HDMI

·CSI camera port for connecting a Raspberry Pi camera

·DSI display port for connecting a Raspberry Pi touch screen display

·Micro SD port for loading your operating system and storing data

·Upgraded switched Micro USB power source up to 2.5A.

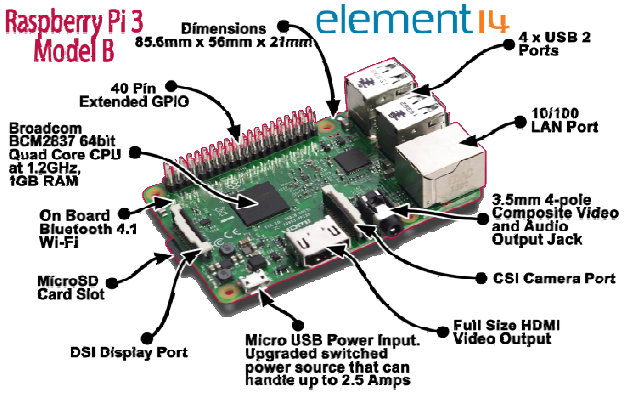

Fig. Raspberry pi3 model B

2] Accelerometer Module ADXL345

The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs .The product measure accelerometer with a minimum full-scale range of +3g. It can measure the static acceleration resulting from motion, shock, or vibration the user selects the bandwidth of the accelerometer using the Cx, Cy, and Cz capacitors at the Xout, Yout, and Zout pins. Bandwidths can be selected to suit the application ,with a range 0.5Hz to 1600Hz for the X and Y axes ,and a range of 0.5Hz to 550Hz for the Z axis .The ADXL335 is available in a small , low profile ,4mm x1.45mm ,16-lead ,plastic lead , frame chip scale package (LFCSP_LQ) .

Features:

3-axis sensing

Small, low profile package

4mm x4 mm x1.45 mm LFCSP

Low power:350 microampere (typical)

Single -supply operation: 1.8V to 3.6 V

10,000g shock survival

Excellent temperature stability BW adjustment with a single capacitor per axis BW adjustment with a single capacitor per axis

RoHS /WEEE lead -free compliantThe

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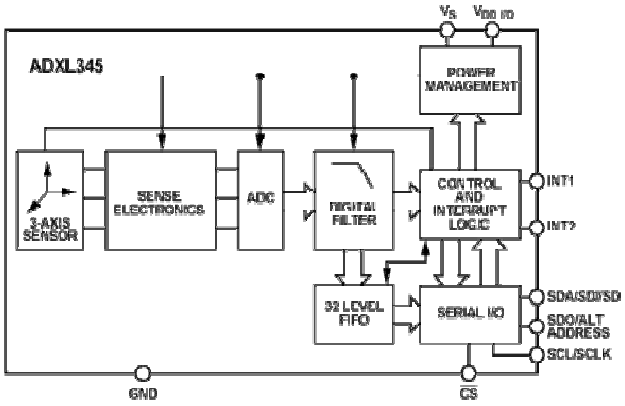


Fig.BlockdiagramofAccelerometerModule ADXL345

3] DS18B20 Water proof temperature sensor

The DS18B20 digital thermometer provides 9-bit to 12-bit Celsius temperature measurements and has an alarm function with non-volatile user-programmable upper and lower trigger points. The DS18B20 communicates over a 1-Wire bus that by definition requires only one data line (and ground) for communication with a central microprocessor. In addition, the DS18B20 can derive power directly from the data line ("parasite power"), eliminating the need for an external power supply. Each DS18B20 has a unique 64-bit serial code, which allows multiple DS18B20s to function on the same 1-Wire bus. Thus, it is simple to use one microprocessor to control many DS18B20s distributed over a large area. Applications that can benefit from this feature include HVAC environmental controls, temperature monitoring systems inside buildings, equipment, or achinery and process monitoring and control systems.

Features:

● Unique 1-Wire® Interface Requires Only One Port Pin for Communication ● Reduce Component Count with Integrated Temperature Sensor and EEPROM • Measures Temperatures from -55° C to +125° C (-67° F to +257° F) • ±0.5° C Accuracy from -10° C to +85° C • Programmable Resolution from 9 Bits to 12 Bits • No External Components Required ● Parasitic Power Mode Requires Only 2 Pins for Operation (DQ and GND) ● Simplifies Distributed Temperature-Sensing Applications with Multidrop Capability • Each Device Has a Unique 64-Bit Serial Code Stored in On-Board ROM ● Flexible User-Definable Non-volatile (NV) Alarm Settings with Alarm Search Command Identifies Devices with Temperatures Outside Programmed Limits ● Available in 8-Pin SO (150 mils), 8-Pin µSOP, and3-Pin TO-92 Package.

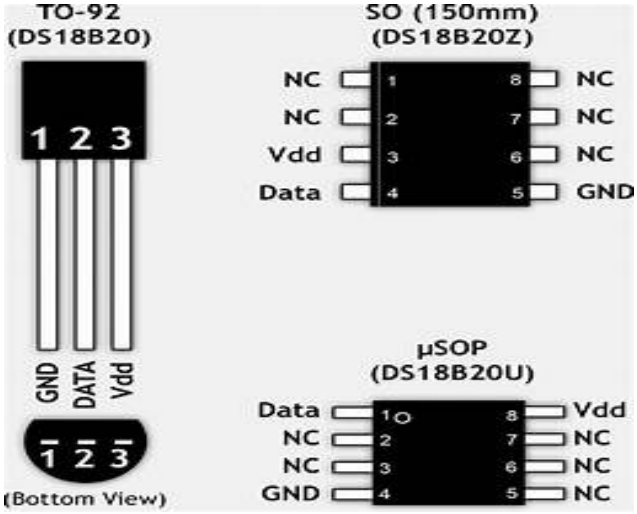


Fig. Pin diagram of temperature sensor

4] 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,By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object. Since it is known that sound travels through air at about 344 m/s (1129 ft/s), you can take the time for the sound wave to return and multiply it by 344 meters (or 1129 feet) to find the total round-trip distance of the sound wave. Round-trip means that the sound wave travelled 2 times the distance to the small to reflect enough of the sound wave back to the sensor to be detected. Other objects can absorb the sound wave all together (cloth, carpeting, etc), which means that there is no way for the sensor to detect them accurately. These are important factors to consider when designing and

$$distance = \frac{speed\ of\ sound \times time\ taken}{2}$$

SS

which means that there is no way for the sensor to detect them accurately. These are important factors to consider when designing and programming a robot using an ultrasonic sensor.

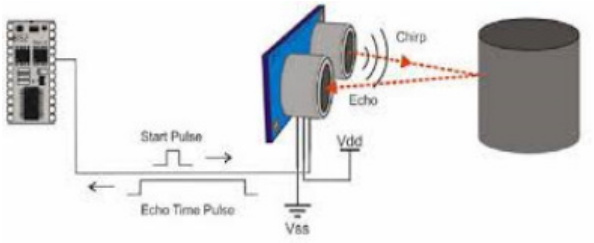


Fig. Distance Measurement

Fig. Ultrasonic sensor

4] GSM+GPS

SIM808 module is a Quad band GSM, Glossiness GPS, Bluetooth three-in-one function module. It is based on the latest GSM/GPS module SIM808 from SIMCOM, supports GSM/GPRS Quad-Band network and combines GPS technology for satellite navigation. The module is controlled by AT command via UART and supports 3.3V and 5V logical level. Note: We are selling the new version now. Please note that the new version ones will use new AT Command for GPS function, and use new library.

Quadband GSm850/900/1800/1900MHz, GPRS multi-slot class12 connectivity: max. 85.6kbps (down-load/up-load), GPRS mobile station class B, Controlled by AT Command (3GPP TS 27.007, 27.005 and SIMCOM enhanced AT Commands) . Supply voltage range 3.4V to 12v DC Integrated GPS/GNSS and supports A-GPS Integrated Bluetooth Function Supports 3.0V to

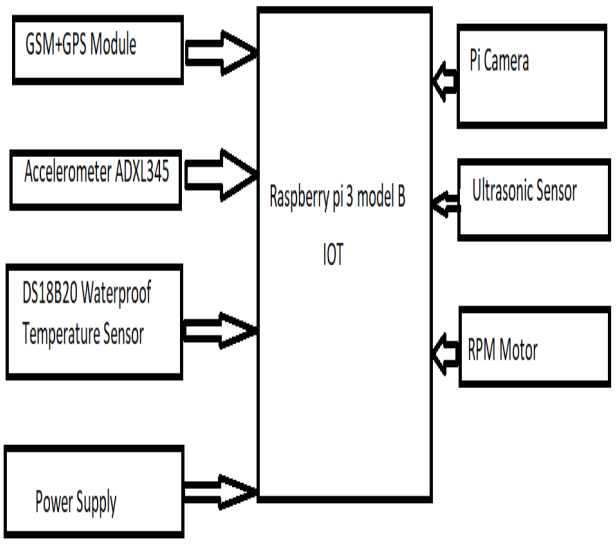
5.0V logic level Low power consumption, 1mA in sleep mode Supports GPS NMEA protocol Standard SIM Card Electronic Characteristics GPS Antenna: this is an SMA GPS antenna connector. You can connect either passive or active GPS antenna to it. Active GPS antenna runs at 2.8V voltage. It does not have power button, once the module plug with DC supply, automatically it will turn on... • Net Indicator: Blue LED, it will tell the status is about the module linking to network. • Status Indicator: Green LED, it will tell whether the module is on, light when the module is running. • GSM Antenna: this is an SMA GSM antenna connector; just connect it to a GSM antenna for receiving GSM signal. • SIM - Card Holder: SIM card holder for standard SIM card. If you use a 5V micro-controller like Arduino, you should have it be 5V, and a 3V logic micro-controller you should set it to 3V.

Fig.GSM+GPS Module

I III] RELATED WORK

1] HARDWARE DISIGN

Hardware system consists of following components shown in below. This system consists GSM+GPS for location tracking. In this system consist raspberry pi as hardware in which Linux software has used. In this system RPM motor used for measurement speed of speed of car motor. Waterproof sensor will detect temperature of car engine. Accelerometer sensor is used for accident detection. Ultrasonic sensor is used for obstacle detection .In this system pi camera has used for capturing of images.



2] SOFTWARE DESIGN

In this system Linux operating system has used in which python language has used. This system has totally depend on internet of thing. In this system data will be stored on cloud system. Linux (/ˈlɪnəks/ (listen) LIN-əks)[9][10] is a family of free and open-source software operating systemsThings (IoT) is turning out to be an emerging discussion in the field of research and practical implementation in the recent years. IoT is a mod operating systems built around the Linux kernel. Typically, Linux is packaged in a form known as a Linux distribution (or distort for short) for both desktop and server use. The defining component of a Linux distribution is the Linux kernel,[11] an operating system kernel first released on September 17, 1991, by Linus Torvalds.[12][13][14]

Linux was originally developed for personal computers based on the Intel x86 architecture, but has since been ported to moreplatforms than any other operating system.[15] Because of the dominance of the Linux kernel-based Android OS

on smart phones, Linux has the largest installed base of all general-purpose operating systems.[16] Linux is also the leading operating system conservers and other big iron systems such as mainframe computers, and the only OS used on TOP500 supercomputers (since November 2017, having before gradually eliminated all competitors).[17][18] It is used by around 2.3% of desktop computers.[19][20] TheChromebook, which runs the Linux kernel-based Chrome OS, dominates the US K–12 education market and represents nearly 20% of the sub-$300 notebook sales in the US.[21] Linux also runs on embedded systems—devices whose operating system is typically built into the firmware and is highly tailored to the system. This includes TiVo and similar DVR devices, network routers, facility automation controls, televisions,[22][23] video game consoles and smartwatches.[24] Many smart phones and tablet computers run Android and other Linux derivatives.[25]

The development of Linux is one of the most prominent examples of free and open-source software collaboration. The underlyingsource code may be used, modified and distributed—commercially commercially—by anyone under the terms of its respective licenses, such as the GNU General Public License.

Some of the most popular and mainstream Linux distributions[26][27][28] are Arch Linux, Centos, Debi an, Fedora, Gentoo Linux, Linux Mint, Mageia, openSUSE and Ubuntu, together with commercial distributions such as Red Hat Enterprise Linux and SUSE Linux Enterprise Server. Distributions include the Linux kernel, supporting utilities and libraries, many of which are provided by the GNU Project, and usually a large amount of application software to fulfill the distribution's intended use. Desktop Linux distributions include a windowing system, such as X11, Mir or a Wayland implementation, and an accompanying desktop environment such as GNOME orKDE Plasma; some distributions may also include a less resource-intensive desktop, such as LXDE or Xfce. Distributions intended to run on servers may omit all graphical environments from the standard install, and instead include other software to set up and operate a solution stack such as LAMP. Because Linux is freely redistributable, anyone may create a distribution for any intended use. Many Linux distributions use the word "Linux" in their name. The Free Software Foundation uses the name "GNU/Linux" to refer to the operating system family, as well as specific distributions, to emphasize that most Linux distributions are not just the Linux kernel, and that they have in common not only the kernel, but also numerous utilities and libraries, a large proportion of which are from the GNU project. This has led to some controversy.[2 Python is an interpreted high-level programming language forgeneral-purpose programming. Created by Guido van Rossum and first released or nonel that incorporates customary entities 1991, Python has a design philosophy that emphasizes code readability, and a syntax that allows programmers to express concepts in fewer lines of code,[26][27] notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales.[28]

Python features a dynamic type system and automaticmemory management. It supports multiple programming paradigms, includingobject-oriented, imperative, functional and procedural, and has a large and comprehensive standard library.[29]

Python interpreters are available for manyoperating systems. CPython, the reference implementation of Python, is open sourcesoftware[30] and has a community-based development model, as do nearly all of its variant implementations. Python is managed by the non-profit Python Software Foundation.

IV] MATHODOLOGY

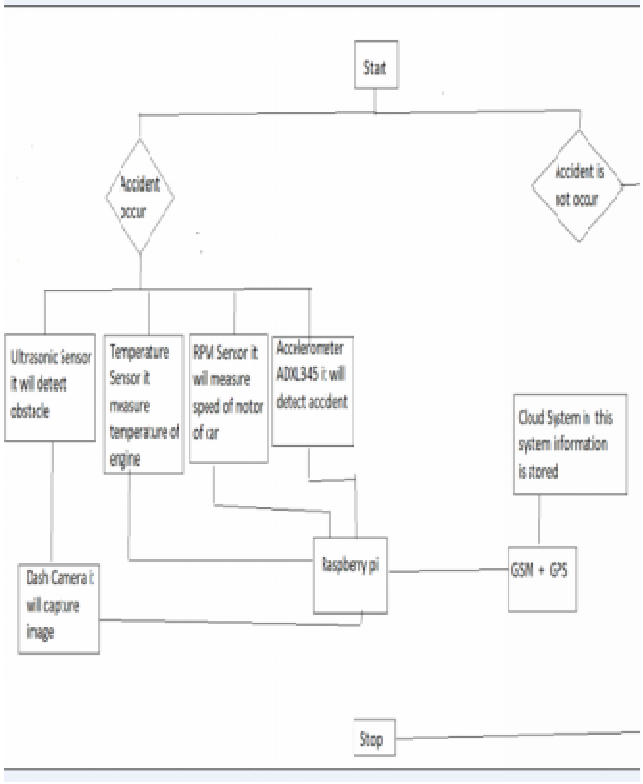


Fig. Flowchart

V] CONCLUSIONS

Thus our proposed system provided the better accident prevention system and also the most reliable accident detection method. The above figure depicts the comparison between the existing system and the implemented prototype. In this prototype the speed of the dc motor can be controlled with the help of dc motor drive and the information could be effectively delivered to the predefined numbers. Thus the paper proposes an approach for effectively designing user-friendly driver vigilance application especially target at preventing accidents. This paper aims to design an advanced driver safety awareness and assistance system that will monitor the driver and command the vehicle to take vital safety measures in order to overcome the serious problems.

VI] ACKNOWLEDGMENT

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