WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

IoT Based Accident Detection System

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ABSTRACT:

Population growth drives innovation in transportation, which in turn causes an increase in the frequency and severity of accidents. Due to the lack of crisis administrations, many lives are lost. Thus, the goal of this endeavour is to provide emergency services to those who need them as soon as possible after an accident. When an accident occurs, the accelerometer immediately communicates its findings to the Arduino, and the Arduino then sends the alarm message via the Internet of Things (IoT) to predetermined emergency contacts. If the incident is minor, the driver can deactivate the alarm by pressing a key. Within this paper, we cover a wide range of applications, from drink recognition and sleep discovery to emergency aid.

INTRODUCTION:

According to ASIRT (Association for Safe International Road Travel), approximately 1.3 million people die each year from road accidents and 20 to 50 million are injured on the roads. Nearly 2% of each country's annual GDP (Gross Domestic Product) is dedicated to road accidents. Road accidents are the ninth leading cause of death in the world and almost 2.2% of the world's deaths are due to road accidents [1], and other organizations, such as the World Health Organization, have reported similar statistics, too [2]. On the other hand, road traffic is one of the biggest problems that has a negative impact on the daily lives of people around the world, and puts pressure on people in different ways. One of the biggest causes of heavy traffic is road accidents [3, 4]. In the presented papers, the purpose is to use various technologies, especially Internet of Things (IoT), to immediately detect the accident and report it to the elegant authorities such as the police, medical emergencies, and road maintenance and transportation organization. Emerging NGN (Next Generation Networks) [5] and technology advancements, especially in the field of IoT and cloud computing, have made many unimaginable science-fiction concepts and theories into reality. The use of these new technologies in this significant field is of great importance [3, 6]. Many researches have been done on smart accident detection systems, like [7] in which the researcher uses a mobile accelerometer to predict the occurrence of an accident. In urban areas accidents are occurs frequently. On that time this smart IoT based Accident Detection System plays a crucial role.

Today, communication devices are in every car. Sonika proposed a design in [8] that explores ways for an ambulance to get more quickly to the scene of the accident. In [9], a method has been proposed in which a variety of IoT-enabled communications and electronic devices are used, which can monitor sensors used in the wireless sensor network to detect accidents. This method utilizes machine-to-machine (M2M) technology where decisions are made without human intervention. An informing system using IEEE 802.15.2 standard ZigBee protocol and the machine-to-machine (M2M) technology in [7] has been presented that enables us to reuse resources and get to the person in need as fast as possible by sending data to the cloud or another M2M network user. There are many research problems in this area and many projects have not been widely implemented yet. But much progress has been made in testing and implementing these systems.

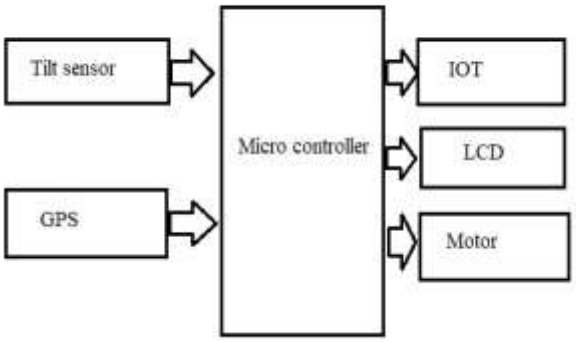

Fig. Block Diagram

Vehicle location and health detection accuracy is the primary focus of vehicle trajectory monitoring systems. & also Rising car ownership rates have contributed to an increase in both traffic congestion and vehicular accidents. Unfortunately, this is because our country does not have access to world-class emergency care facilities. This system's design makes it possible to detect accidents in a lot less time, and for the most essential data, including location, time, and angle of impact, to be transmitted to a first aid centre in a matter of seconds. In a short amount of time, the rescue team will receive this urgent message, which will help save precious lives. Embedded applications, geolocation services, and wireless networking are just a few of the hybrid methods used to realise these systems. This project will enable two-way communication between a central hub and each vehicle-mounted unit. The vehicles will be equipped with GPS and GSM tracking modules that will allow for real-time monitoring via cellular networks. The microcontroller's software will regulate the machine's functions based on readings from the vibration detector. In the event of an incident, the gadget will send a message to the control station via the GSM network, including its precise location as determined by the GPS module. It's a thorough and efficient answer to the problem of inadequate emergency response. In the event of a traffic accident, the reporting system is able to automatically locate the scene, conduct a search, and transmit the incident's basic details to the responding rescue agency, including its location, the time, and any contributing factors. Data of interest will be culled by a command function on the server side.

Node MCU

The Internet of Things (IoT) has been a trending field in the world of technology. It has changed the way we work. Physical objects and the digital world are connected now more than ever. Keeping this in mind, Expressive Systems (A Shanghai-based Semiconductor Company) has released an adorable, bite-sized Wi-Fi enabled microcontroller – **ESP8266**, at an unbelievable price! For less than $3, it can monitor and control things from anywhere in the world – **perfect for just about any IoT project**.

The ESP8266 Node MCU has total 30 pins that interface it to the outside world. The connections are as follows:

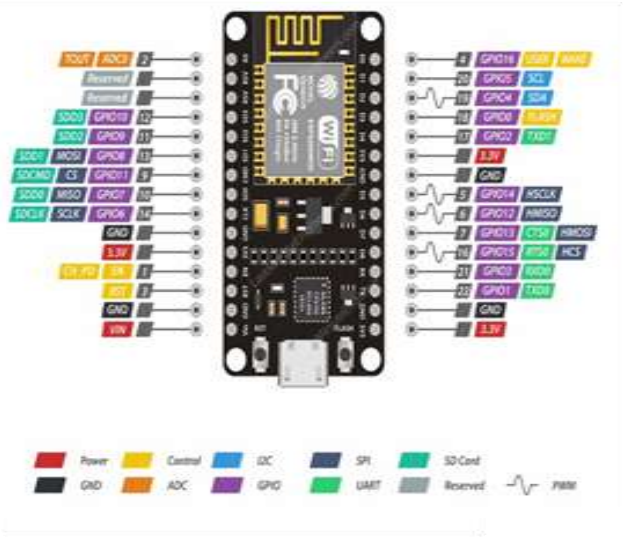

Fig. Node MCU

Power Pins There are four power pins viz. one VIN pin & three 3.3V pins. The VIN pin can be used to directly supply the ESP8266 and its peripherals, if you have a regulated 5V voltage source. The 3.3V pins are the output of an on-board voltage regulator. These pins can be used to supply power to external components.

GND is a ground pin of ESP8266 Node MCU development board.

I2C Pins are used to hook up all sorts of I2C sensors and peripherals in your project. Both I2C Master and I2C Slave are supported. I2C interface functionality can be realized programmatically, and the clock frequency is 100 kHz at a maximum. It should be noted that I2C clock frequency should be higher than the slowest clock frequency of the slave device.

GPIO Pins ESP8266 Node MCU has 17 GPIO pins which can be assigned to various functions such as I2C, I2S, UART, PWM, IR Remote Control, LED Light and Button programmatically. Each digital enabled GPIO can be configured to internal pull-up or pull-down, or set to high impedance. When configured as an input, it can also be set to edge-trigger or level-trigger to generate CPU interrupts.

LIQUID CRYSTAL DISPLAY (LCD)

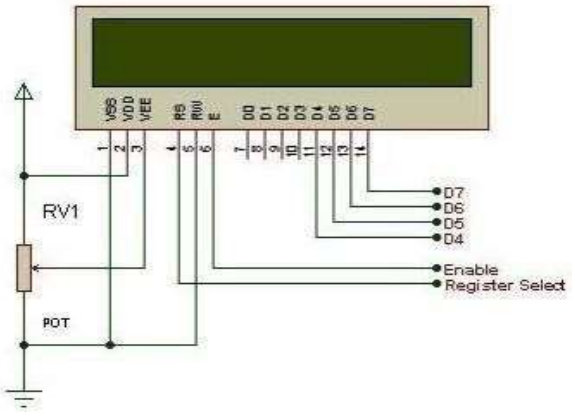

Fig. LCD

Depending on how many lines are used for connection to the microcontroller, there are 8-bit and 4bit LCD modes. The appropriate mode is determined at the beginning of the process in a phase called

"initialization". In the first case, the data are transferred through outputs D0-D7 as it has been already explained. In case of 4-bit LED mode, for the sake of saving valuable I/O pins of the microcontroller, there are only 4 higher bits (D4-D7) used for communication, while other may be left unconnected.

Consequently, each data is sent to LCD in two steps: four higher bits are sent first (that normally would be sent through lines D4-D7), four lower bits are sent afterwards. With the help of initialization, LCD will correctly connect and interpret each data received. Besides, with regards to the fact that data are rarely read from LCD (data mainly are transferred from microcontroller to LCD) one more I/O pin may be saved by simple connecting R/W pin to the Ground. Such saving has its price. Even though message displaying will be normally performed, it will not be possible to read from busy flag since it is not possible to read from display.

Motor

An electric motor is a device used to convert electrical energy into mechanical energy. Scientifically speaking, the electric motor is a unit used to convert electric power into motive energy or electrical energy into mechanical energy.

Fig. Motor

GPS

The Global Positioning System (GPS) is a satellite-based navigation system that provides location and time information. The system is freely accessible to anyone with a GPS receiver and unobstructed line of sight to at least four of GPS satellites. A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites GPS is nowadays widely used and also has become an integral part of smart phones.

RESULT:

Fig. Working Condition

CONCLUSION:

This system was proposed to increment in population is the significant purpose behind quick development of innovation and vehicles, which is additionally liable for some number of mishaps in this quick moving world. Numerous passing is caused because of absence of crisis administrations. Along these lines, in this undertaking we intend to give crisis administrations to the individual who meet with a mishap as quickly as time permits. At the point when a vehicle meets with a mishap, promptly the accelerometer sends varieties to the Arduino and subsequently the Arduino sends the alarm message through the GSM MODULE, including the area which is distinguished by GPS MODULE to recently spared crisis contacts. In the event that the mishap is not serious, at that point the alarm message can be ended by the driver by a key gave. This paper points in giving crisis benefits as quickly as time permits for future extension, we include numerous applications like liquor recognition and rest discovery and so forth.

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