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Vehicle safety management and email alert system using Raspberry pi

G.Sivakeerthi[1], P.Karthik[2], D.Pavankumar[3], L.Veerareddy[4], A.Anasuyamma[5]

student[1,2,3,4],Assistant professor[5]

Electronics and Communication Engineering

Audisankara College of Engineering & Technology, Gudur, A.P, India.

ABSTRACT:

Safety is primary concern everywhere and for everyone. Every person wants his to be secured while travelling. This project describes a system that can monitor a vehicle and driver. This is a simple and useful security system and easy to install. Here our application uses Raspberry Pi as its controller and heart beat sensor is interfaced to verify the driver's heart rate. In case of abnormal condition the vehicle will stop to avoid further damage. This module is employed as a precautionary measure.Vibration sensors are also connected to identify accident and the location details will be updated using IoT module.

Keywords:Fire Sensor,Vibration Sensor,

RASPBERRY PI,Buzzer,LCD.

INTRODUCTION

Recently, traffic on roads has been increasing rapidly a result of which it is becoming extremely difficult to manage vehicles in terms of traffic management, vehicle theft, and accidents. According to Mansell, one in every 42 vehicles in the United States is stolen estimating a loss of over $9 billion per annum. Several tools and techniques are used to minimize the probability of such incidents while preserving the safety of the people involved. Vehicle tracking is an old concept and has been implemented across the globe for tracking stolen vehicles or sometimes for personal safety. Several methods have been proposed and implemented worldwide to overcome these issues. However, the cost of these solutions varies and is dependent on the technology used.

The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. An automatic alarm device for vehicle accidents is introduced in this paper. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid centre within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the

accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM 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 both Micro electro mechanical system (MEMS) sensor and vibration sensor. The Angle of the rolls over of the car can also be known by the message through the MEMS sensor. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way. The usage of auto mobiles has improved linearly over the past decade, which increased in the risk of human life. This is because due to the insufficient emergency facilities.

2. LITERATURE REVIEW

During 1969 on the Hanshin expressway a Traffic control system was adopted to maintain a smooth traffic flow and to ensure comfortable, efficient transportation & safety. The developed system has Four Television Cameras at a curved area in expressway where frequent accidents occurs and to experiment whether accidents can be detected using the images obtained from these cameras [1].Cargo transport vehicles plays a vital role in every Countries supply chain & economy. A dynamic monitoring system is designed using embedded controllers for achieving real time data acquisition, transmission and analysis [2].Speed being the vital reason for accidents & the proposed system monitors the speed of the vehicle using GSM technology effectively with send the location of the incident [3].A new type of automatic alarming device discusses about the detection algorithm for detecting occurrence of an accident. It also elaborates on accident detection and judging the crash types by checking the authenticity of the alert signals [4]. A hardware system was built to monitor the electric vehicle to avoid theft and traffic accidents issues using Internet of Things [5].A system is developed using Android based application which detects an accident situation and send alert message to the nearest Police station and Hospital. The application is designed to obtain the outward force of the vehicle body. The proposed application hopes to reduce the false alarm rate [6].The proposed system discusses about the methods to identify whether a person is in drunken state or not using sensor and also to determine the status of a vehicle is met with an accident or not by continuous monitoring to reduce accidents [7]. The current exponential traffic growth becomes the real challenge in real monitoring of vehicles and its safety. Various latest techniques in safety of passenger such as Airbags, ABS, Automatic braking and EBD assist in safety in travel. The proposed system detects and intimates on accident immediately to the emergency services [8, 12].Accident is detected by Embedded technology using accelerometer sensor and the location of the vehicle is determines by android technology [9].A low cost system is discussed to detect the crash and intimate the vehicle location to an emergency medical services for reduction in fatalities [10].Real time monitoring of vehicle is done by the proposed design of Information Collection system. It collects and process the information such as speed, lights and braking system of vehicle [11, 13,14].

EXISTING SYSTEM:

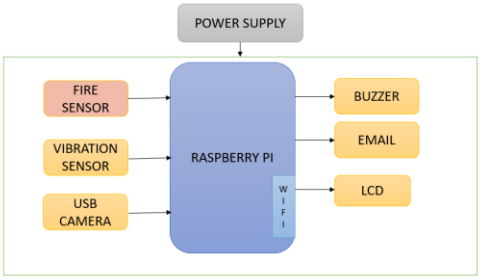
At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking the position of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In this project GPS is used for tracking the position of the vehicle, GSM is used for sending the message and the ARM controller is used for saving the mobile number in the EEPROM and sends the message to it when an accident has been detected. From the past event and the existing approach the below Drawback are been noted: 1. Manual system is adopted. 2. Tracking of accident is a crucial process in the system. 3. Required medical attention cannot be given to the needed person. 4. Life loss and property loss were not stopped in large scale. Considering all the drawbacks into account we have formulated a proposed system which covers all the above mentioned drawbacks.

PROPOSED SYSTEM:

In our proposed system, the retrieval of location of accident through GPS involves the understanding of image processing, GPS system and Raspberry Pi and cloud. Raspberry pi is a small single board computer, which is in a size of a credit card that can be connected to any external electronic device for multiple purposes. In this the raspberry pi process the image of the scene if there is any accident occurs in the road then the raspberry pi process and detect the accident. Then it send the alert to ambulance service with the location. The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world.An image will

be captured and sent to the authorized one through mail after accident occurred.

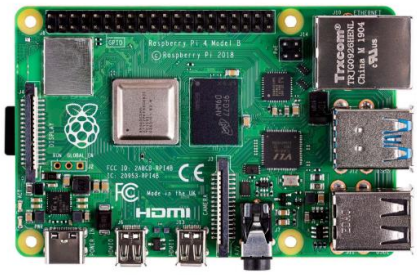
BLOCK DIAGRAM:



HARDWARE DECRIPTION:

RASPBERRY PI

Raspberry Pi 4 Model B is the latest product in the popular Raspberry Pi range of computers. It offers ground-breaking increases in processor speed, multimedia performance, memory, and connectivity compared to the prior-generation Raspberry Pi 3 Model B+, while retaining backwards compatibility and similar power consumption. For the end user, Raspberry Pi 4 Model B provides desktop performance comparable to entry-level x86 PC systems. This product's key features include a high-performance 64-bit quad-core processor, dual-display support at resolutions up to 4K via a pair of micro-HDMI ports, hardware video decode at up to 4Kp60, up to 4GB of RAM, dual-band 2.4/5.0 GHz wireless LAN, Bluetooth 5.0, Gigabit Ethernet, USB 3.0, and PoE capability (via a separate PoE HAT add-on). The dual-band wireless LAN and Bluetooth have modular compliance certification, allowing the board to be designed into end products with significantly reduced compliance testing, improving both cost and time to market.



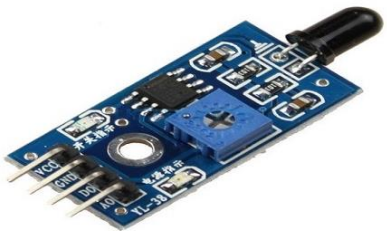
USB CAMERA

A digital digicam is an optical device that records photographs that may be saved directly, transmitted to another location, or both. These photographs can be still photographs or shifting photographs such as videos or movies. The term digital digicam comes from the word digital digicam obscura(Latin for "darkish chamber"), an early mechanism for projecting photographs. The current digital digicam developed from the digital digicam obscura. The functioning of the digital digicam may be very just like the functioning of the human eye.

Fig. USB Camera

FIRE SENSOR:

A flame-sensor is one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a fire or flame. The flame detection response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression system. This sensor is used in industrial boilers. The main function of this is to give authentication whether the boiler is properly working or not. The response of these sensors is faster as well as more accurate compare with a heat/smoke detector because of its mechanism while detecting the flame.



TILT SENSOR :

The Tilt Sensor Vibration Alarm Vibration Switch Module for Arduino come with the basic components for operation. Supplying power and it is good to be used. Attach it to object and it will detect whether the object is tilt. Simple usage as it is the digital output, so you will know the object is tilt or not by reading the output.
It uses SW-460D or SW-520D tilt sensor. The Tilt Sensor is the ball rolling type, NOT Mercury type. Comes with an M3 mounting hole for ease of attaching it to an object. Onboard, it provides a tilt switch, high sensitivity and commonly being used for tilt detection. The module comes with a power LED and status LED for the visual indicator.

RESULTS:

CONCLUSION:

Uncertainty exists in future of road safety and it is not same across various countries in globe. Countries should approach towards mature road safety approach for minimizing the deaths in road accidents. Vehicle Accident Detection & Alert Messaging can overcome the drawbacks of currently existing system. It is a very useful application which helps to know when a person met with accident. The system implementation mainly concentrates on accident detection and thereby alerting them by sending messages to the assigned numbers. Details such as Location, Image of the driver and Temperature of the vehicle will be included in the E-mail & SMS.In future enhancement of the prototype, the GPS coordinates of the accident location can be sent to nearest hospital and police station too.

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