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Accident Detection and Alert System using IoT

Kiran Jaware, Shubham Shirole, Roshan, Jadhav, Prof.S.Y.Mandlik, Prof.S.K.Said

Department of Computer, Jaihind College of Engineering, Kuran, India

Master in Computer Engineering, Jaihind College of Engineering, Kuran, India

Assistant Professor, Jaihind College of Engineering, Kuran, India

ABSTRACT: The main obstacle on the road is seen to be caused by excessive traffic flow during peak hours, particularly when people are commuting to work. The entire number of cars or items exceeds it's carrying capacity, obstructing emergency vehicles like fire trucks and rescue vehicles. In addition, fuel waste increases environmental pollution, which is unsuitable for a nation's economic development. The road transportation system must be as automated as possible if it is to evolve into one that is trustworthy, dependable, cleaner, and safer. We must activate the GSM device so that we may transmit the message in order to track the vehicle. Additionally, it is triggered by the raspberry pi controller's vibration sensor picking up an accident. When the GSM is turned on, it receives the most recent positional data (latitude and longitude) and sends a message to the program's specified emergency server. The image processing technique recognizes a person's face and, via an alarm, indicates who that person is.

KEYWORDS: Car Accident Detection, GPS, GSM, raspberry pi, controller, road transportation etc.

I. INTRODUCTION

One of the primary causes of fatalities is traffic accidents. The amount of time between the accident and the arrival of an emergency medical institution at the scene is a key element in the post-accident survival rates. More lives can be saved by lowering mortality rates by shortening the distance between the accident and the arrival of medical assistance. Using Accident Detection Using Raspberry Pi, which alerts if the accident occurred and promptly notifies the emergency personnel, is one way to end that wait. The system is detailed, with its primary use being to identify accidents using vibration sensors and send alert messages to the appropriate locations. The location of the collision, the amount of alcohol consumed, the seat belt usage, the speed, and the number of passengers are all included in the alert message. Initially, this system uses GPS to continuously record latitude and longitude values from satellite input. We must activate the GSM device so that we may transmit the message in order to track the vehicle. Additionally, it is triggered by the raspberry pi controller's vibration sensor picking up an accident. After activation, the GSM obtains the most recent latitude and longitude position value.

II. PROBLEM DEFINITION

An enormous rise in the quantity of physical items or cars on the road is caused by the population boom. As a result of extremely heavy traffic, the number of traffic accidents rises. In this study, the computer vision paradigm is used to monitor traffic flow. Photos or a succession of images improve the road perspective. This research study uses the camera module of the Raspberry Pi coupled with the Raspberry Pi 3 for traffic management in order to detect vehicles, monitor, and estimate traffic flow using low cost electrical devices. Additionally, it plans to create a remote access system utilising a Raspberry Pi that will only detect, track, and count vehicles when certain variations in the monitored region occur. To compute data and communicate a compressed video stream for a video-based solution that is mostly written in Python programming, the suggested system captures video streams like those from moving cars in the monitored area. The suggested approach is regarded as an affordable option for sectors where cost-effective solutions are provided.

III. SCOPE

1. Transportation is crucial to our daily lives, and it has helped to simplify many of our tasks through development. The use of GPS-based IoT-based vehicle accident detection systems has gained popularity. Latitude and longitude values are provided in the message. These values can be used to pinpoint the accident's location.
2. With the use of a method to prevent accidents, this system can be further applied. To recognise and prevent accidents before they happen. In order to record the events and determine the cause of the catastrophe, we can also include a camera that could act as a black box, similar to the one in an aeroplane. If the person operating the car has consumed alcohol, the vehicle can be halted by sounding an alert.
3. The sensors are used to monitor physiological characteristics like heart rate and alcohol percentage while the image processing approach analyses face emotions. You achieve an accuracy of x in a picture test training with a response time of x seconds. However, the sensors' performance was evaluated to be 90% effective. The method created is therefore practical and efficient. and it uses alarm to detect.

IV. OBJECTIVES

1. We can keep an eye on the car's speed.
2. We can locate the car's position.
3. A mobile phone alert message for remote information

V. RELATED WORK

Prachiet al. [3]presented a prototype for an intelligent accident-detection and ambulance rescue system that consists of a sensor, a GPS unit, and a GSM phone. The system, which is installed in the car, may recognise an accident and relay the location of the accident to the primary worker unit, which has a database with information on all of the nearby medical facilities. An emergency vehicle is sent to the scene of the accident to transport the patient to the clinic while also checking vital signs like temperature and cardiac rate and sending those results to the appropriate medical facility. presented a prototype for an intelligent accident-detection and ambulance rescue system that consists of a sensor, a GPS unit, and a GSM phone. The system, which is installed in the car, may recognise an accident and relay the location of the accident to the primary worker unit, which has a database with information on all of the nearby medical facilities. An emergency vehicle is sent to the scene of the accident to transport the patient to the clinic while also checking vital signs like temperature and cardiac rate and sending those results to the appropriate medical facility. Pachipala Yellamma et.al In this regard, the suggested model combines an Arduino UNO R3 microcontroller, a GPS receiver (GY6MV2), and a GSM module (SIM 800L). Additionally, GPS GY6MV2 is used to determine the longitude and area of the accident. The GSM module SIM 800L is used to send SMS messages informing the recipient of the accident's kind and providing the accident's location through Google Maps. The ADXL335 MEMS Accelerometer sensor records the vehicle's X and Y coordinates. Additionally, messages, the scope, and longitude of the accident site are displayed on a 16x2 LCD screen. Hari Chandan T. et.alAn ultrasonic sensor, an Arduino UNO, a potentiometer, a CAN controller, a DC motor, a GSM module, an LCD display, and a buzzer make up this system. If a specific vehicle is close to the vehicle in front, the suggested system automatically adjusts the vehicle speed. The ultrasonic sensor identifies the object or vehicle ahead of the car and provides the data to Arduino UNO. This system also includes an over-speed detection feature that monitors speed and notifies the driver if the car exceeds a certain speed limit. Additionally, the proposed system would send an SMS alert to the cellphone of the concerned person at the taxi company or car rental agency if the driver exceeded the speed limit. Aakash Choudhury et.al. The purpose of this paper is to offer a solution to this issue by allowing prompt and appropriate communication to the involved employees so that appropriate medical assistance may reach the accident site soon. It uses an accelerometer to detect the accident, a heart rate sensor to monitor the driver's heart rate, a GPS module to determine the location of the accident, and a GSM module to send an SMS to the closest hospital, nearest police station, and a relative of the concerned driver with a link to the location and heart rate of the driver. The Arduino Uno serves as the brain of the device. This will guarantee that medical help arrives as soon as possible, improving the victim's chances of surviving.
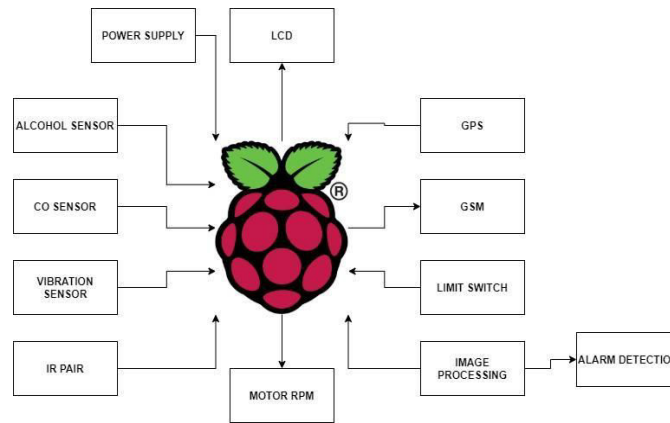
VI. SYSTEM ARCHITECTURE

Fig: - System Architecture

The strong demand for vehicles has also led to an increase in traffic congestion and auto accidents. The majority of traffic accidents outside of cities are caused by intoxicated driving rather than irresponsible driving on the part of drivers. In addition to drunk driving, rude driving without seat belts also claims lives. The public's life is in grave danger as a result. The absence of the best emergency facilities in our nation is the cause of this. This paper introduces an automatic alert system that provides the most accident-related information. The proposed system can identify accidents in a short amount of time and sends information to the emergency centre in a matter of seconds. This information includes the precise location of the accident as well as details on the speed, blood alcohol content, whether or not the driver was wearing a seat belt, and the number of passengers in the car. This alert message has been sent to the emergency server, which will notify the ambulance, the local police station, as well as the insurance office, helping to save the lives of those who need it most. In the unlikely event that there are no casualties, a switch is also available close to the driver's seat to stop the message from being sent. This can help save the ambulance and police departments' valuable time. The alert message is automatically sent to an emergency server when an accident occurs.

VII. COMPONENTS DETAILS

1.   Raspberry Pi

The Raspberry Pi is a line of single-board computers the size of a credit card created in the UK by the Raspberry Pi Foundation to support the teaching of fundamental computer science in schools. The last upgrade to the original Raspberry Pi is the Model B+. Model B was superseded by it.
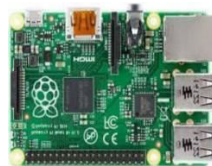

Fig. 2 Raspberry Pi

2.   Alcohol Sensor

An alcohol sensor can determine whether alcohol is present. An analogue voltage and gas in the atmosphere are output readings. The sensor can turn on power supply with the less than 150 Mah to 5V and temperatures between -8 and 50° C. The micro controller is connected to an alcohol sensor (MQ3) that measures the air's alcohol content. It provides digital data in the form of input to the controller.

Fig. 3 Alcohol Senor

3. GSM

GSM transmits the SMS to the parent of the associated student using AT instructions. Any GSM network operator SIM card can be used with the GS Modem, which functions exactly like a mobile phone and has a separate phone number. Benefits of utilising this modem include Note that you can converse and create embedded applications via its RS232 connection. Additionally, it may be used in GPRS mode to access the internet and perform numerous applications for data logging and management. applications for data transfer, SMS control,

There is potential for remote control and logging. The European Telecommunications Standards Institute (ETSI) created the Global System for Mobile Communications standard to describe the protocols for second-generation digital cellular networks used by mobile devices like mobile phones and tablets.

4. Vibration Sensor

The piezoelectric sensor is another name for the vibration sensor. These flexible sensors instruments that are used to measure different processes. This sensor converts changes in acceleration, pressure, temperature, force, or strain into an electrical charge by using the piezoelectric effects. It is an accelerometer. A sensor that generates a proportionate electrical response to the acceleration of something which vibrates and to which the accelerometer is connected. The device receives the signal generated by the accelerometer and transforms it into a velocity signal.

Fig. 4 Vibration Sensor

5. IR Sensor:

As the eye blinks, the variation throughout the eye will change. If the eye is closed, then there is a high output; otherwise, there is a low output. The infrared waves that are transmitted to our eyes by the IR transmitter. The reflected infrared rays from the eye are picked up by the IR receiver. If the eye is closed, the IR receiver output is high; otherwise, the output is low. This will reveal whether the eye is shutting or opening. The logic circuit receives this output to signal the alert.

6. GPS

GPS is used for real-time tracking, and it provides the controller with asynchronous data containing the latitude and longitude of the bus's location.

7. LCD

A type of flat panel display are called as an LCD (Liquid Crystal Display) operates primarily using liquid crystals. Since they are frequently used in mobile, phones, televisions, and computers, LEDs offer a wide range of applications for consumers and enterprises. signifies "Liquid Crystal Display." In TVs and computer monitors, LCD is a flat panel display technology that is widely utilised. Additionally, it is utilised in the screens of mobile gadgets like laptops, tablets, and smartphones. A liquid crystal material is sandwiched between two pieces of polarised glass (also known as substrate) to create an LCD. Light produced by a backlight enters the first substrate.

Fig. 5 LCD

VIII. CONCLUSION

The suggested method offers quick access to emergency medical care. Also to prevent death. It is to give information on how the event happened and region of the collision and more details. It facilitates the provision of facilities and Assistance for the accident victim. GSM is used to deliver details about the accident and the location of the vehicle is tracked using a GPS module.

REFERENCES

[1] 1Hemangi S. Badhan, 2Shruti K. Oza Electronics, Computers and Artificial Intelligence (ECAI). Accident Detection Using Raspberry Pi

[2] Apeksha P Kulkarni, Vishwanath P Baligar Real Time Vehicle Detection, Tracking and Counting Using Raspberry-Pi on Computational Science and Engineering (CSE) and IEEE International Conference on Embedded and Ubiquitous Computing (EUC).

[3] Bruno Eraldo, Heyul Chavez-Arias Design of a control and monitoring system to reduce traffic accidents due to drowsiness through image processing.

[4] Mr. S. S. Kulkarni1 (PG Student), Mr. A. V. Thakur2 Image Processing for Driver's Safety and Vehicle Control using Raspberry Pi and Webcam.

[5] Rickin Patel , Vipul K. Dabhi A Survey on IoT based Road Traffic Surveillance and Accident Detection System. [6] Vaibhav Rathod , Prof.Mrs.Ranjana Agrawal Camera based Driver Distraction System using Image Processing.

[7] Siddharth Tripathi, Uthsav Shetty, Asif Hasnain, Rohini Hallikar Cloud Based Intelligent Traffic System to Implement Traffic Rules Violation Detection and Accident Detection Units.

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