Advanced High Speed Black Box Based Vehicle Crash Investigation System

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ABSTRACT

Nowadays, vehicles have transformed into a basic bit of our step by step lives. In India, the amount of vehicles has created in a giant rate which makes people lives more straightforward and better. The world has ended up being totally dependent upon vehicles for the transportation reason; anyway on account of overpowering arrangements and less than ideal driving consistently accidents happen causing a ton of mishaps. The essential purpose behind our errand is to develop a model of Black Box that can be presented in any vehicle for assessment reason. A Black Box is a device that records all of the activities of the vehicle. This can add to grow progressively secure vehicles, improving the treatment for mishap misused individuals, causing by offering data to the assessment and overhauling road status to reduce the end rate. The subject of the assignment is that certain presentation part of vehicle during or before the mishap is recorded in a memory which will be annihilated after a particular time allotment. By then another course of action of data can be taken care of this. The Event Data Recorder - EDR incorporates data on speed at which the vehicle is moving. The checking framework incorporates camcorder front and back in time slip by mode which is utilized to show the situation of mishap in video design on ongoing premise with no misrepresentation and GPS for the area following alongside time. At the point when the vehicle crashes, the framework catches the episode by utilizing camcorder alongside the area and time utilizing GPS. The information has been gathered in a memory. Afterward, the information can be recovered from the memory for examination process.

KEYWORDS: Vehicle, Black Box, GPS, Camera, Vehicle Crash, Python

INTRODUCTION

The vehicle setback is a critical open issue in various countries. According to World Health Organization, more than one million people kick the basin every year on account of transportation related accidents. Despite care campaign, this issue is growing a direct result of riders poor practices, for instance, speed driving, alcoholic driving, driving without satisfactory rest, etc. These explanation gigantic social and fiscal loads to people included. Nevertheless, incredible security contraption for vehicles is difficult to complete and super costly. Various cases remain pending as a result of darken reasons of a mishap. Car equipment accepts a gigantic activity in the vehicle business and even more basically addresses the prosperity and security concerns. The endeavor presents an organized structure of the Black Box with the key features of the data recorder which could be useful for private vehicles and at the same time it in like manner has a couple of additional features that could help the directing the amount of accidents, or at total least, will fill in as an assessment instrument to deflect future setbacks by stalling the past incidents.

Like carrier data recorders on plane, "Revelation" development directly expects a critical activity in motor vehicle incident assessment. A Black Box is an automated electronic device, which is used to record and store information explicitly. It finds and to separate the clarification of a disaster successfully and to settle various discussions related to accident, for instance, crash suit, security settlements. Here the black box is used to record accelerating, checking system nearby zone and time.

In order to acknowledge what sort of sensors should be brought into the vehicle, explore was finished to recognize the key information required for better setback assessment. Resulting to isolating the information and pondering what should be conceivable and what could help the most, the going with data were viewed as the most noteworthy ones required after a setback: Speed estimation, video spouting of the vehicle close by time and location.

This system is principally devoted basically to two approaches. The first is the best approach to perceive and record data from the vehicle. The second is the methods by which to show the data recorded to the customer in a revised way. To complete the chief methodology, some huge parts like speed sensor and camcorder (front and back) at time sneak past mode. Event data recorders fill in as device to impartially separate the earnestness and the progression of events that happen already and during the disaster. The EDR locally accessible records material data already and during the mishap, in order to enable the mishap specialists to redo the circumstance, seconds before the mishap. The pertinent

data joins the hour of the setback expanding velocity and video of the mishap

Existing System
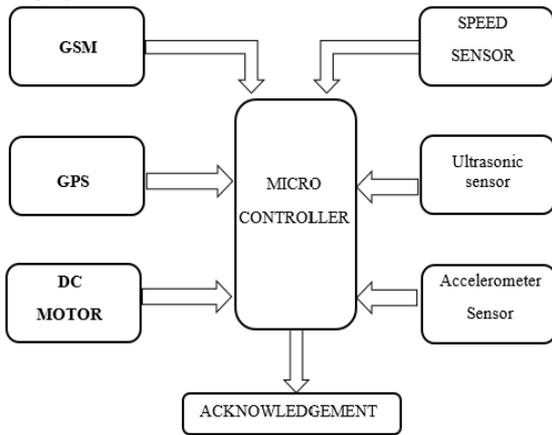
The black box contains the Renesas 64 pin Microcontroller, LCD, DC motor, DC driver, Ultrasonic sensor, Temperature sensor, Accelerometer sensor, Slot sensor, GSM, and bumps switch. It detects the engine temperature, obstacle presences, acceleration & seat belt check. The outputs of these parameters are displayed on the LCD. This collected information's along are send to the police server, ambulance through the GSM. GPS tracking system developed in this paper helps to track the vehicle in case of an accident and enables authorities to extend immediate emergency medical service. When an accident occurs the microcontroller gets activated and starts collecting the information such as temperature, the presence of obstacle, acceleration and set belt check respectively from the sensors This collected information is displayed on the LCD screen and is sent to the police server through the mail and an SMS to the emergency medical service through GSM. The GPS in the mobile communication helps to know the exact location of the accident spot. By using this information police can easily know the accident spot and they get the correct proofs of the accident to provide justice.

Proposed System

Vehicle accident is the major problem and it is hard to investigate and find the victim or a person behind an accident. There is the need to find the easy way to complete the investigation. This project provides solution for the investigation process. Vehicle mishap is the serious issue and it is difficult to explore and discover the person in question or an individual behind a mishap.
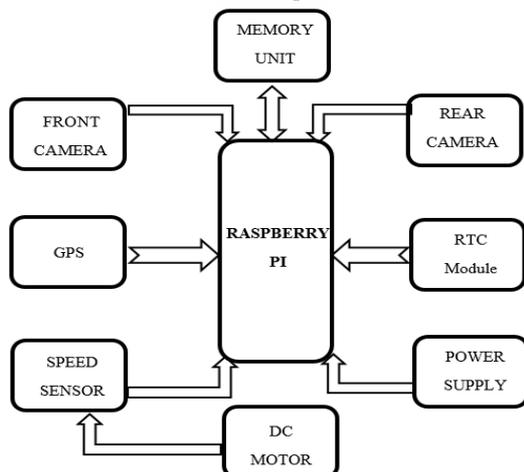
Functional Block Diagram of Black-Box System

There is need to develop a vehicle black box system which reduces the process of investigation and reduce the crimes, accidents etc. If it is installed in all the vehicles it will helpful for insurance claim problem and other investigation purposes. The functional block diagram of vehicle black-box system

Features of Vehicle Black Box System

There is an additional bit of leeway by utilizing camera. We can get the unmistakable information about the vehicle parameters, for example, speed, motor on and off time area and video information is additionally recorded in time-slip by mode it is primary preferred position of the framework. Numerous edges of video can be changed over into single casing to diminish the size of the information after that the information can be recovered and utilized for examination or protection guaranteeing purposes. These are the highlights of the vehicle discovery framework .The proposed thoughts which are advantage for both the proprietor of the vehicle and outsider proprietor and examination officials.

GPS

Global Positioning System (GPS) utilizes sign sent by satellites in space and ground stations on Earth to precisely decide their situation on Earth. Radio Frequency sign sent from satellites and ground stations are gotten by the GPS. GPS utilizes these sign to decide its precise position. The GPS itself doesn't have to transmit any information. The sign got from the satellites and ground stations contain time stamps of when the sign were transmitted. By computing the contrast between when the sign was transmitted and when the sign was gotten. Utilizing the speed of the sign, the separation between the satellites and the GPS collector can be resolved utilizing a basic equation for separation utilizing pace and time. Using data from at least 3 satellites, the accurate situation of the GPS can be triangulated. For more data about GPS and how to utilize it, elude the point GPS Receiver Module in the sensors and modules section. The GPS beneficiary module utilizes UART correspondence to speak with controller or PC terminal.

RTC

Ongoing timekeepers (RTC), as the name suggests are clock modules. The DS1307 constant clock (RTC) IC is a 8 stick gadget utilizing an I2C interface. The DS1307 is a low-control clock/schedule with 56 bytes of battery reinforcement SRAM. The clock/schedule gives seconds, minutes, hours, day, date, month and year qualified information. The end date of every month is naturally balanced, particularly for a considerable length of time with less than 31 days.

They are accessible as incorporated circuits (ICs) and direct planning like a clock and furthermore work date like a schedule. The fundamental favorable position of RTC is that they have a game plan of battery reinforcement which keeps the clock/schedule running regardless of whether there is control disappointment. An extraordinarily minimal current is required for keeping the RTC energized. We can discover these RTCs in numerous applications like implanted frameworks and PC mother sheets, and so forth. In this article we are going to see around one of the continuous clock (RTC)

Raspberry PI 3 B+

The Raspberry Pi is a credit card-sized computer. The Raspberry Pi 3 Model B+ is an improved version of the

Raspberry Pi 3 Model B. It is based on the BCM2837B0 system-on-chip (SoC), which includes a 1.4 GHz quad-core ARMv8 64bit processor and a powerful Video Core IV GPU. The Raspberry Pi can run a full range of ARM GNU/Linux distributions, including

Snappy Ubuntu Core, Raspbian, Fedora, and Arch Linux, as well as Microsoft Windows 10 IoT Core. The Raspberry Pi 3 Model B+ has many performance improvements over the Model B including a faster CPU clock speed (1.4 GHz vs 1.2 GHz), increased Ethernet throughput, and dual-band WiFi. It also supports Power over Ethernet with a Power over Ethernet HAT. The MagPi Magazine has a blog post with performance benchmarks comparing various Raspberry Pi models.The dual-band wireless LAN comes with modular compliance certification, allowing the board to be designed into end products with significantly reduced wireless LAN compliance testing, improving both cost and time to market.

Raspberry Camera

The Raspberry Pi Camera Board connects straightforwardly to the CSI connector on the Raspberry Pi. It's ready to convey a completely clear 5MP goals picture, or 1080p HD video recording at 30fps! Most recent Version 1.3! Hand crafted and produced by the Raspberry Pi Foundation in the UK, the Raspberry Pi Camera Board includes a 5MP (2592?1944 pixels) Omnivision 5647 sensor in a fixed center module. The module joins to Raspberry Pi, by method for a 15 Pin Ribbon Cable, to the devoted 15-stick MIPI Camera Serial Interface (CSI), which was structured particularly for interfacing to cameras.

The CSI transport is prepared to do very high information rates, and it solely conveys pixel information to the BCM2835 processor. The board itself is modest, at around 25mm x 20mm x 9mm, and weighs simply over 3g, making it ideal for portable or different applications where size and weight are significant. The sensor itself has a local goals of 5 megapixel, and has a fixed center focal point installed. Regarding still pictures, the camera is fit for 2592 x 1944 pixel static pictures, and furthermore underpins 1080p @ 30fps, 720p @ 60fps and 640x480p 60/90 video recording. The camera is bolstered in the most recent form of Raspbian, the Raspberry Pi's favored working framework.

DC Motor

A DC engine is any engine inside a class of electrical machines whereby direct flow electrical power is changed over into mechanical power. Frequently, this kind of engine depends on powers that attractive fields produce. Despite the sort, DC engines have some sort of interior component, which is electronic or electromechanical. In the two cases, the heading of current stream in some portion of the engine is changed periodically. The speed of a DC engine is controlled utilizing a variable inventory voltage or by changing the quality of the current inside its field windings.

While littler DC engines are ordinarily utilized really taking shape of machines, devices, toys, and car systems, for example, electric vehicle seats, bigger DC engines are utilized in lifts, lifts, and electric vehicles. A 12v DC engine is little and reasonable, yet incredible enough to be utilized for some applications. Since picking the correct DC engine for a particular application can be testing, it is imperative to work with the correct organization. A prime model is MET Motors,

which has been making excellent lasting magnet DC engines for over 45 years.

Memory

A storage gadget alludes to a figuring equipment used to store data for all time or briefly. The gadget can be outside or inner to a PC, server, and other figuring frameworks. Capacity gadgets are otherwise called stockpiling medias or capacity medium. A memory card or memory cartridge is an electronic information stockpiling gadget utilized for putting away computerized data, commonly utilizing blaze memory. These are regularly utilized in convenient electronic gadgets, for example, advanced cameras, cell phones, PC, PCs, tablets, PDAs, compact media players, videogame consoles, synthesizers, electronic consoles and computerized pianos.

Speed Sensor

Here is a motor speed sensor module, the huge goal is to check the pace of an electric motor. The module can be used in association with a microcontroller for motor speed acknowledgment, beat count, position limit, etc. On a fundamental level, any rate meter basically measures the rate at which some event occurs. Typically this is done by counting the events for a given time period (compromise interval) and after that simply isolating the amount of events when to get the rate.

Basically, the microcontroller-flawless motor speed sensor module delineated is a clear contraption that yields took care of heartbeat trains when the visual method for its optical sensor is physically impeded by some sort of opened wheel or similar segment (an optical sensor ordinarily contains a light releasing diode that gives the illumination, and a phototransistor that identifies the proximity or nonappearance of that lighting up).

The transmissive optical sensor used here includes an infrared light radiating diode and a phototransistor. This the two keeps block from stray outside light sources and by having the two sections composed for a specific repeat of radiation, they are altogether progressively safe to undesired impedance.

Working Principle

A noteworthy number of vehicles at present on the streets contain electronic frameworks that record in case of an accident. That is the reason it is so imperative to have recorders that unbiasedly track what goes on in vehicles previously, during and after an accident as a supplement that has been utilized. In this task we have done the semi-module of the discovery which gathers video information, speed, date, time and topographical directions.

The Black Box will give us input about wellbeing of vehicle and accidents/mishaps and take into consideration availability to information including the vehicle's mechanical and electrical status. The Black Box will give us moment input for any physical inconsistencies, and will likewise give the war room access to the information on the Black Box. Our Black Box System configuration comprises of discovery equipment and a sensor subsystem.

The area of the vehicle, speed of the vehicle, and the area of the black box. The discovery comprises of equipment to forestall information disappointment, secure information,

oppose outside components and perform typical tasks. In the event that a mishap were to happen, a Data Analyst can utilize the Black Box to decide the reason for the mishap, and give approaches to counteract a future mishap.

The essential parts of the task are GPS which gives area information of the vehicle, RTC, Front camera, back camera, Speed sensor and memory unit. At the point when the motor turns over then another arrangement of information will be put away naturally. The Event Data Recorder incorporates data on speed at which the vehicle is moving. The observing framework incorporates camcorder front and back in time slip by mode which is utilized to show the situation of the mishap in picture position on ongoing premise with no adulteration and GPS for the area following alongside time.

At the point when the vehicle crashes, the framework catches the pictures by utilizing camcorder in time slip by mode alongside the area and time utilizing GPS. After a mishap, the information recorder doesn't erase information and records until full. Afterward, the information can be recovered from the memory for examination process.

➢ View whether the mishap was brought about by an effect or different elements
➢ Determine the state of the vehicle previously and during the mishap
➢ Locate the geographic area of the mishap
➢ Determine whether nature assume a job in the mishap
➢ Being ready to comprehend the standard working condition contrasted with the information obtained during mishap
➢ Remotely observing vehicle status
➢ Detect and report the unwavering quality of the vehicle

Conclusion

Vehicle accidents don't occur without any reasons. They are available into being at one time a couple of variables, these is the segments concerning drivers, lanes or as for specific standards. the near legitimization for each traffic setback was connected including human factors, every misfortune would maybe be named among sure inside each concerning the 3 driver's misery rules (mental, visual, and manual). The comprehension as for the specialists once delineating the parts stressed inside each disaster suggests the utilization of the purposeful law in pantomime of giving a significance layout on the earlier minutes embellishment degree setback.

This has been effectively demonstrated that the model of the proposed hypothesis and ideas for the usage of black box in the cars works impeccably. In the event that a vehicle met with a mishap the framework will get actuated naturally and start it's reconnaissance mode and the short message alongside the definite area of vehicle and the sensors esteems is sent to the concerned people. The best bit of leeway is that by giving crisis medicinal administrations on time death rates will be diminished.

The future work of this undertaking includes the data compression and convert into Internet of things. Data compression has become an adult over the most recent twenty years. Putting away information in such a manner which requires fewer spaces than the normal.

Both the amount and nature of the video stream must be compacted generally with no misfortune or quality change.

Compression is performed by a program or code that uses an algorithm to contract the size of the information with no information misfortune. The Internet of Things is quickly changing the world, empowering the capacity and information gathering and different changes. This venture can be additionally upgraded by putting away the information in a cloud server and recovering them just by the concerned approved individual.

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