

Vehicle Accident System (Using GPS Tracker and Airbag ECU)

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Abstract

An **airbag** is a vehicle occupant restraint system (RS) a bag designed to inflate extremely quick then quickly deflate during a collision.

The concept of the airbag is a soft pillow to land against in a major crash. The first patent on an inflatable crash-landing device for airplanes was filed during World War II. In 1980s, the first commercial airbags was appeared in automobiles. An adoption of airbags came during the late 1980s and early 1990s. In car a driver airbag, and a front passenger airbag is there and many modern vehicles now include six or more units

Air bag is made of a thin, nylon fabric, which is folded and inside into steering wheel or dashboard or, more recently, the seat or door.

Inside the car a **sensor** is the device that tells the bag to inflate it happens when there is a collision force equal to running into a brick wall at 10 to 15 miles per hour (16 to 24 km per hour).



GPS stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object for eg.:- land etc. GPS technology was first used by the US military. In 1960s expanded into civilian use over the next few decades. Today, GPS receivers are included in many

commercial products, such as automobiles, smartphones, exercise watches, and GIS devices etc.

In GPS system it includes 24 satellites which is deployed in space about 12,000 miles (19,300 kilometers) above the earth's surface. The orbit of earth once every 12 hours at an extremely fast pace of roughly 7,000 miles per hour (11,200 kilometers per hour).

A GPS satellite broadcasts a message which include the satellite's current position, orbit, and exact time. Each GPS receiver combines the broadcasts from various multiple satellites to calculate its exact position using a process called triangulation. Three satellites are required in order to determine a receiver's location, though a connection to four satellites is ideal since it provides greater accuracy.

Working of GPS, it should establish a connection to the required number of satellites. For example, car's GPS unit is typically faster than the receiver in a watch or smartphone.

Introduction

The vehicle's crash sensors provide crucial information to the airbag electronic controller unit (ECU) which gives signals to car maker server.

Server sends message to

1. Nearest hospital of accident location.
2. Nearest Police station of accident location.
3. Family member.

Location will be track by GPS (Global Position System) using GPS API.

Top causes of car accidents?

Car accident can lead a several unwanted permanent injuries, consequences, loss of earnings, etc.



Below is the list of top causes of car accident.

1. Distracted Driving

A usually to talk on a cell phone, send a text message or eat food which can diverts his or her attention from road.

2. Speeding

Speed kills, and traveling above the speed limit is an easy way to cause a car accident you've seen them on the highway.

3. Drunk Driving

Drinking and driving, you can lose the ability to focus and function properly and it's very dangerous while operating a vehicle.

4. Reckless Driving

If you don't drive carefully then you may end up in a needless car accident.

5. Rain

Due to rain sometime weather gets bad so do the roads and many car accidents happen in the rain because water creates slick and dangerous surfaces for cars, trucks, and motorcycles and often causes automobiles to spin out of control or skit while braking.

6. Running Red Lights

While driving a car you should follow the traffic rules, red means stop and not doing so usually leads to car accidents. Drivers that run red lights, run the risk of causing wrongful death because they often cause side-impact collisions at high speeds.

7. Running Stop Signs

Driver Should never ignored stop signs. Because each year, thousands of car accidents occur due to one driver ran a stop sign.

8. Night Driving

Night driving is to much risky . While driving in daylight it be hazardous, but driving at night nearly doubles the risk of a car accident occurring. Because you can't see what's up ahead you don't know what to anticipate as you drive towards it

9. Design Defects

Inside the car it have hundreds of parts, and any of those defective parts can cause a serious car accident. Many car makers company had problems with design defects in the past, including Ford Explorer rollover accidents and Toyota's unintended acceleration crashes.

10. Unsafe Lane Changes

While driving sometimes we need to get over to another lane If the drivers don't make safe lane changes properly, it often leads to a car accident.

11. Wrong-Way Driving

First driving car we should know the rule which everyone has lapses in judgment, but when behind the wheel of a car, those clouded instincts can be deadly. When you turn down a street thinking it is a normal right turn, but in actuality, it is a one-way street in the opposite direction.

12. Improper Turns

Inside the car already features has been provided like stop lights, turn signals, and lanes designated for moving either right or left as opposed to straight is because when drivers don't follow the rules of the road, car accidents are often the result .

13. Tailgating

Driving so close to another car that they cannot react in time if the car in front of them brakes suddenly because many of them drivers are impatient and reckless .An fatal car accidents have occurred when a motorist dangerously tailgated another driver at high speeds.

14. Road Rage

An driver can be angry at another driver for one reason or another, but some drivers let their rage overcome them. An driver in anger or speeding past another driver only to pull in front of them and brake, these road "rages" cause many needless car accidents each year.

15. Fog

Driving is a skill which requires the ability to see, but fog makes it extremely difficult to see sometimes more than a car length in front of you. Avoid car accidents by using your head lights — and never your high beams — when driving in the fog.

16. Animal Crossings

The driver should follow the rules of the roadway, wild animals do not take driver's education. Wild animals will wade out into the street, and it's up to you to make sure that you don't get into a car accident with them.

Helping Road Accident Victims Statistic.

As per 2017 statistics, 147,913 people have been dead in a road crash and in 2016 statistics, 1,50,785 people have been dead in a road crash.

As per the statistics we got in 2013 total of 4,69,882 people have been injured in road accidents and 1,37,423 people have died. These lives could have been saved if they had received immediately on time help. Due apathy of the society, many people just passed by people as they lay in critical conditions

GPS working

At over 20,000 kilometers above sea level (20,180 kilometers (12,540 miles)) is a constellation of satellite each orbiting earth. these satellite beaming data down to us on earth which is intern received by the devices such as phone navigation units in your cars allowing you to see where you are on your planet.

GPS stands for Global Positioning System, which works through trilateration, not triangulation or multilateracies, which is commonly misconceived.

USA system is the most in-demand navigational satellite system from all around the world. India, Russia and Europe have akin system which exists in worldwide.

Navistar system is nothing different from GPS which anchors phones and many electronics devices which is set up within them. GPS satellites are aligned on the earth's surface. We have at least four satellites.

In GPS units send signals to our cell phones to receiveGPS satellites podcasts messages to our planet which has precise timestamp.

These information help you to sort about satellites. Satellites send precised signal which makes the distance between you and your mobile impressively short. By multiplying this time difference with the speed of light (as the signal is sent as the speed of light), you can get the distance you are from the satellite. Satellites are sending signals about its position where you can locate it even being outside the locus. By introducing satellites we are closing the distance and getting more informative. We are getting exact position of where we are. We are down to five and ten minutes on average with the potential error being around 15 meters. There are a lot of factors which escalate the potential error, but the most significant is due to the ionosphere, a part of the upper atmosphere extending from 60 km to 2,000 km where free electrons have very good effect on the electromagnetic waves that is passing in this layer.

The fallacy is comparatively smaller when satellites are overheard straightly this is due to the fact that the distance amid the person and satellite is directly overheard. Even small changes or differences in the atomic clocks found can be detected.

Due to relative velocity of earth, the general relatively then comes in action of gravitational frequency shift which is greater than the 7 microseconds per day delay due to the velocity relative to Earth. this adds up to a 38 microsecond delay, which if left uncorrected would translate through to a 10 km/day pseudo range error, rendering GPS's invalid from the get go if this was not to be taken into consideration.

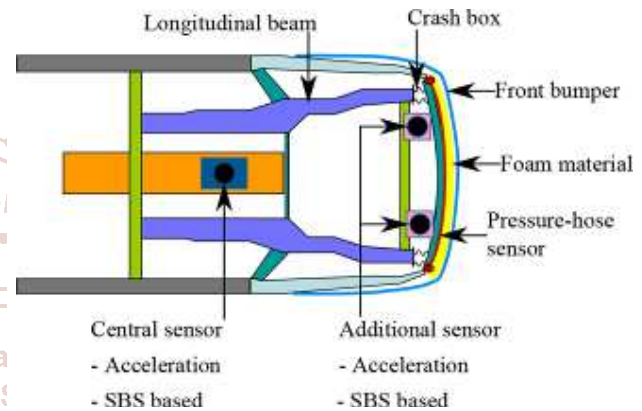
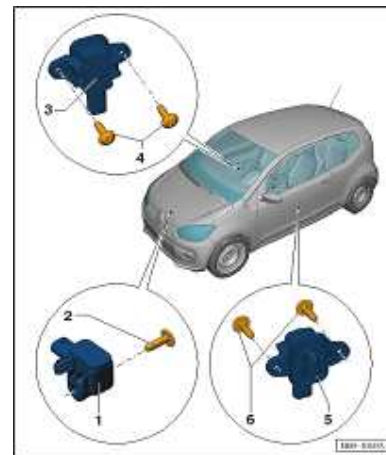
The GPS clock reduced from 10.23MHz to 10.22999999543 MHz to cancel out the effects of relativity. Every time we turn our GPS on, physics and mathematics are involved hugely.

Working of Vehicle Accident system during car crash with help of (ECU and GPS tracker)

ECU controls all the electronic component integrated or installed in the car such as cars sensors, sound system and GPS system and may other components it can differ from different car models.



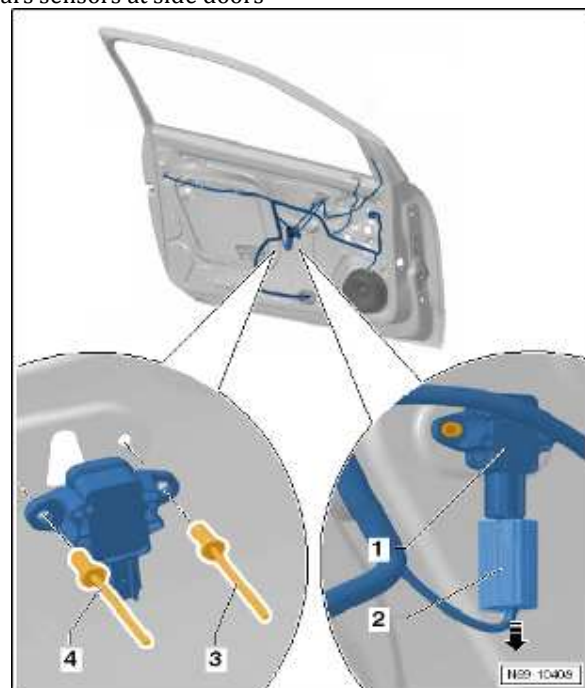
ECU gets its power supply from the car battery or solar panels in some exceptional cars.



In cars airbag system the impact sensors are connected are place in front of the bumper of the car and side door and even in back bumpers of cars which gives input signals to the to the cars ecu when that sensor got hit.

In ideal care there is minimum 1 sensor are placed at front bumper and 2 sensors at each side of the door.

Cars sensors at side doors





When ECU send signal to air bag to inflate at same time the signal sent to car manufacturer server that the car accident happened through 4g internet speed.



The car manufacture then broadcasts the pre written message to the nearest hospitals, police station, and relatives from its server.

Information send to police station and hospital be like car related information owner information, accident location. And the drone stretcher is send from hospitals helipad to the given accident latitude, longitude coordinates and patient is taken to hospital along with that police and towing service will help to manage traffic in that location.

Conclusion

In a car this safety system should be there with the help of this system someone's life can get save by alerting/passing message to nearby police station and hospital with accident location.

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