

Using Waterfall model for Airbags.

1). Requirements:

⇒ To provide a cushion like a bag for the car who are travelling in the car when there any accident is occurs.

⇒ To protect the human body from the collision that occurs on the car.

⇒ It can be completed with in fraction of second so the output of the bag can be completed within the seconds.

2). Analysis and Design:

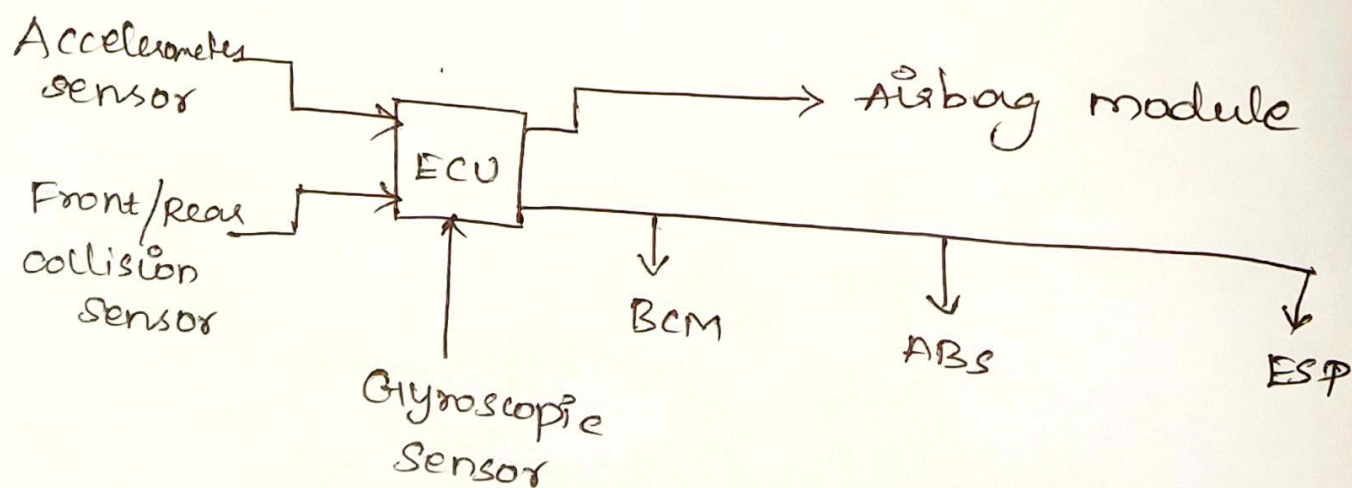
→ Accelerometer sensor.

→ Front / Rear collision sensor

→ ECU

→ Airbag cushion

→ Gyroscopic sensor.



ECU - Electronic control unit,

BCM - Body control module

1). Accelerometer sensors:

It is used to detect the change in speed. If the deceleration is high enough, then accelerometers trigger the air bag circuit.

2). Front / rear sensors:

If the collision occurs in front/rear, that sensor will detect the collision and trigger to ECU.

3). ECU:

It can control the airbag function. When it receives some signals from the sensor, it can react to the airbag.

4). Airbag cushion modules:

⇒ The airbag cushion module is the chemical at the heart of the air bag reaction. It is called sodium azide, or NaN_3 .

⇒ Crashes trip the sensors in case that send an electric signal to the ignitor.

⇒ The heat generated causes sodium azide to decompose into sodium metal & nitrogen gas which inflates the car's air bags.

Development:

Develop the coding that determine to trigger the sensors & the gas can fuled to the bag within fraction of second.

Test:

The testing is done with the above program that we can dumped in some of hardware in the loop (HIL).

Deployment:

This can be deployed to the car and then it will work when the accident or collision is occur.

Maintenance:

To maintain it with some of the things the gas is ignite after some years and the sensors are working.