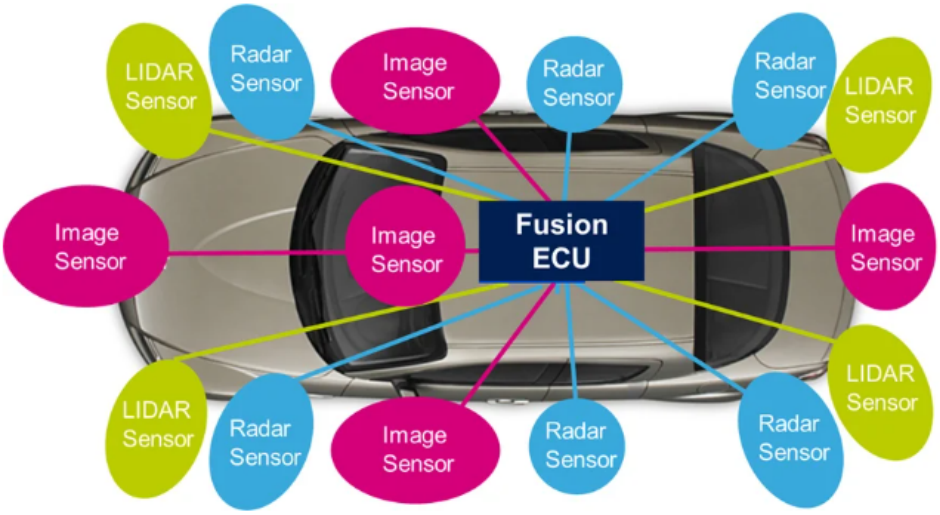
There are three main groups of sensors for autonomous driving.

1. Camera
2. Radar
3. Lidar-based systems



Camera is used for speed detection and outlining objects. Radar sensors are located in the front and back of the vehicle to monitor traffic.Lidar systems are rarely used as of now, because of cost and availability reasons.Then we use Sensor fusion to collectively take inputs from all sensors to interpret environmental conditions for detection certainty.

a) Camera:

Advantages:

- Vision like sensory: Cameras can distinguish between shapes, colours and identify objects. Similar to human vision.
- Recognising 2D information: Capability of reading 2D shapes and colours make it important to reading lanes,pavement markings. Infrared lighting may also be equipped for navigation at night.
- Low cost

Disadvantages:

- Poor vision under extreme weather events.

b) Radar:

Advantages:

- Unaffected by weather conditions
- Default sensor for emergency braking: Due to its ability to detect and forecast moving objects coming into the vehicle's path.

Disadvantages:

- Low-definition modelling: Compared to the camera, radar is relatively weak at modelling a perfectly precise shape of the object.

c) LiDAR:

Advantages:

- High-definition 3D modelling: LiDAR can be seen as a more advanced version of radar. It has a detection range of as far as 100 metres away thus capable of measuring thousands of points at any moment, allowing it to model up a very precise 3D depiction of the surrounding environment.
- Unaffected by weather conditions: Similar to radar.

Disadvantages:

- Highly sophisticated: LiDAR functionality is very sophisticated making it prone to system malfunctions and software glitches.
- High cost