The evolution of the automobile is quite interesting to understand. In 1700 we had a Steam and Electricity powered car. Later in the 1800s, we had the first patented gas-powered car. There was no looking back since then. From a car with no windshields and steering wheel, we now have a driverless car!

Introduction of Self-Driving Vehicles

The idea of the self-driving vehicle was introduced by **General Motors** in the year 1939. It was a radio-controlled electric vehicle. The self-driving car has undergone a complete transformation since then and it is an autonomous vehicle. An autonomous vehicle uses a combination of sensors, artificial intelligence, radars, and cameras to operate, without any human intervention. This type of vehicle is still in its development stage since there are various components to be considered to make it safe for its passengers.

Computer Vision Technology

The inclusion of **Computer Vision technology** can make the autonomous vehicle safe for its passengers as per the researchers and professionals. There are various research carried on to check its viability. Computer Vision is the core of Artificial Intelligence technology. AI helps computers to decode and understand the visual data acquired from various sources. It involves automatic visual understanding using AI algorithms. The best example of computer vision is the facial recognition tool. In autonomous vehicles, it is used with sensor technology to identify people, cars, and other objects on the road.

How has Computer Vision Technology made the Autonomous Vehicle reliable & intelligent?

Recognize Objects

There are various moving as well as stationary objects on the road like pedestrians, other vehicles, traffic lights, and more. To avoid accidents or collisions while driving, the vehicle needs to identify various objects. Autonomous vehicles use sensors and cameras to collect data and make 3D maps. This helps to identify and detect objects on the road while driving and makes it safe for its passengers.

3D Map Creation

The cameras on the vehicle can capture images in real-time. Computer vision uses real-time images to create a 3D map. With the usage of 3D maps, autonomous vehicles can decipher the driving space for risk-free driving and also opt for alternate routes in case of projected collision. This makes driving easy and accident-free for its passengers.

Deployment of Airbags

The data of surroundings are continuously decoded by computer vision. It can predict any collision or probable accidents in advance. It can deploy airbags well in advance to protect its passengers in case of an unavoidable collision. The safety of the passengers is the top priority and computer vision is intelligent enough to ensure the same.

Tracking of Cars

Computer vision uses bounding box detention with complex algorithms to detect if the car on the road is the same as before. This is useful to track and also predict behavioral patterns of other drivers and to make driving safe.

Lane line Detection

Cutting lanes can prove to be a disaster in the case of self-driving vehicles. Computer vision with Deep learning technology uses segmentation techniques to detect lane lines and to stay in the stipulated lane while self-driving. It can also detect the curves and turns on the road making it a safe experience for its passengers.

Low light mode driving

The light condition will differ as per the route, terrain, and time of the day. Self-driving vehicles need to switch between normal and low light modes. The images captured in the low light condition are often blurry and make driving difficult and unsafe. Computer vision with its algorithms can identify the low light condition and adjust to the same while driving. This is done using LIDAR & HDR sensors, FMCW Radars, SAR and thermal cameras.

Data for Training

The self-driving cars to ensure safe driving condition captures data about the location, road & traffic conditions, terrains, number of people in the areas and more. These data sets are used for situational awareness while driving. The same data sets are useful for deep learning model training. For instance, the images of traffic signals at various junctions captured by the camera are used by computer vision to check traffic signals while training deep learning models. It also helps to identify and classify various types of objects on the road.

Conclusion

Computer vision with an AI-based algorithm is the “eye” of self-driving vehicles. The main objective of computer vision is to ensure the safety of its passengers and to deliver a smooth self-driving experience. The technology hasn’t been perfected yet as few limitations need to be fixed. But the pace at which the technology is progressing, intelligent and reliable self-driving car using computer vision will soon be seen on the roads.

Aventior delivers top-class computer vision services not only to the automotive industry but also to other domains like healthcare, life sciences, aerospace, and manufacturing. Aventior’s team of highly skilled computer vision engineers are engaged in projects belonging to various domains including life science, healthcare, automotive, energy, manufacturing, and aerospace. They ensure to meet the product goals efficiently and create the most competitive products for clients. Furthermore, Aventior has recently launched its Vehicle Detection Deep Learning Algorithm on the ESRI marketplace. This Deep Learning based process block is capable of detecting and counting various vehicles. To know more about our services, write to us at **info@aventior.com**.