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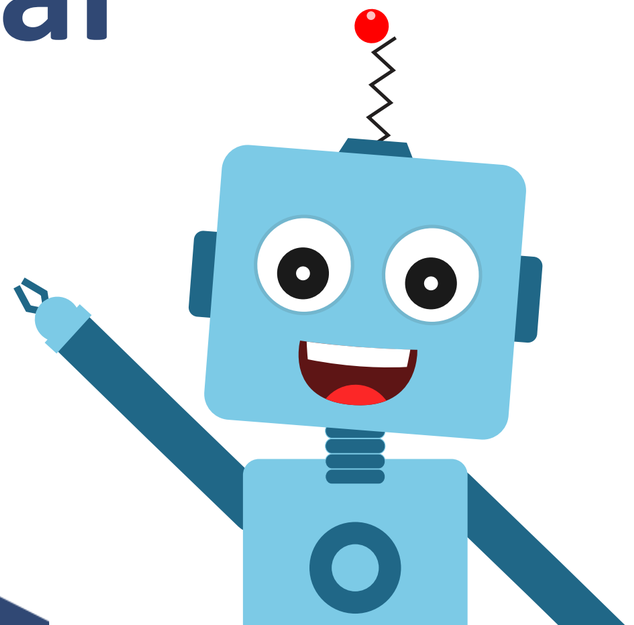
AI Based Self Driving Car Part -1

Session 14



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Self Driving Car

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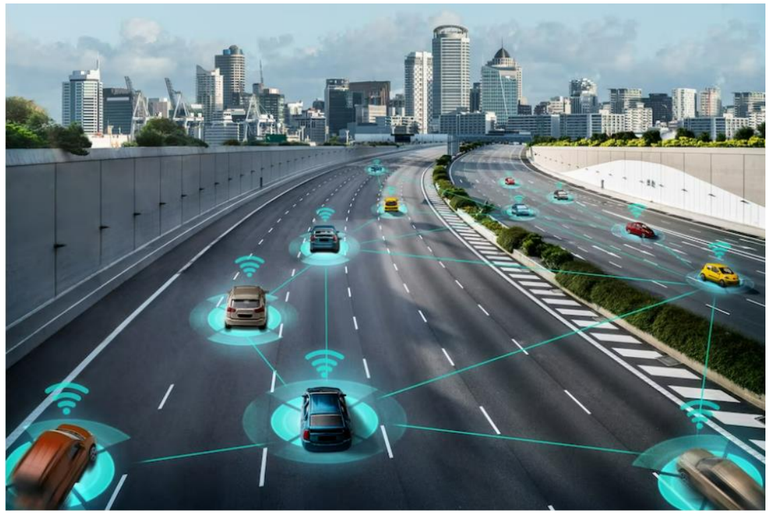
Self-driving cars, also known as autonomous vehicles, are vehicles equipped with advanced technologies such as sensors, cameras, GPS, and artificial intelligence (AI) algorithms that allow them to drive without human intervention. The cars use computer vision, machine learning, and other technologies to sense their environment, make decisions, and safely navigate roads and highways.

- The importance of self-driving cars in the future of smart cities lies in their potential to revolutionize transportation and mobility. Some of the key benefits include:



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The importance of self-driving cars in the future of smart cities lies in their potential to revolutionize transportation and mobility. Some of the key benefits include:

1. **Improved safety**: Self-driving cars have the potential to reduce the number of accidents caused by human error. They can detect and respond to road hazards more quickly and accurately than humans, which could lead to fewer fatalities and injuries.

2. **Increased efficiency**: Autonomous vehicles can communicate with each other and with traffic management systems to optimize traffic flow and reduce congestion. This could lead to faster and more reliable travel times for everyone.

3. **Improved accessibility**: Self-driving cars can provide mobility for people who are unable to drive, such as the elderly, disabled, or blind. They can also serve as a convenient and affordable alternative to personal car ownership.

4. **Reduced environmental impact**: Autonomous vehicles have the potential to reduce emissions by improving fuel efficiency, reducing the need for parking, and reducing the amount of land needed for transportation infrastructure.

Overall, self-driving cars have the potential to transform the way we live and travel, making our cities safer, more efficient, and more accessible.

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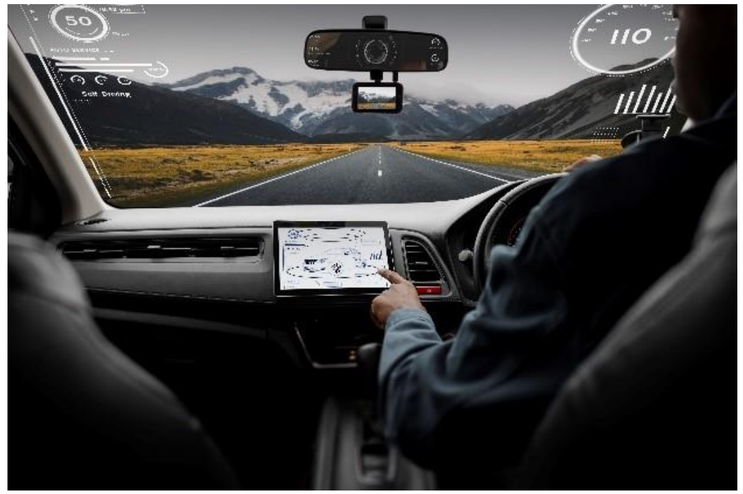
- Self-driving cars use computer vision to perceive and understand their environment. They do this by using cameras and other sensors to capture images and data about the roads, other vehicles, pedestrians, traffic signs, and other objects around them. The car then processes this data using machine learning algorithms and computer vision techniques to identify and track these objects and understand their behaviour.
- An example of a company using computer vision in self-driving cars is Tesla. Tesla's self-driving technology uses a combination of cameras, radar, and ultrasonic sensors to gather data about the environment. The cameras are used for computer vision tasks such as recognizing and classifying objects, detecting lane markings, and detecting traffic signals. The radar and ultrasonic sensors provide complementary information, such as detecting the speed and position of other vehicles, even in adverse weather conditions.
- Tesla's computer vision system is also trained on large datasets of real-world driving scenarios to continuously improve its accuracy and reliability. For example, if the car encounters a new type of road obstacle, it can learn from this experience and use this information to make better decisions in the future.



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- Overall, computer vision plays a crucial role in enabling self-driving cars to safely navigate roads and highways and make decisions based on their environment. The technology is constantly evolving and improving, and we can expect to see more sophisticated and effective applications of computer vision in self-driving cars in the future.
- Neural network models are a type of machine learning algorithm that are commonly used in self-driving cars. These models consist of multiple interconnected nodes, called artificial neurons, which process information and make predictions based on input data. Neural networks are used for a wide range of tasks in self-driving cars, including object recognition, object tracking, lane detection, and decision making.
- In self-driving cars, neural network models are integrated into the vehicle's control system. The models are trained on large datasets of real-world driving scenarios, such as images of roads, vehicles, and other objects, to learn how to identify and classify objects in the environment. The training process enables the neural network to learn the patterns and relationships between the input data and the desired output, so that it can make accurate predictions based on new data.
- Once the neural network models are trained, they are integrated into the self-driving car's control system and used to make decisions in real-time. For example, the neural network may use computer vision to recognize and classify objects in the vehicle's environment, such as other vehicles, pedestrians, and road signs. It may then use this information, along with data from other sensors, to make decisions about how to control the vehicle, such as adjusting speed, changing lanes, or avoiding obstacles.

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- Self-driving cars, as the name suggests, are cars which can drive themselves. They use sensors and systems to drive the car. How does the car know when to stop, slow down or take turns? The car uses sensors and systems to understand traffic lights, road bumps, people crossing roads, and even vehicles around you.

WHY SELF-DRIVING CARS?

- Self-driving cars have always been a dream but today, we are slowly starting to see them today. They are helpful in avoiding road accidents or can even help blind people to drive a car. Many cars today are equipped with sensors and advanced systems that alert drivers to avoid dangers. They can be used to travel in dangerous places where it is unsafe for humans to go like toxic areas or even on different planets like Mars.

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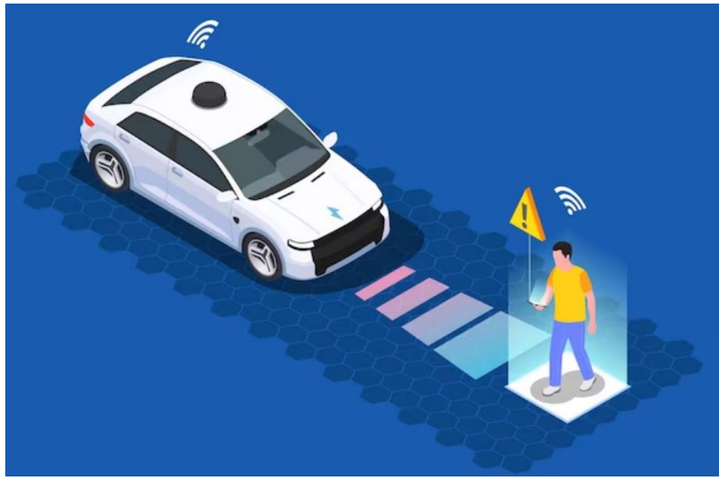
- AI is used for robots to understand its surroundings like people walking, street lamps, pavements, animals, etc. AI helps it to understand that such things need to be avoided so the car can avoid crashes or accidents.
  The car can change directions, slow down or even stop until the obstacle is gone. It finds out how far another car is, predicts approaching obstacles like a vehicle or a person crossing the road and selects the best action like slowing down, stopping, or changing directions. The AI can even suggest the best routes to a destination based on traffic and weather.
  Advanced self-driving cars can also find out if the car is rotated to a side in uneven terrain which will then adjust itself to stand as straight as possible.



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