AI: Self Driving Cars

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Introduction

Artificial Intelligence (AI) is quickly changing the way we live, especially when it comes to transportation. A great example of this is the self-driving car, which is designed to operate without human control. These vehicles use sensors, cameras, and advanced computer programs to gather information about their surroundings and make decisions on the road. From avoiding obstacles to following traffic laws, self-driving cars show how AI has the potential to improve safety, efficiency, and convenience in our daily lives.

Artificial Intelligence Beginnings

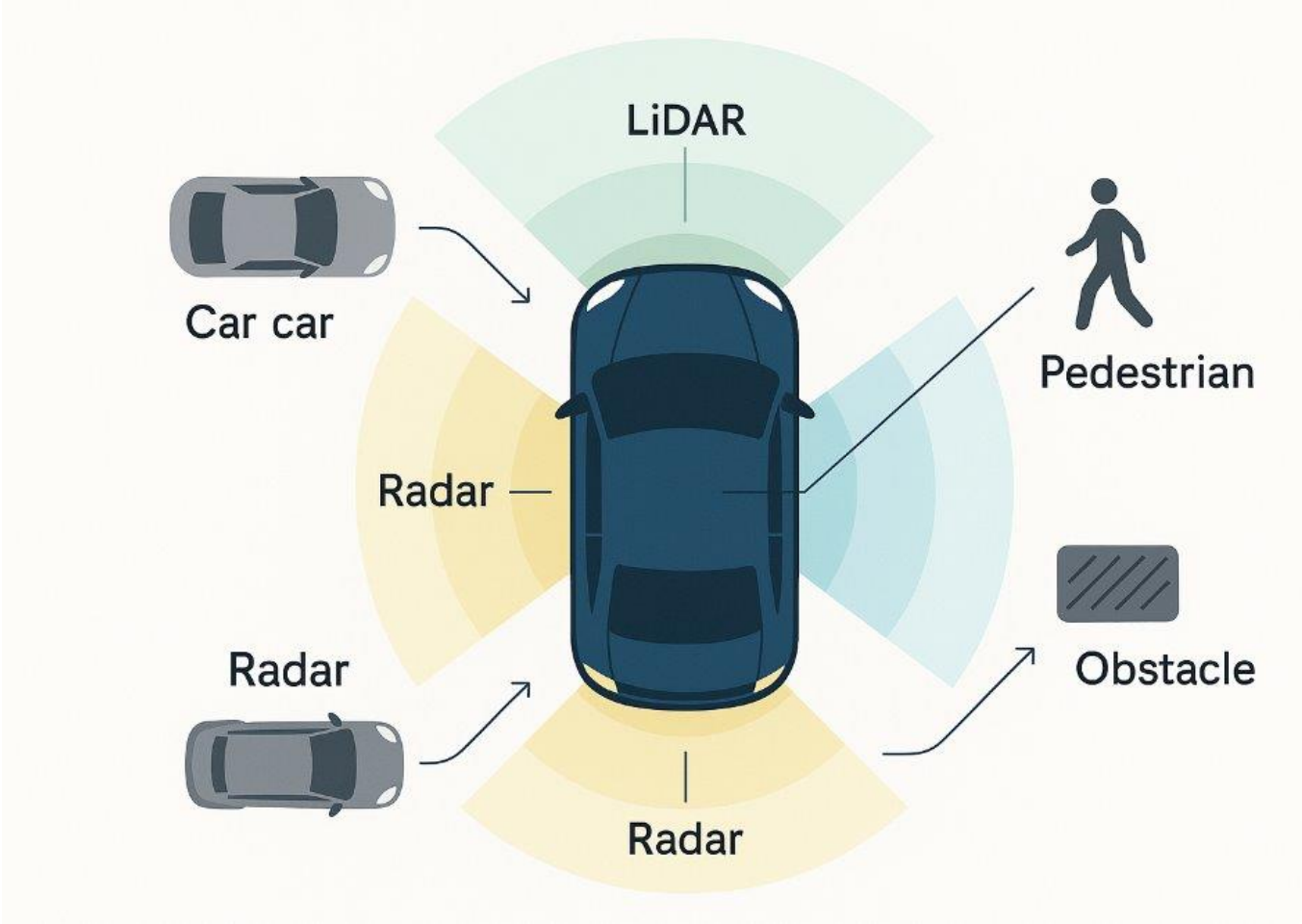
- The idea of Artificial Intelligence began in the 1950s when scientists started exploring how machines could think and solve problems.
- The term "Artificial Intelligence" was first used in 1956 at a conference led by John McCarthy.
- Early AI research focused on simple problem-solving tasks and teaching computers to play games like chess.
- In the 1960s, one of the first AI programs, called ELIZA, was created to simulate conversations like a therapist.
- By the 1970s and 1980s, AI was used in expert systems that helped make decisions in areas like medicine and engineering.

Artificial Intelligence's Introduction To the Auto Industry

- In the 1980s-1990s, AI concepts were first explored in automotive settings through university-led projects like CMU's Navlab and Germany's VaMoRs, testing early autonomous prototypes.
- AI-related systems like adaptive cruise control, anti-lock braking, and electronic stability control began appearing in vehicles, marking the start of automation in commercial cars.
- The 1990s and early 2000s saw AI powering initial driver assistance features such as parking sensors, collision warnings, and early versions of lane-keeping systems.
- These early AI applications laid the groundwork for the advanced perception, decision-making, and control systems used in today's autonomous driving technology.

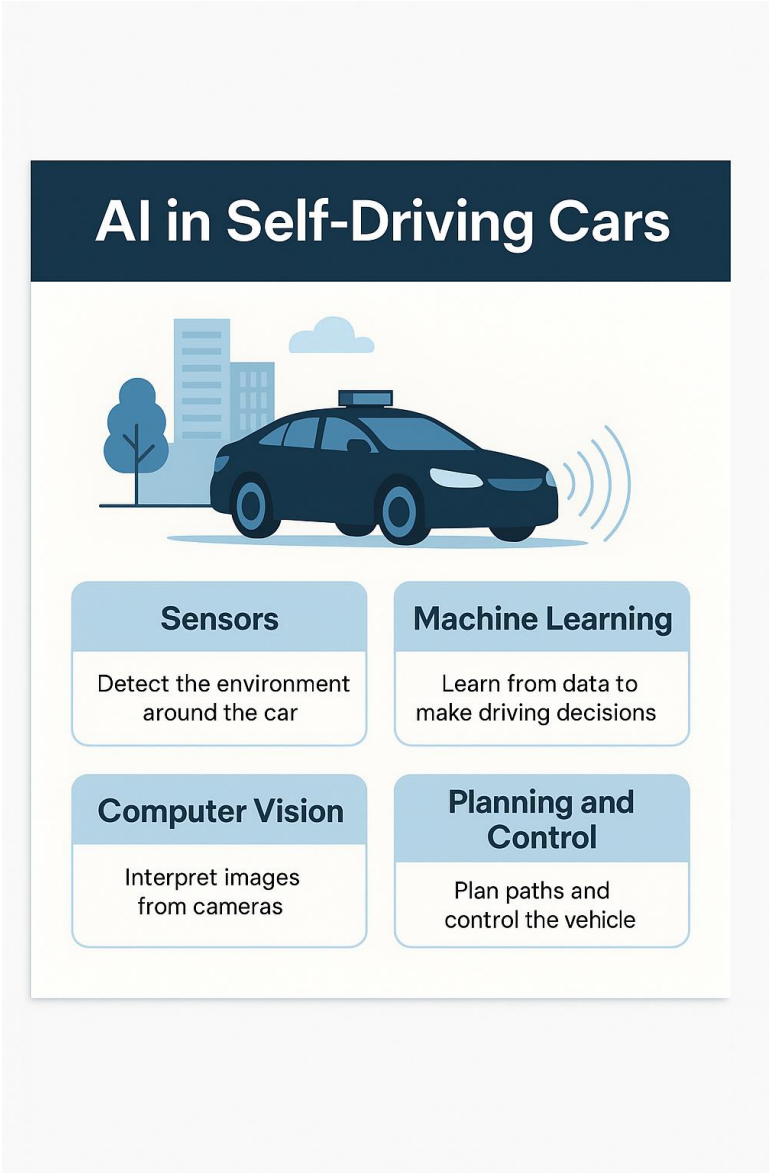
How Do Self-Driving Cars Actually Work?

- Use cameras, radar, LiDAR, and sensors to “see” the road
- Detect lane markings, signs, pedestrians, and other cars
- AI processes this data in real time to make driving decisions
- Decide when to brake, accelerate, steer, or stop
- Use GPS and maps to follow routes and reach destinations



Levels of Autonomous Driving

- The SAE or The Society of Automotive Engineers defines 6 levels of driving automation (Level 0–5).
- Level 0: No automation (you drive)
- Level 1: Basic driver assistance (cruise control)
- Level 2: Partial automation (like Tesla Autopilot)
- Level 3: Conditional automation (car can drive, but human must take over if needed)
- Level 4: High automation (no human input in most scenarios)
- Level 5: Full automation (no steering wheel or driver needed)

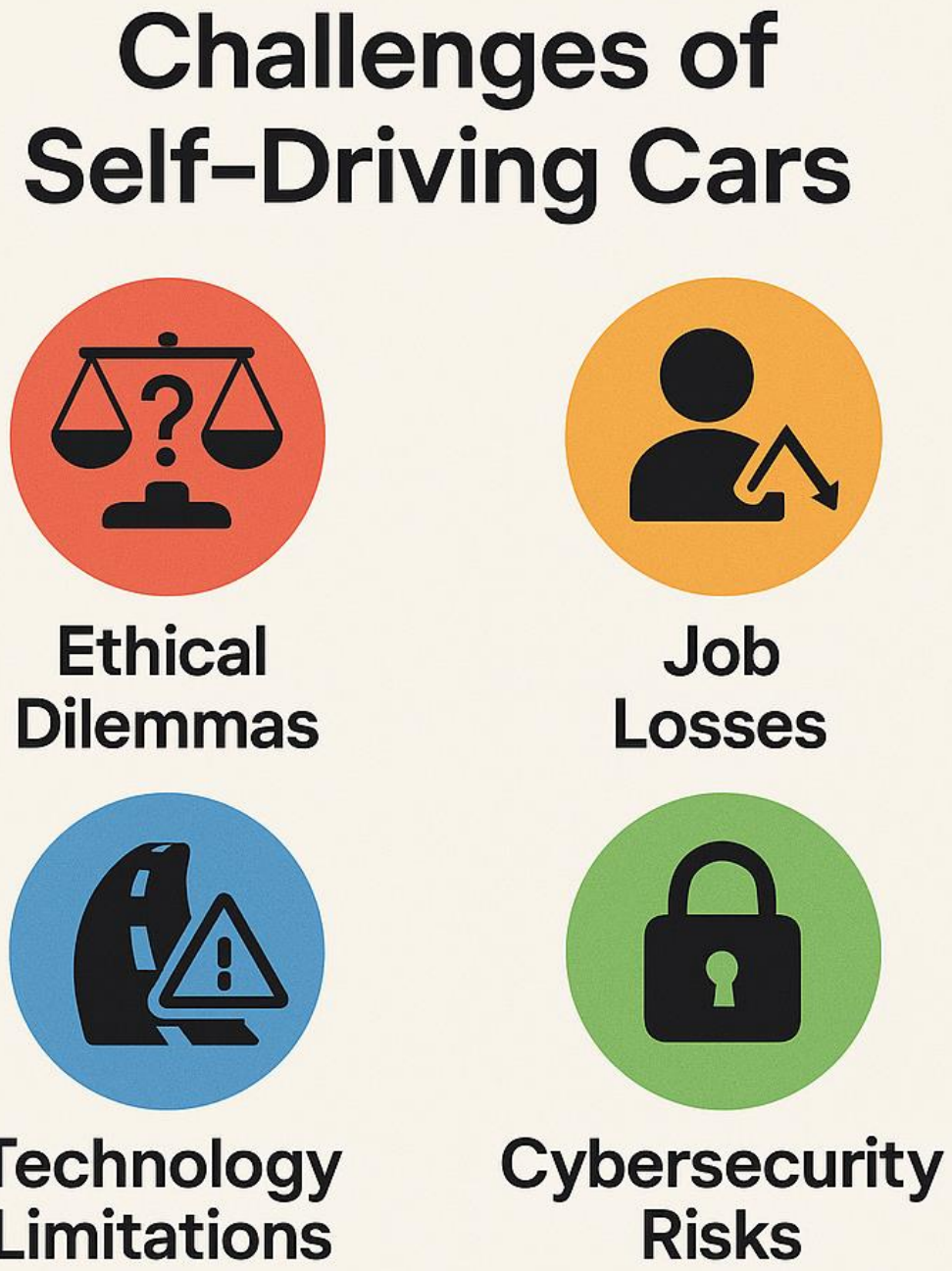


Benefits of AI in Self-Driving Cars

- **Safety**: Reduces accidents caused by human error
- **Accessibility**: Helps people who can’t drive (elderly, disabled)
- **Efficiency**: Optimizes traffic flow and fuel usage
- **Convenience**: No need to focus on driving—more productive time

Challenges and Concerns

- Ethical dilemmas arise over who is responsible if a self-driving car causes an accident.
- Self-driving technology could lead to job losses for truck drivers, taxi drivers, and others.
- Current technology has limits and can't always handle complex situations or bad weather.
- There are cybersecurity concerns, including the risk of hacking or software failures.



Real-World Examples

- Tesla Autopilot
- Waymo (by Google)
- Cruise (by GM)
- Amazon’s Zoox
- Each company is working on different types of autonomous cars, from consumer vehicles to robotaxis.

The Future of AI in Transportation

As tech improves, we might see:

- AI taxis with no driver
- Delivery robots and drones
- AI in public transportation

Governments and tech companies are working on regulations and infrastructure to support these changes.

Guided Questions

- Would you buy a car that includes self-driving features or Autonomous Driving?
- Would you trust a car that is driving itself to switch lanes on the highway at 80 MPH ?
- How could a company like Tesla expand on their self-driving cars to make them better or more reliable?
- Would you say that self-driving cars are beneficial or harmful to society?
- If you got into an accident while self-driving was activated, who is at fault? You or the computer?

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