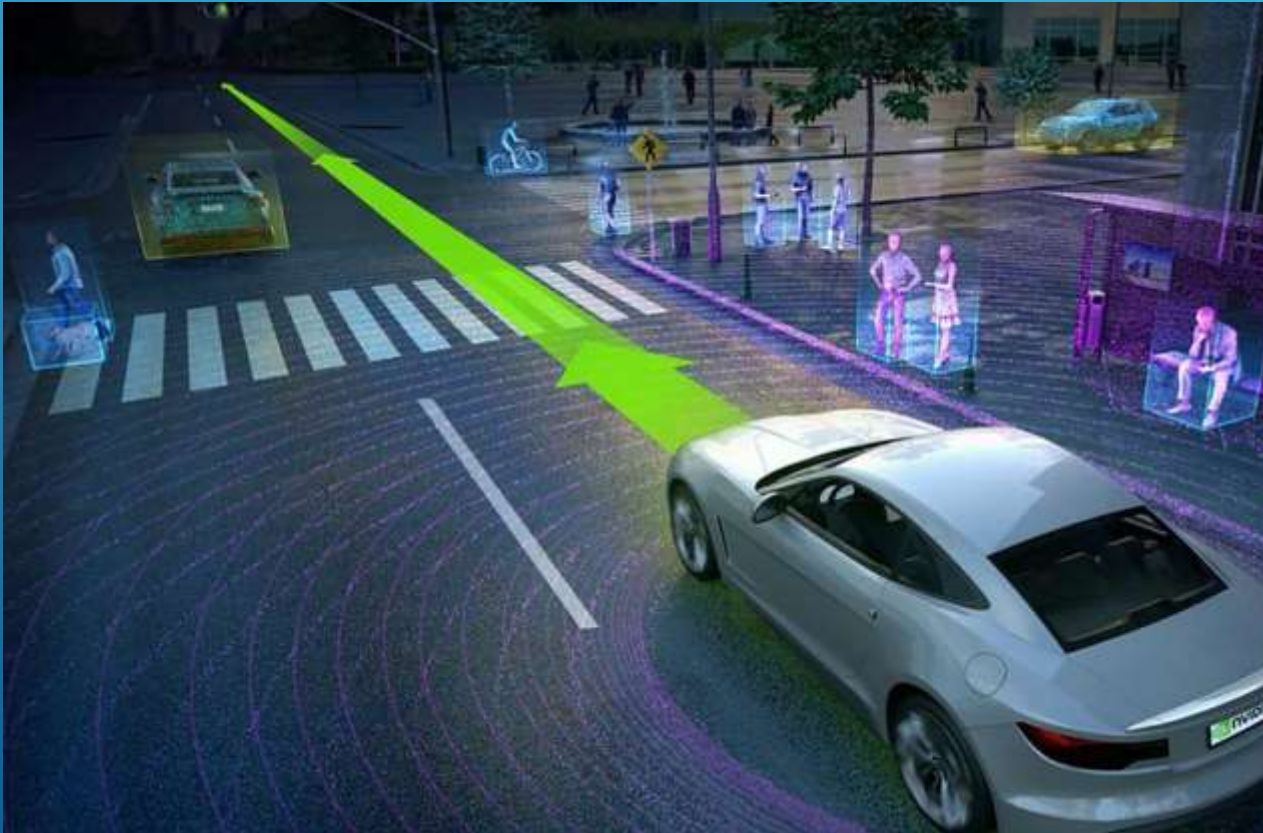


SELF DRIVING CARS

A **self-driving car** is a **vehicle** that is capable of sensing its environment and navigating without human input. **Self-driving cars** can detect surroundings, using a variety of techniques such as radar, GPS, and computer vision.



SOME HISTORY

- ▶ Experiments have been started on automating cars since 1920.
- ▶ First experimental vehicle took place in 1950.
- ▶ The first self-sufficient and truly autonomous car appeared in 1980.



LET'S TALK ABOUT FUTURE

This month at Las Vegas took place CES.
CES is an impressive trade show for new technology,
where innovations are introduced to the marketplace.

10 Exhibitors belong to Marketplace "Self-Driving Technology"

- Toyota
- Honda
- Nvidia
- Oasis
- Navya



NAVYA ARMA

An electric, intelligent and autonomous bus at the service of mobility. This innovating driverless bus can transport up to 15 passengers safely, driving up to 45 km/h

Suitable for:

- Urban areas
- Industrial sites
- Airports
- Amusement parks
- Hospitals
- Resort complex



RINSPEED OASIS

The ingenious self-driving electric vehicle for the city and surrounding areas.

Has integrated small garden behind the windshield, armchairs and TV.

Looks like a modern living room in white.



WAYMO: THE GOOGLE SELF-DRIVING CAR PROJECT

- ▶ Began at 2009. Months later, a car made the first route autonomously
- ▶ 2012, many kilometres were self-driven on freeways and city streets.
- ▶ 2014, Designed a new prototype vehicle without steering wheel and pedals
- ▶ 2016 Over 3 million km self-driven



TESLA AUTOPILOT

- ▶ 8 surround cameras provide 360 degrees of visibility around the car at up to 250 meters of range.
- ▶ 12 ultrasonic sensors complement this vision, allowing for detection of both hard and soft objects
- ▶ A forward-facing radar processing provides additional data about the world which is able to see through heavy rain, fog and dust.



SAE CLASSIFICATIONS

SAE International is a global association for aerospace, automotive and commercial-vehicle industries.

- ▶ Level 0: Automated system has no vehicle control, but may issue warnings.
- ▶ Level 1: Driver must be ready to take control at any time. Automated system may include features such as Adaptive Cruise Control (ACC), Parking Assistance with automated steering, and Lane Keeping Assistance (LKA) Type II in any combination.
- ▶ Level 2: The driver is obliged to detect objects and events and respond if the automated system fails to respond properly. The automated system executes accelerating, braking, and steering. The automated system can deactivate immediately upon takeover by the driver.
- ▶ Level 3: Within known, limited environments (such as freeways), the driver can safely turn their attention away from driving tasks, but must still be prepared to take control when needed.
- ▶ Level 4: The automated system can control the vehicle in all but a few environments such as severe weather. The driver must enable the automated system only when it is safe to do so. When enabled, driver attention is not required.
- ▶ Level 5: Other than setting the destination and starting the system, no human action is required. The automatic system can drive to any location where it is legal to drive and make its own decision.

PROS AND CONS

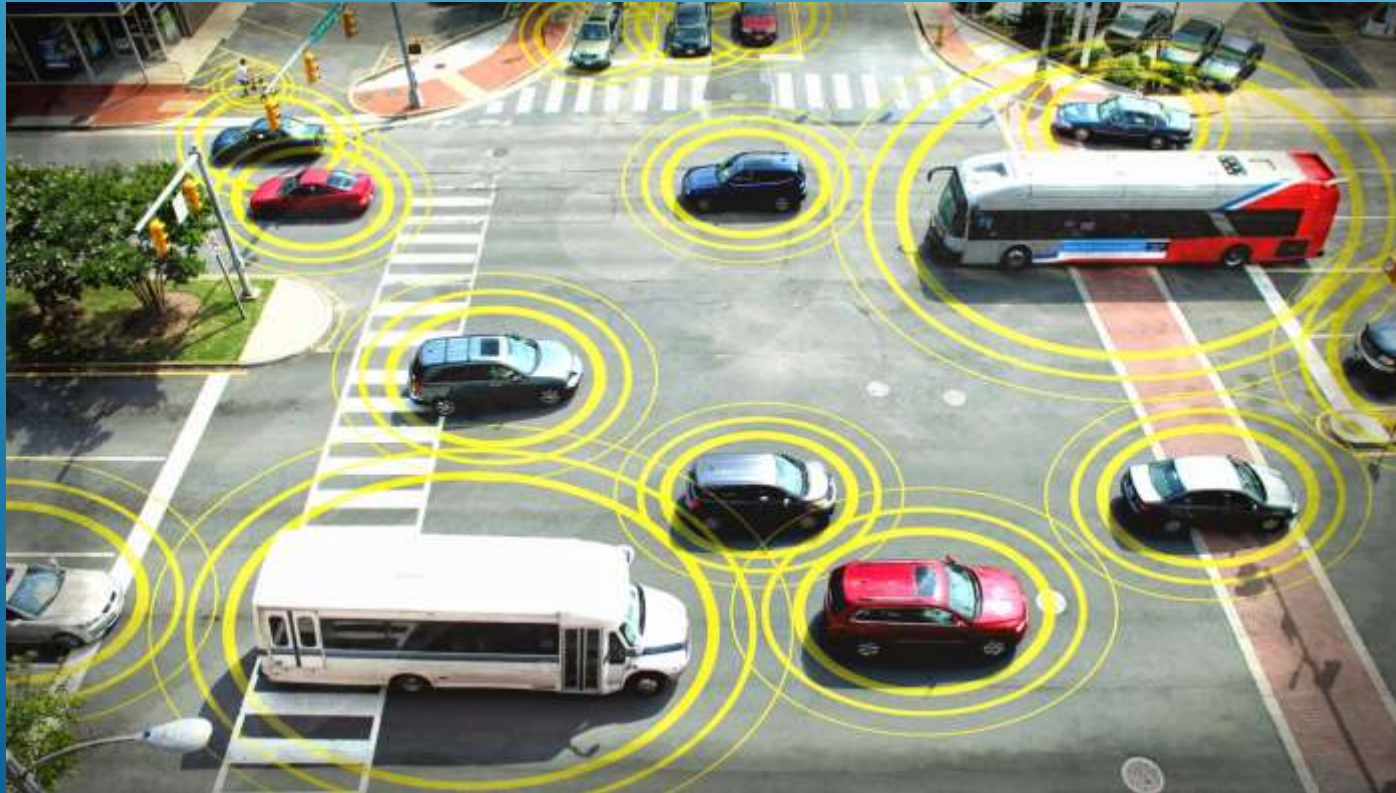
- ▶ make our roads safer
- ▶ free up people's time
- ▶ improve mobility for everyone
- ▶ improve traffic and fuel efficiency
- ▶ easy Parking
- ▶ expensive technology
- ▶ computer malfunction, could cause crashes
- ▶ hacking problems
- ▶ road system need upgrades
- ▶ ethical problems



ETHICAL PROBLEMS

A typical ethical problem is the choice of the car. What will it prefer between plowing into a group of schoolchildren and going off a bridge and killing all its passengers?

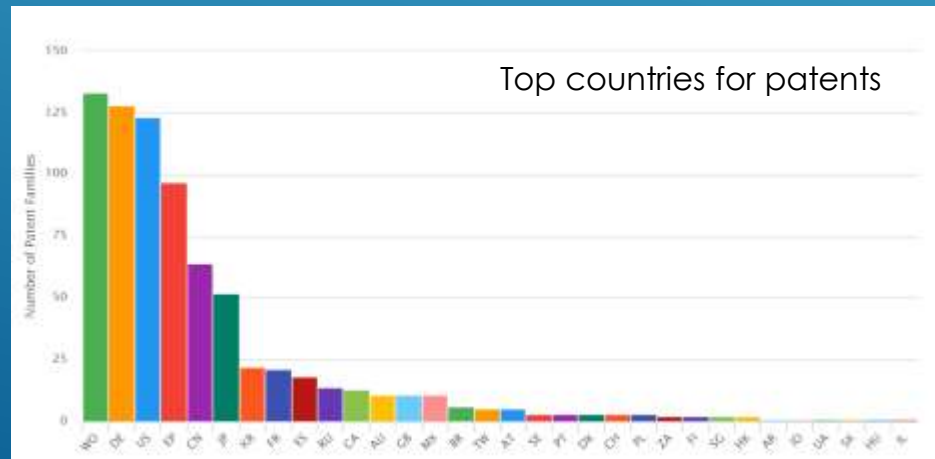
Should the vehicle always prioritize the safety and comfort of passengers?



Top Applicants

Company	Share (Estimated)
Others	~65%
BOSCH ROBERT	~10%
FORD GLOBAL TECH	~8%
CONTINENTAL TEVES	~5%
VOLVO CAR	~3%
AUDI	~2%

actumet technologies



THANK YOU FOR YOUR ATTENTION

