

ARTIFICIAL INTELLIGENCE AND AUTOMATED VEHICLES

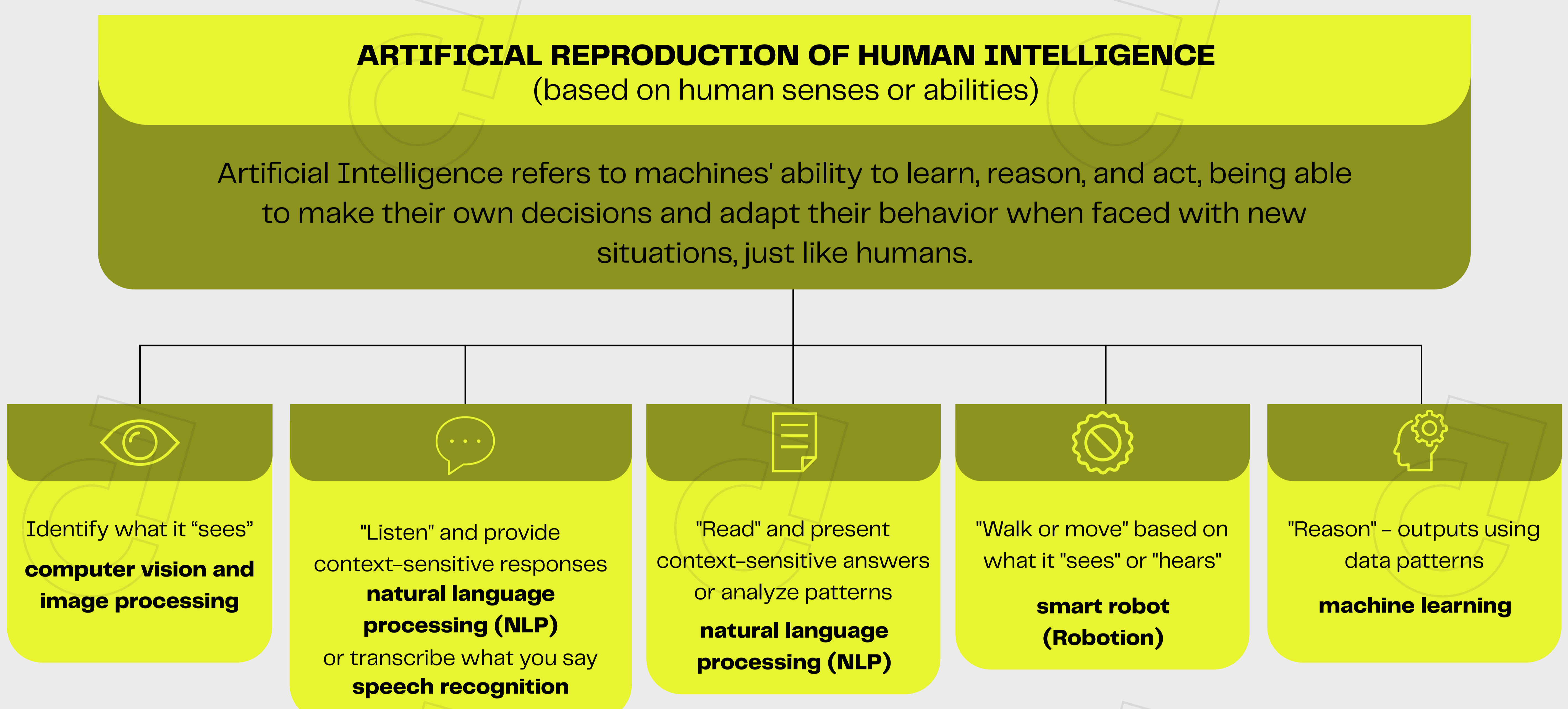
FUTURE OR REALITY?

Artificial Intelligence and Automated Vehicles – Future or Reality?

Vehicles with no pedals, steering wheels, that drive automatically come to mind when we think of automated vehicles. We know that such a technology is under development and implementation in Brazil. This series of articles covers the key aspects of autonomous vehicles, including (a) how Artificial Intelligence works in autonomous vehicles and (b) relevant legal issues.

Improvements in Artificial Intelligence are creating a new reality for autonomous vehicles. This is because Artificial Intelligence enables us to replace human drivers for "artificial drivers", making it possible to replace the capabilities and senses of a human driver with artificial intelligence.

Here is how Artificial Intelligence might work:



Artificial Intelligence enables the driving automation system to identify road signs, vehicles, and pedestrians. It also allows the car to "think" about what to do in different, expected, and unexpected situations, just as humans do. In this regard, the development of Artificial Intelligence is undoubtedly the path to achieving the dream of self-driving cars.

On the other hand, the replacement of a human driver, in whole or in part, poses certain legal challenges that need to be addressed. Without being exhaustive, those aspects include:

- The need to regulate autonomous cars comprehensively
- Consumer-related laws
- Civil liability aspects, including who is liable for damages caused by autonomous cars
- Telecommunications regulation regarding connected and online vehicles
- Transparency about how algorithms make decisions
- Data protection issues arising from the collection of drivers' and third parties' data



Artificial Intelligence and Automated Vehicles – Reality

There are many innovations in the automobile market that result in different levels of driving automation. *The Society of Automotive Engineers (SAE)*, in SAE J3016, outlined six levels of driving automation based on the level of human interference in driving tasks.

The SAE recently updated this standard in partnership with the *International Organization for Standardization (ISO)* to serve as a global guide.

Below we show how the levels of driving automation are classified:

LEVEL 0

No driving automation

The vehicle is fully conducted by a human driver. There is no driving automation, but this does not mean no technology.

The vehicle might have supporting features that provide warnings and momentary assistance to the driver, such as:



Blind spot warning



Automatic emergency braking



Lane departure warning



Lane change alert

Issues an alert if there is a deviation without the turn signal activated.



Blind spot warning

If it detects a vehicle on the blind spot area, it will warn the driver.



Hill-start assist

Automatically engages the brakes to hold the vehicle in place for up to two seconds when on a hill.



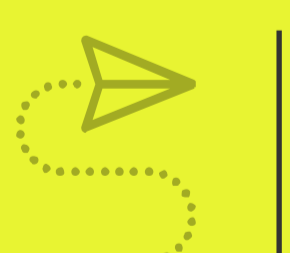
Cross-traffic alert

If traffic is detected behind the vehicle when slowly backing out of a parking spot or driveway, it will warn the driver.



Frontal collision alert

Monitors speed and distance from the vehicle ahead, and emits audible and visual alerts when detecting a possible collision.



Rear parking sensor

While slowly backing up, a series of beeps is emitted when nearing an object.



Headlight height and intensity assistant

Automatically turns off the high beam upon detecting an approaching vehicle.



LEVEL 1

Driver assistance

The main driving tasks depend on the driver.

The vehicle has one of the two (but not both) functionalities listed below:



Frontal assistance: Adaptive cruise control

The driver sets the distance from the vehicle ahead. If it detects the car ahead is slower, it automatically slows down the vehicle to avoid a collision.

OR



Lateral assistance: Lane centering

If the system detects that the driver is driving off the center of the traffic lane, it will bring the car back.



Adaptative cruise control



Active lane management

If the system detects an unintentional lane drift, it will alert the driver and correct the vehicle back into the lane.



Emergency braking

Activates the brakes automatically when detecting risk of collision.



Parking Assist

Controls the steering wheel when parking the vehicle.



Automatic switching of headlamps

Regulates the intensity of headlights when detecting an approaching vehicle.



Driver fatigue detector

When it detects signs of fatigue or attention fall, it activates alerts.



LEVEL 2

Partial driving automation

The vehicle controls both the steering wheel and the pedals simultaneously. The driver needs to be alert to act in risky situations.

The car can drive without human interference for a few miles. It combines the following technologies:



Adaptive cruise control

AND



Lane centering



Adaptive cruise control



Lane centering

LEVEL 3

Conditional driving automation

The vehicle can make decisions independently.

The vehicle can travel without human interference for many miles, but the driver must be alert to act.



Traffic Jam Pilot



Traffic Jam Pilot

Recognizes, predicts, and makes decisions, applying a high level of control over acceleration, braking, and steering.



LEVEL 4

High-level driving automation

The vehicle can operate and make decisions on its own.

The car can travel without human interference under limited conditions. It may have difficulty working in adverse weather conditions and on dangerous roads.



Pedals or steering wheel may or may not be installed.

LEVEL 5

Full driving automation

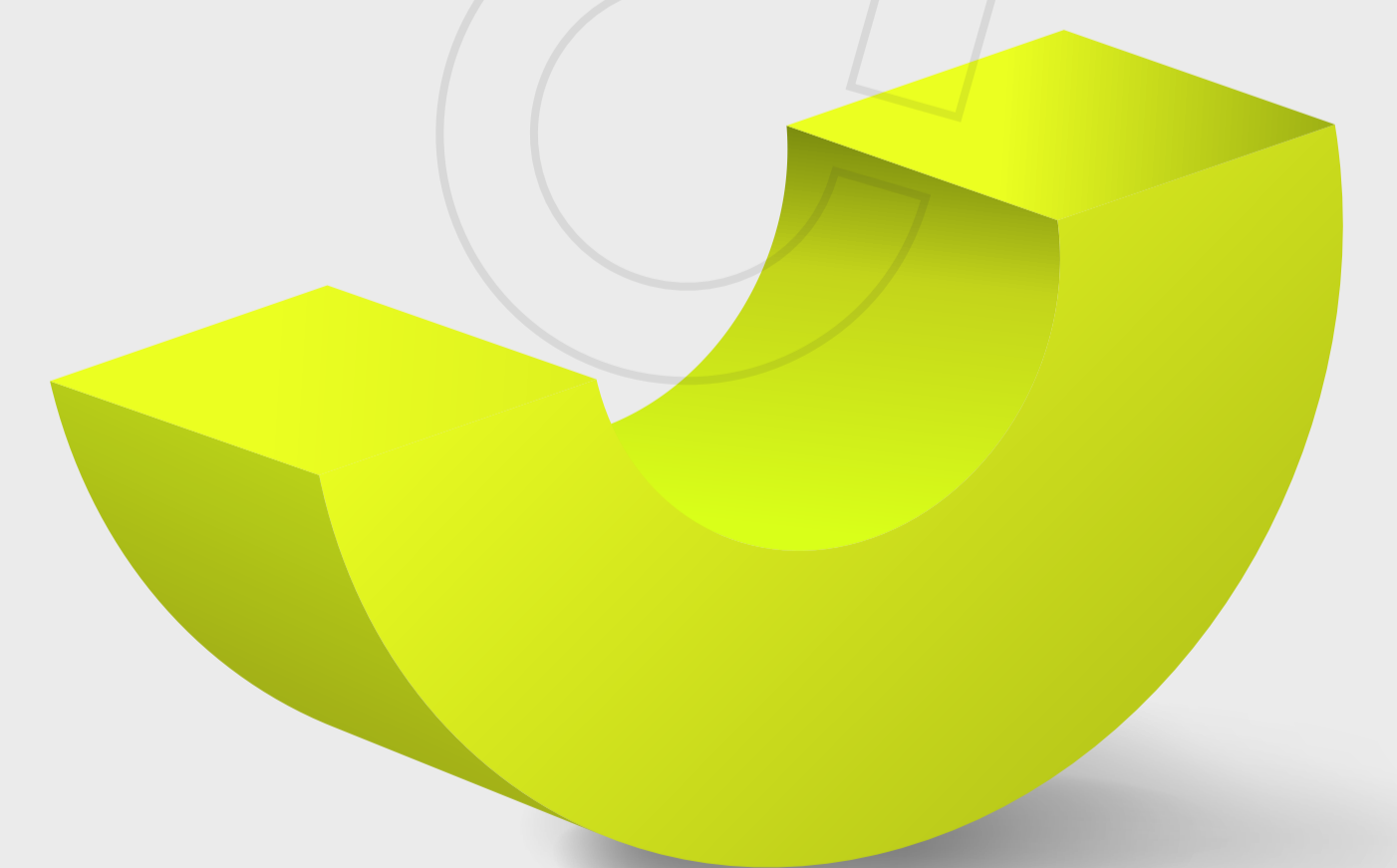
The vehicle can operate, decide on its own, and even correct failures.

The car can travel without human interference under all conditions.



As a rule, there are no steering wheel or pedals. The passenger simply provides the coordinates to the destination.

Fully automated vehicles, without pedals, steering wheel or driver. Levels of driving automation that are yet to come.



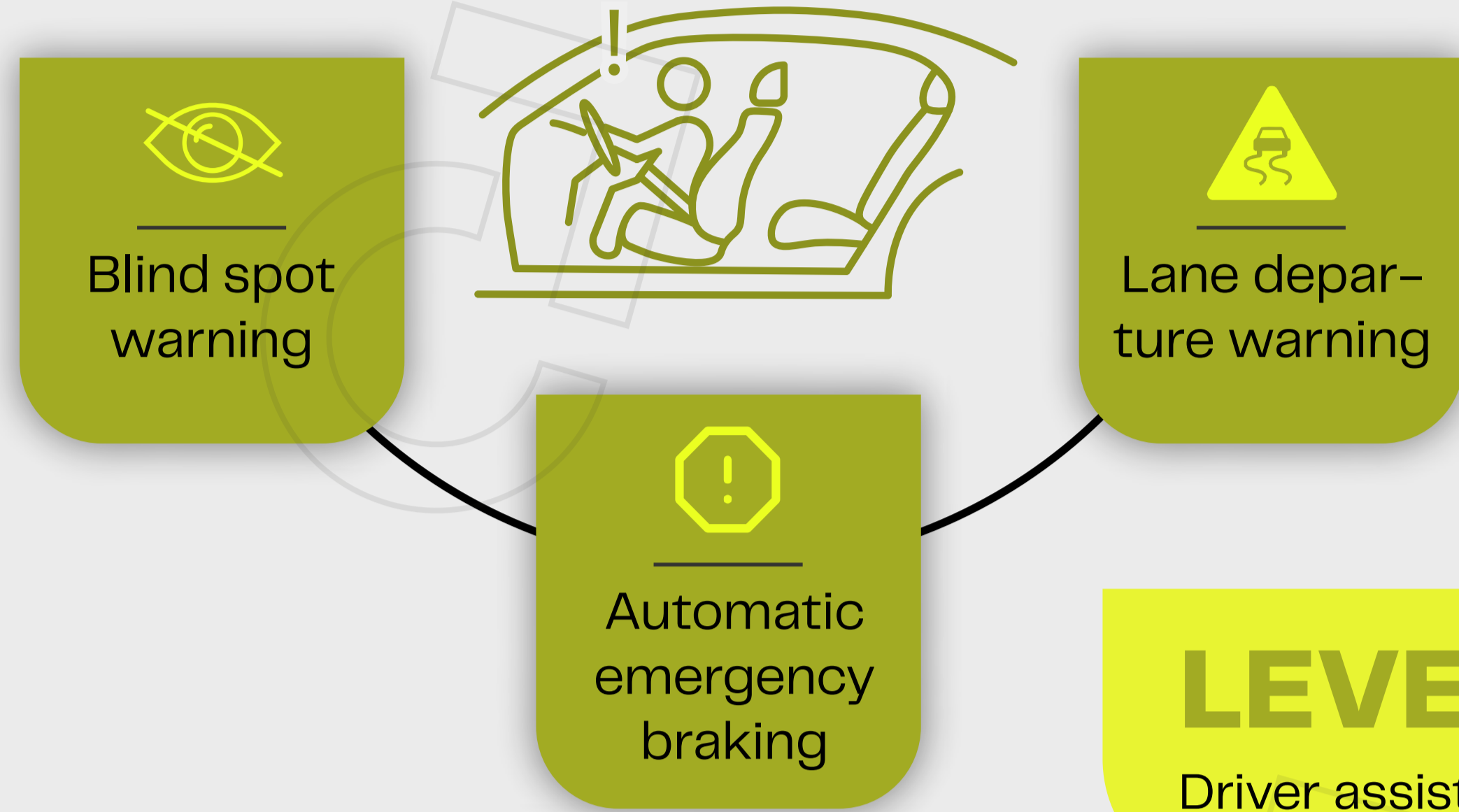
AUTOMATED VEHICLES

Reality or Future?

LEVEL 0

No driving automation

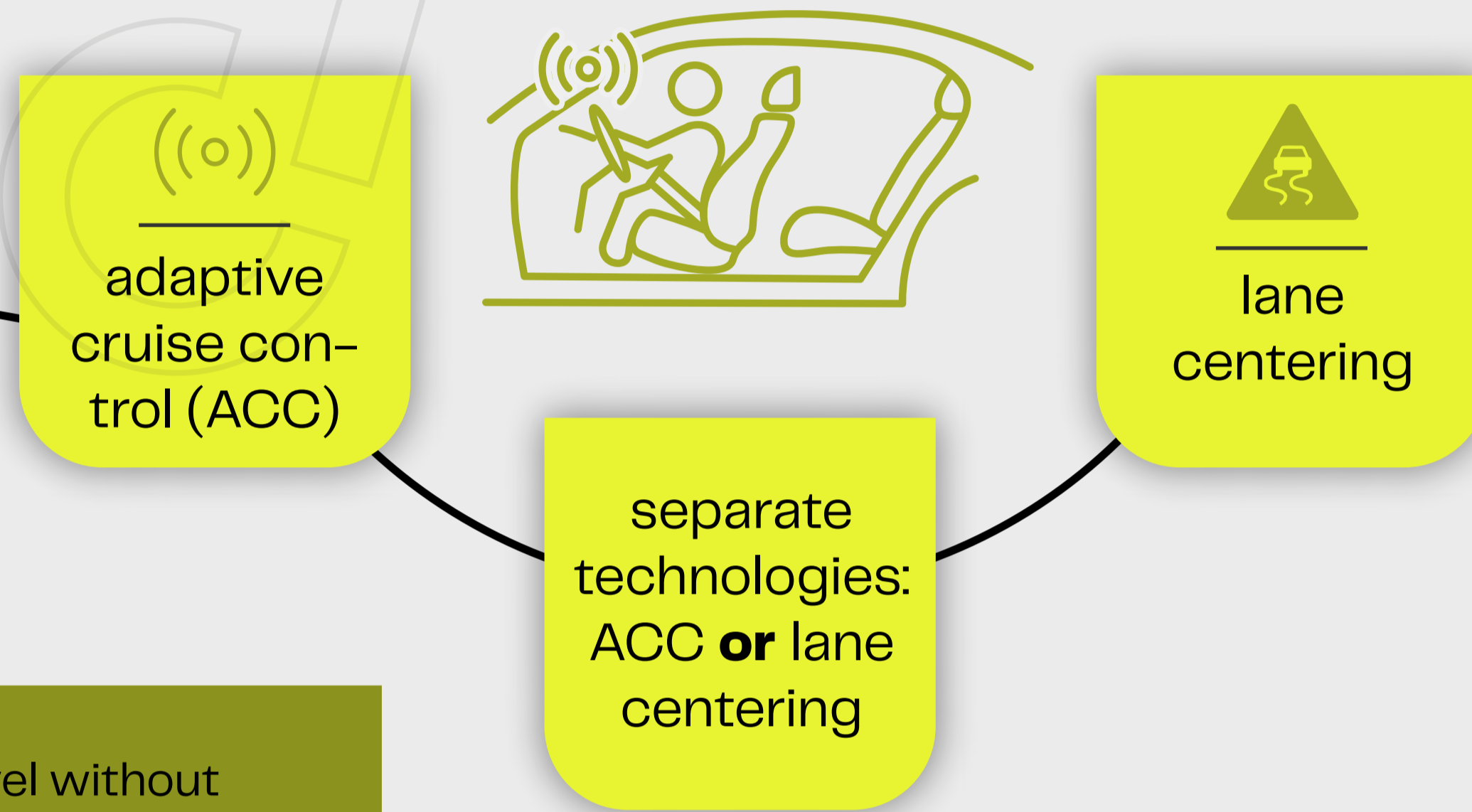
Limited technology that provides warnings and momentary assistance.



LEVEL 1

Driver assistance

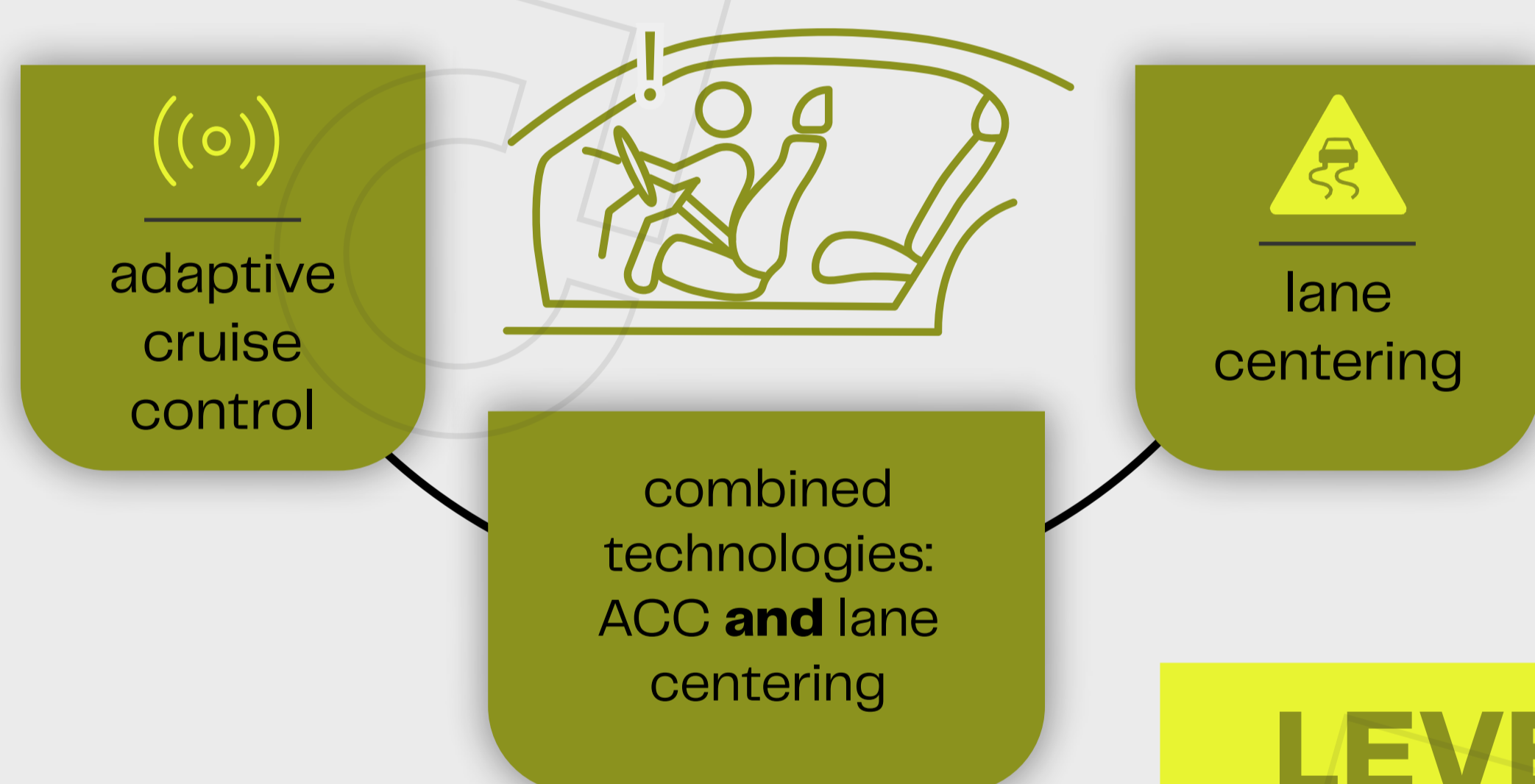
Technologies that provide steering or brake/acceleration support to the driver.



LEVEL 2

Partial driving automation

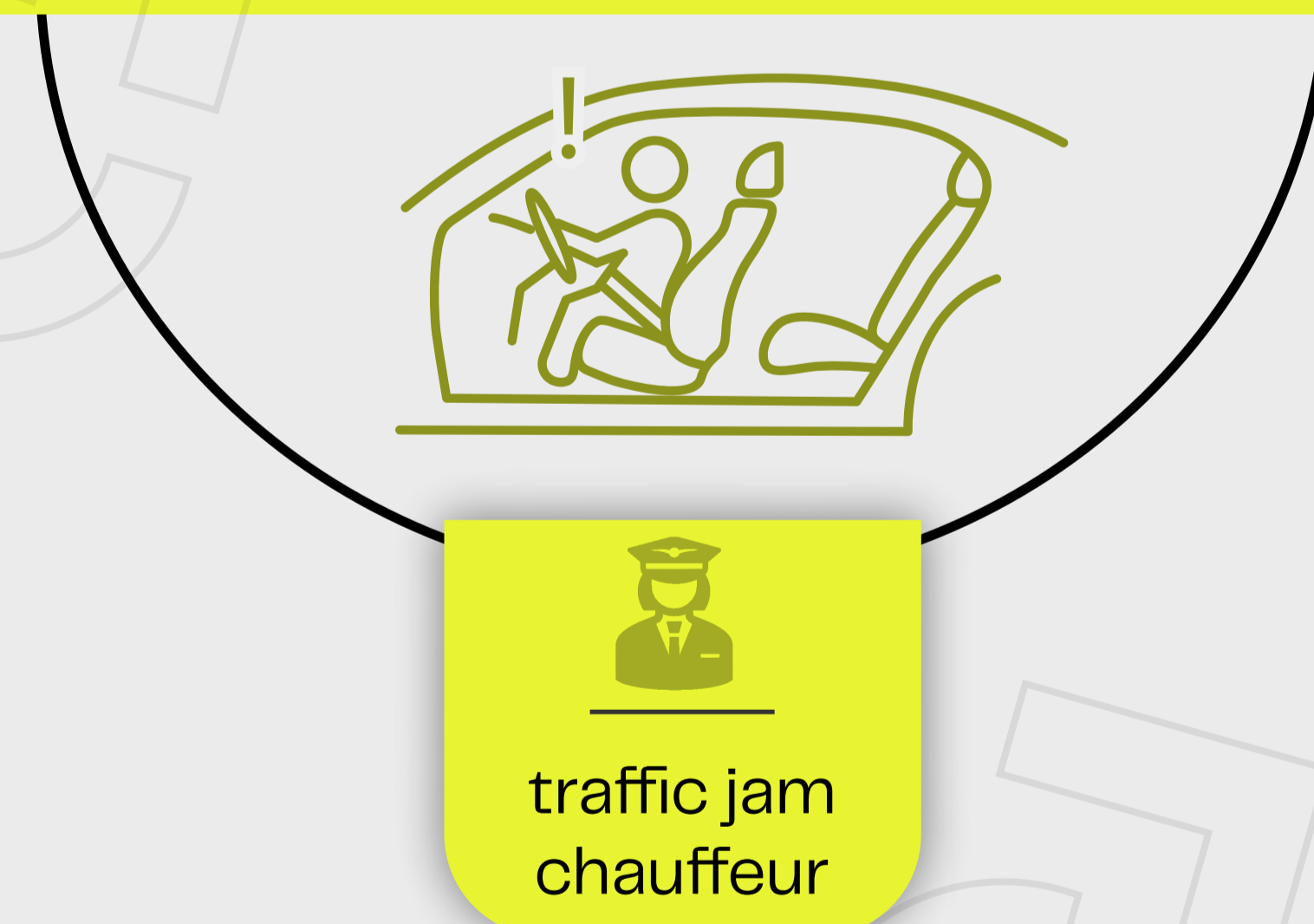
The car can travel without human interference for a few miles.



LEVEL 3

Conditional driving automation

The car can travel without human interference for many miles, but the driver must be alert to act.



LEVEL 4

High driving automation

Fully automated vehicles, without pedals, steering wheel, or driver.

The car can travel without human interference under limited conditions.



Pedals or steering wheel may or may not be installed

LEVEL 5

Full driving automation

The car can travel without human interference under all conditions.

Fully automated vehicles, without pedals, steering wheel, or driver.



As a rule, there is no steering wheel or pedals. The passenger simply provides the coordinates to the destination

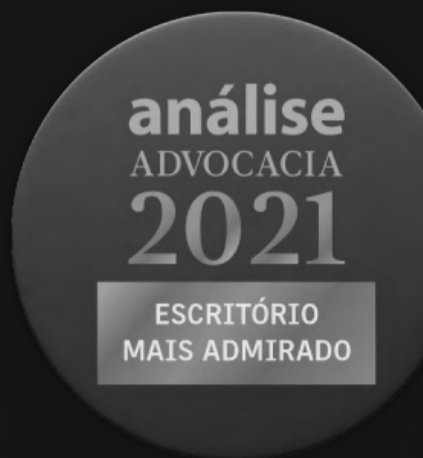
For further information, please refer to the relevant Primer
Source: Society of Automotive Engineers, SAE J3016

Legal Aspects of Automated Vehicles

- The need to regulate autonomous cars comprehensively
- Consumer-related laws
- Civil liability aspects, including who is liable for damages caused by autonomous cars
- Transparency about how algorithms make decisions
- Data protection issues arise from the collection of drivers' and third parties' data



Our recognitions



Análise Advocacia (2021)



Chambers & Partners Brazil (2021 & 2022)



Leaders League (2021 & 2022)



Transactional Track Record (2021 & 2022)



The Legal 500 (2022)

Meet our Partners



Alan Campos Thomaz

Partner

Technology & Digital Business, Privacy and Data Protection, Fintechs and Intellectual Property
at@camposthomaz.com

+55 11 9 8375.2627 +1 (650) 6436652



Sérgio Meirelles

Partner

Corporate, M&A, Venture Capital and Wealth

sergio@camposthomaz.com

+55 11 9 7551.9865



Filipe Starzynski

Partner

Litigation & Law Enforcement, Civil, Real State, Labor and Family
filipe@camposthomaz.com

+55 11 9 7151.9639



Juliana Sene Ikeda

Partner

Intellectual Property, Technology, Agreement and Life Sciences
juliana@camposthomaz.com

+55 11 9 8644.1613



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