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AI PROJECT PO

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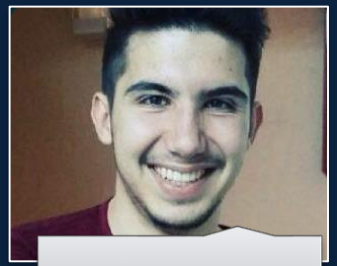

Lucas BONMARIN

TOPIC

AI Applications in Autonomous Vehicles

Source

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PLAN

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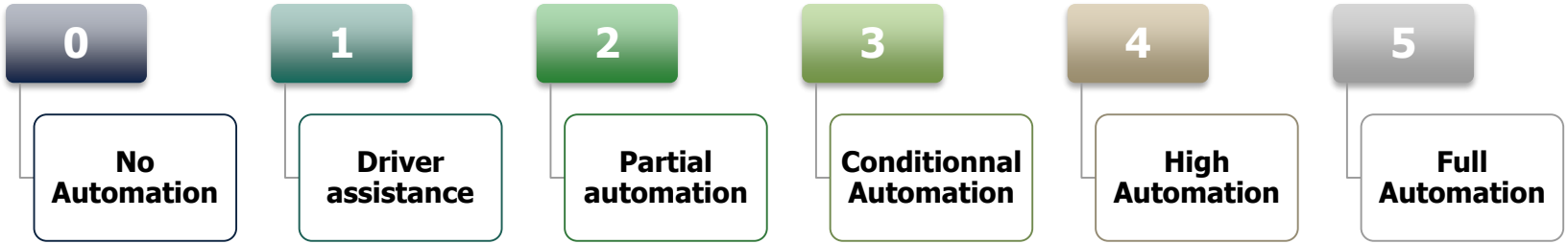
AUTONOMOUS VEHICLE : WHAT IS IT ?

- A vehicle that can guide itself without human conduction.
- Vehicle using automation for difficult tasks = semi-autonomous
- Vehicle relying solely on automation = autonomous.

Different levels of Autonomy



EXISTING SOLUTIONS

Cars

- Adaptive cruise control
- Advanced Automatic Collision Notification, such as OnStar
- Intelligent Parking Assist System
- Automotive night vision with pedestrian detection
- Driver Monitoring System

Shared autonomous vehicles

- Focus has been on low speed, 20 miles per hour (32 km/h), with short, fixed routes for the "last mile" of journeys
- Local Motors ("Olli") and the Gateway project.

Motorcycles

- Several self-balancing autonomous motorcycles were demonstrated in 2017 and 2018 from BMW, Honda and Yamaha

Buses

- Autonomous buses are started to be used in Stockholm.
- China has also a small fleet of self-driving public buses in the tech district of Shenzhen, Guangdong.

EXISTING SOLUTIONS

Trucks

- Caterpillar Inc. made developments in 2013 to improve efficiency and reduce cost at various mining and construction sites
- week of autonomous driving across Europe in April 2016, by trucks from Volvo and the Daimler Company

Drones

- Delivery drones for various industries, including packages and food
- traditional transportation companies compete with start-ups, governments and technological companies like Amazon, on this market
- Main issue : **legislation**

Trains

- First self-driving train in UK was launched in London Thameslink route.
- An example of automated trains is the Docklands Light Railway in London.

Others

- Automated Guided Vehicle
- Aicraft
- Watercraft
- Submersibles

EXISTING COMPANIES

Waymo Semi

- March 2018, Waymo, the automated vehicle company spun off from Google parent company Alphabet Inc., announced it was applying its technology to semi trucks.

Uber Semi

- Our self-driving semi trucks are already in the road in Arizona

Tesla Semi

- In November 2017 Tesla, Inc., owned by Elon Musk, revealed a prototype of the Tesla Semi and announced that it would go into production

Starsky Robotics

- In 2017, Starsky Robotics unveiled its technology that allows to make trucks autonomous.

EXAMPLES OF ETHICAL CONSIDERATIONS

- **Extreme cases**: kills a group of pedestrians or plunge of a cliff?
  - ***How a car should decide between the lives of its passengers and those of pedestrians?***

- **If there's an accident, who can we blame? The constructor? The engineer or the vehicle?**

CURRENT LIMITATIONS & HARD PROBLEMS

- One of the current limitations for vehicular automation was the electrical power required to run the processors.
- How do we store the huge amont of data?
- Balance between speed and the safety on the road (Pedestrians, other vehicles, etc.)
- How to avoid random noise?

CURRENT LIMITATIONS & HARD PROBLEMS

- ➔ **Creating and maintaning maps for self-driving cars is difficult work**
- ➔ **Transition to autonomous vehicles : Driving requires many complex social interactions !**
- ➔ **Bad weather makes everything trickier.**

CONCLUSION

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