AI-Assisted Autonomous Navigation

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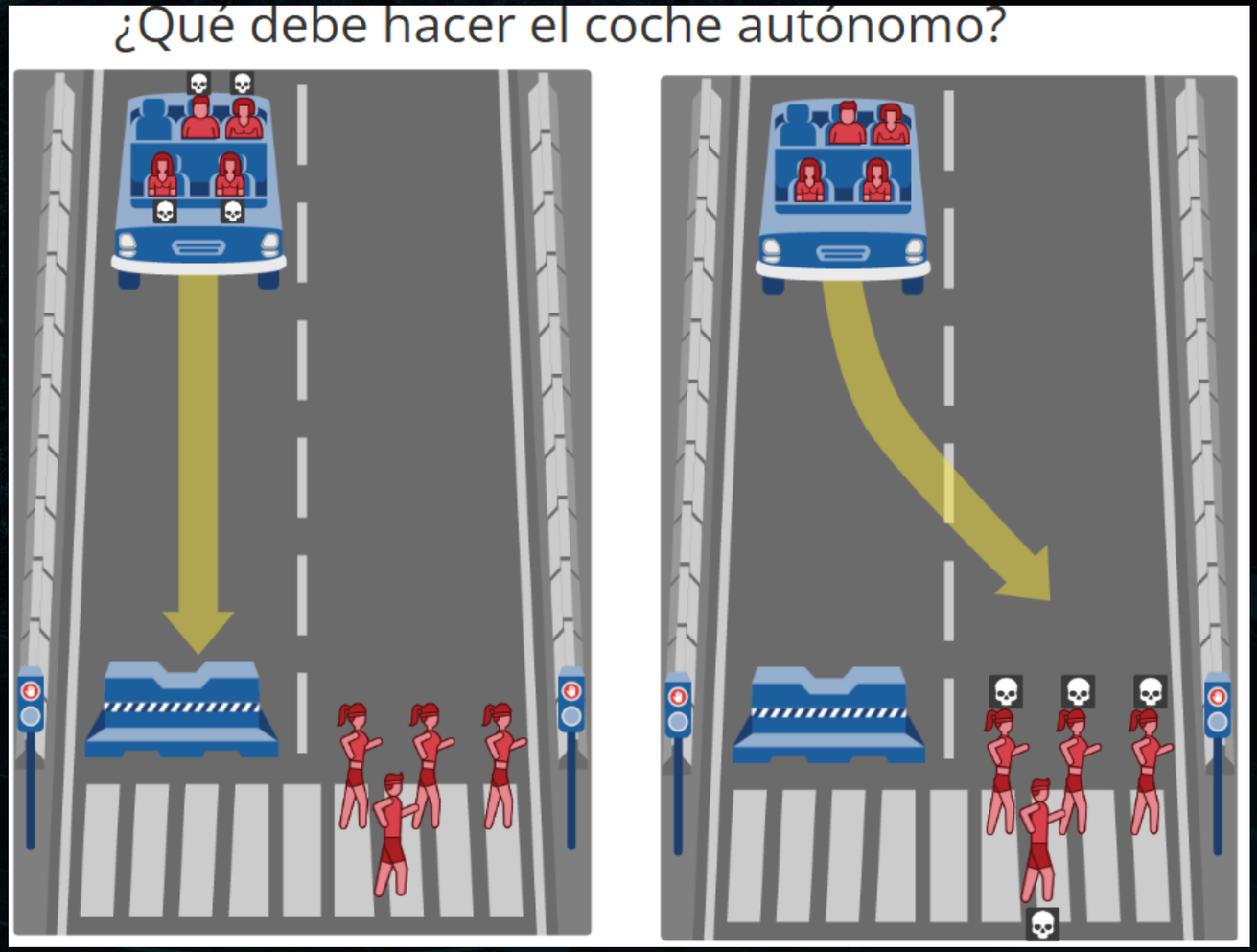
Moral dilemma of autonomous vehicles

The Moral Machine: An MIT Experiment

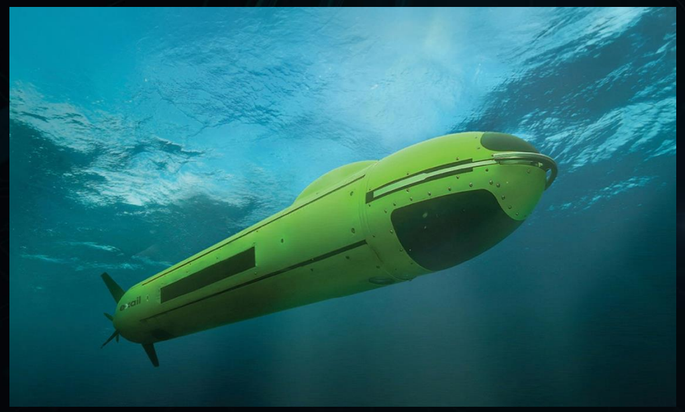
https://www.moralmachine.net/hl/es



What solution are self-driving car developers adopting? We'll cover it at the end of the presentation... Don't miss out!

What do we call autonomous navigation?

A device that is capable of moving from one point to another in space, without any human control, and adapting to the dynamic environment that surrounds it.

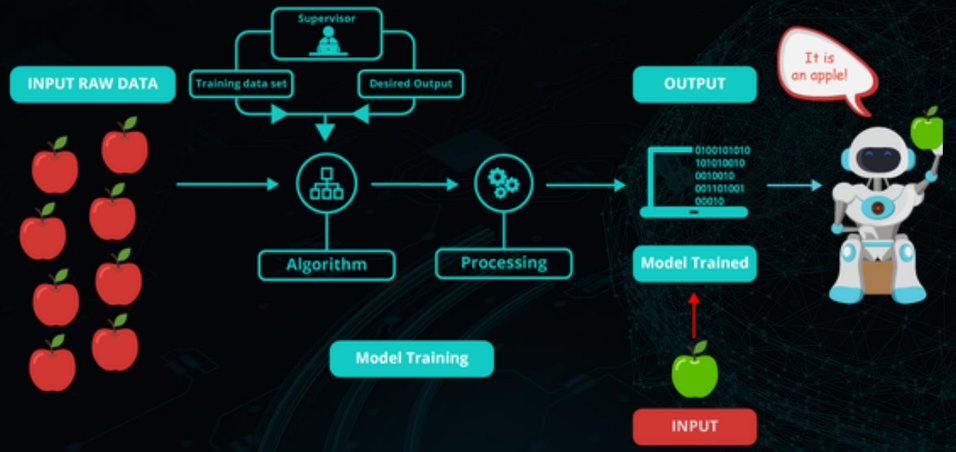


Autonomous navigation issues

- Real-time recognition of the dynamic environment
- Positioning
- Short-term and long-term planning
- In drones and submarines: 3D movement and maintenance in the fluid.

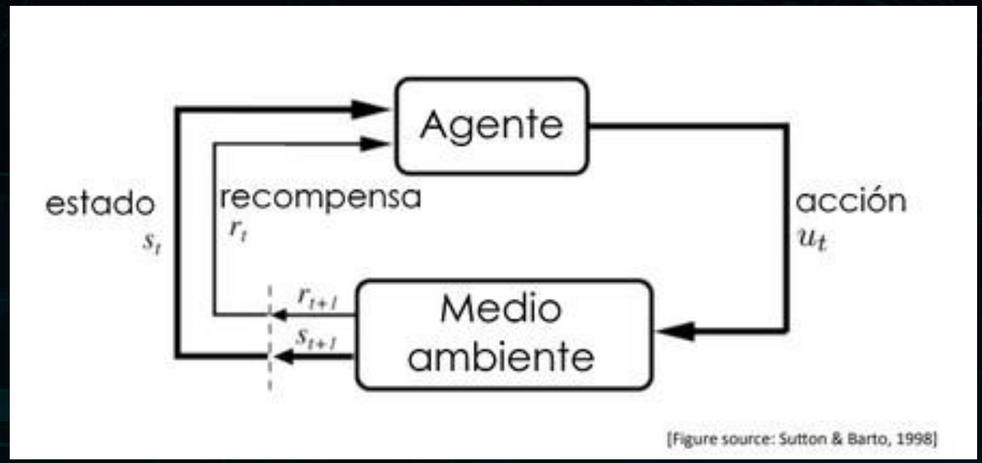
In what aspects does AI play an essential role?

A brief review



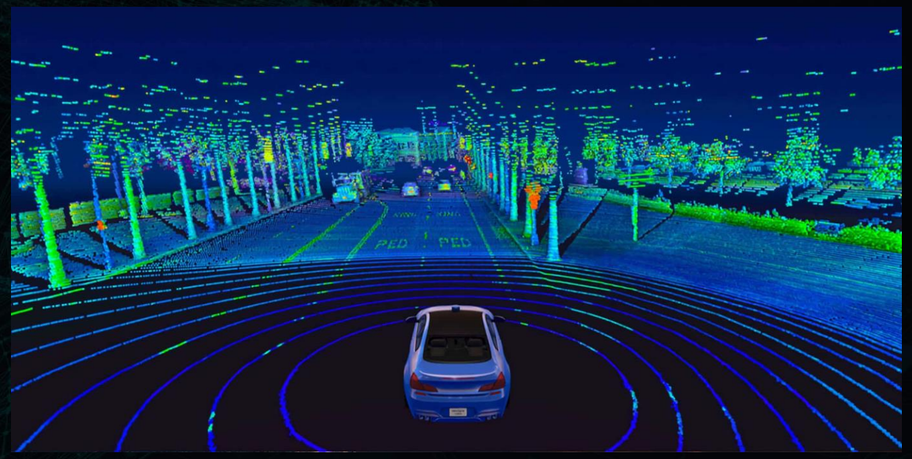
Supervised Learning

Reinforcement learning



[Figure source: Sutton & Barto, 1998]

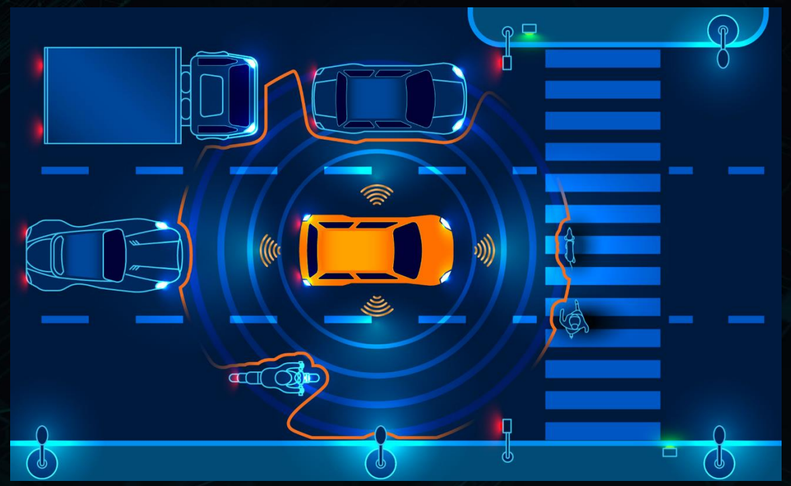
Real-time recognition of the dynamic environment



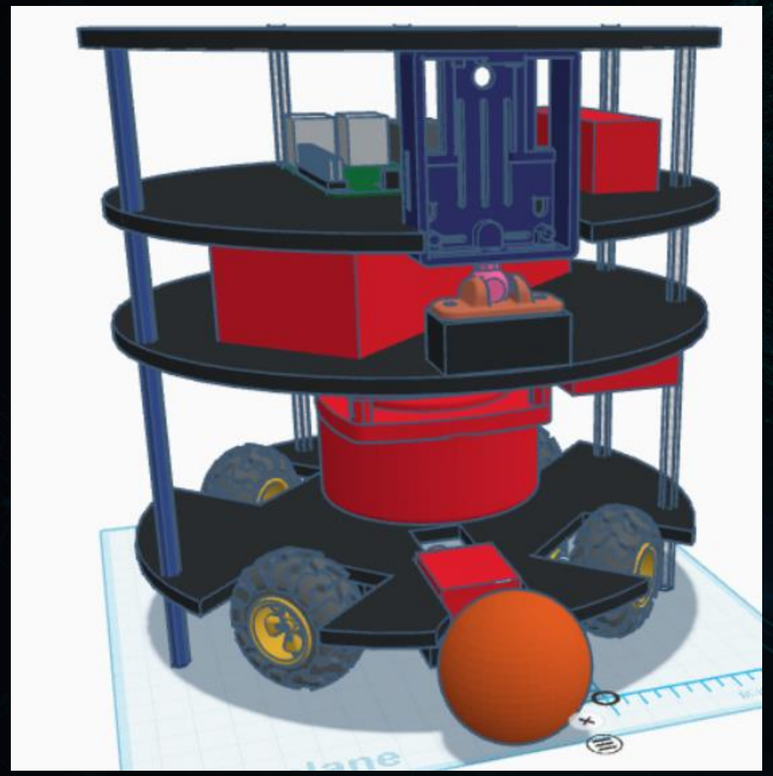
- Main sensors: lidar and camera
- Global static elements database
- Did any of you participate in the training of an AI for autonomous vehicles?
- Simulators for reinforcement learning
- Relatively tidy environment
- Speed vs precision

Positioning

- Local and global
- Main sensors: gps (global), ultrasonic and lidar (local), environment info
- Using AI for local
- Additional signals in the environment to improve the local position
- Speed vs precision (once again...)

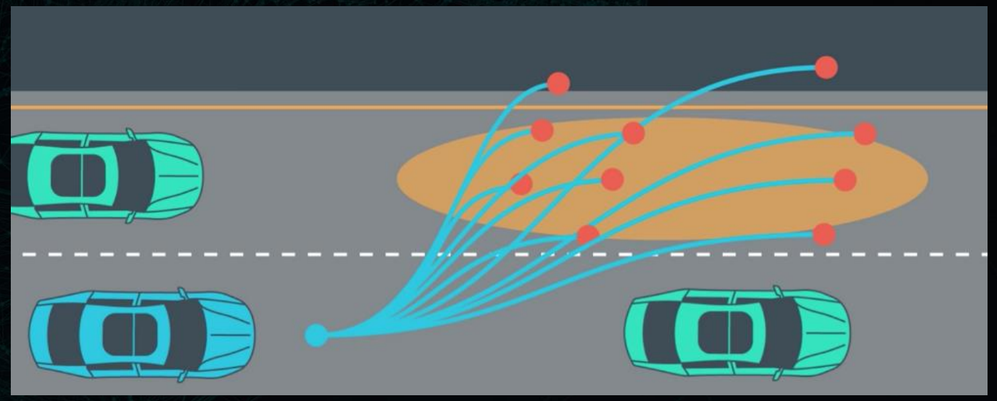


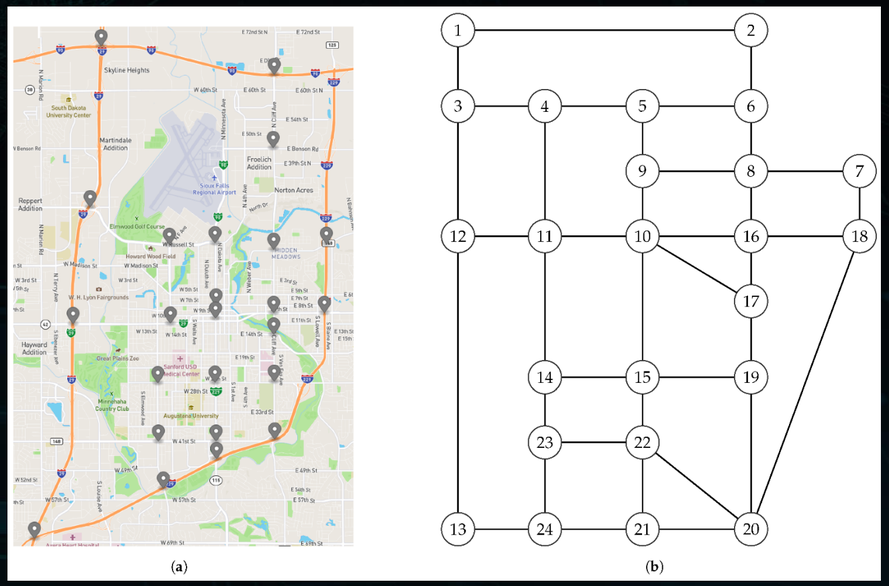
Lidar in soccer



Short-term and long-term planning

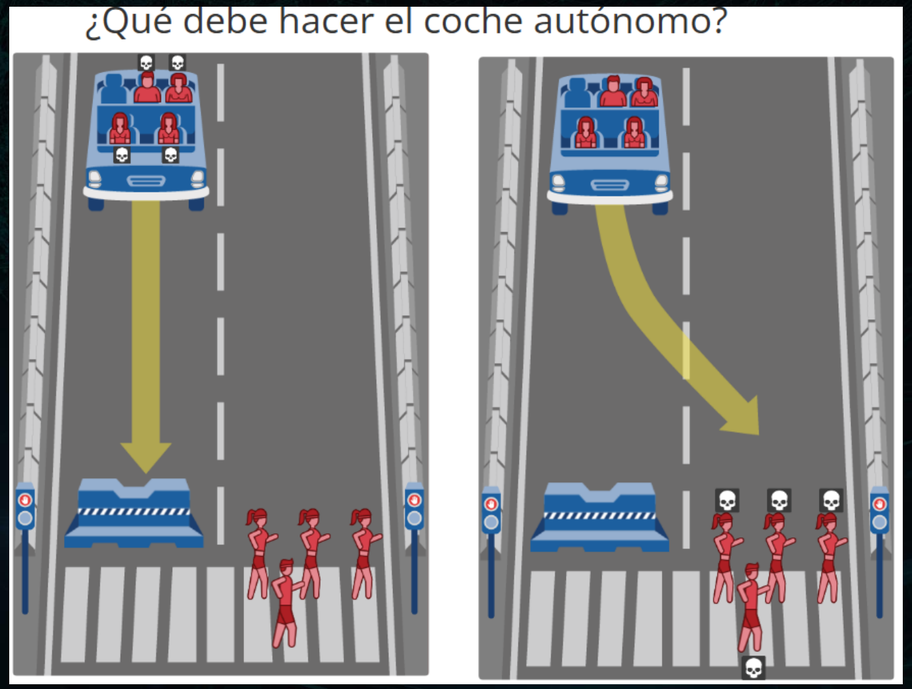
- Main sensors: GPS, Environment Info and Global Mapping System
- Using AI for local and route optimization
- Path-planning algorithms (Traveling salesman problem?)





Using Simulators for Reinforcement Learning

Hey, don't forget the solution to the moral problem of self-driving cars!



Buckle Up for the IA Revolution!

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