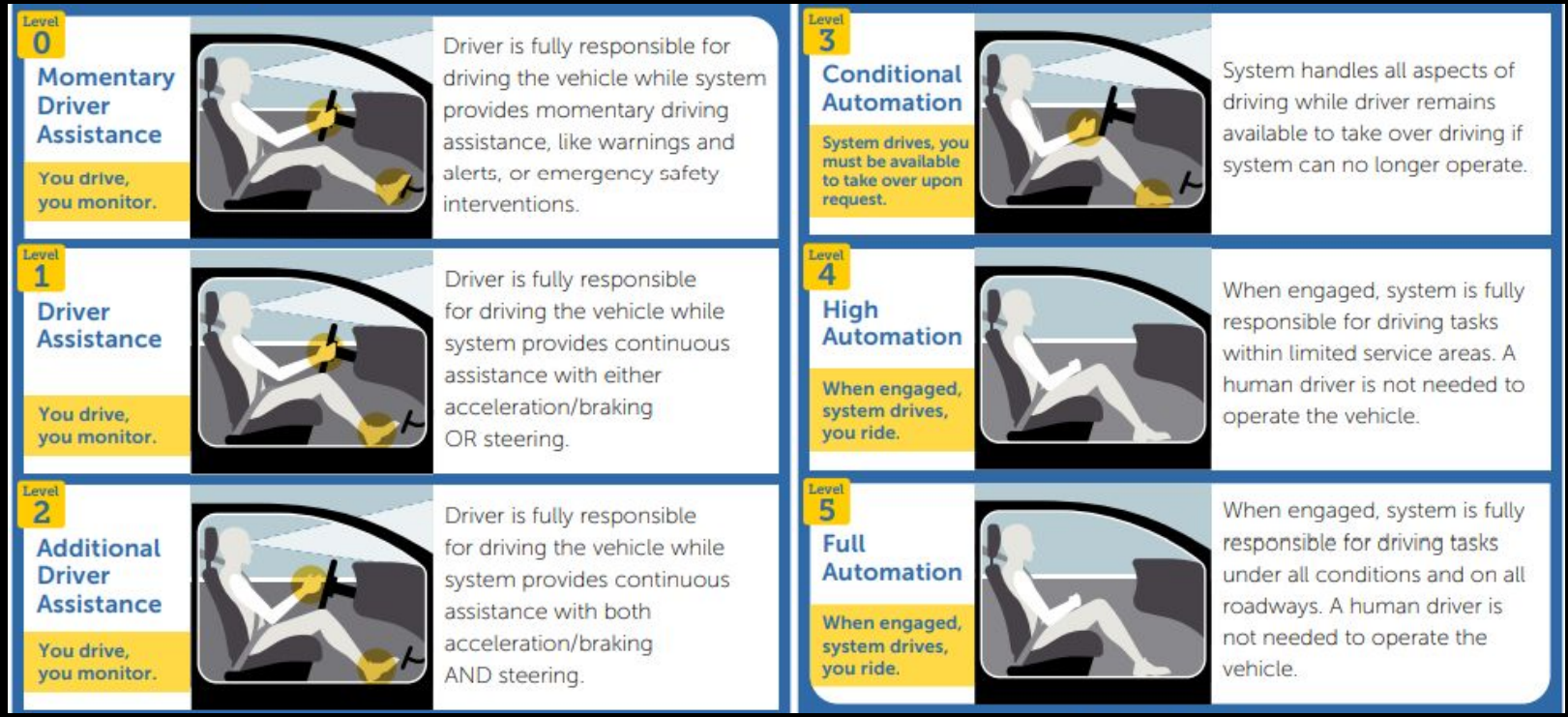
Self-driving cars: Safety and Decision-making

Sam Lojacono
Kiana Herr

Levels of Automation

NHTSA



"Automated Vehicles for Safety," NHTSA (National Highway Traffic Safety Administration), accessed October 25, 2022, https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety.

Safety Is The Point

Decision making is based on programmed “risk magnitudes.” For example:

“Getting sideswiped by a truck has a risk magnitude of 5,000, getting into a head-on crash with another car has a risk magnitude of 20,000, and hitting a pedestrian has a risk magnitude of 100,000 (Nelson).”

Ideal fully-automated systems will:

- Eliminate drowsy, distracted, or impaired driving
- Prevent traffic law violations
- Enable people with disabilities that prevent driving to travel safely
- Take in sensor data from all directions and process it quickly, and respond to hazards more quickly than human reaction time allows
- “...communicate with one another and change routes based on traffic, accidents or construction”

Marc Saltzman, “Self-Driving Cars Are a Thing of the Future. but Is That Future Right around the Corner?,” USA Today (Gannett Satellite Information Network, August 29, 2022), https://www.usatoday.com/story/tech/2022/08/29/self-driving-cars-future-gm-tesla/7896389001/.

MBA Andy Lau, “The Ethics of Self-Driving Cars,” Medium (Towards Data Science, August 13, 2020), https://towardsdatascience.com/the-ethics-of-self-driving-cars-efaaaaf9e320.

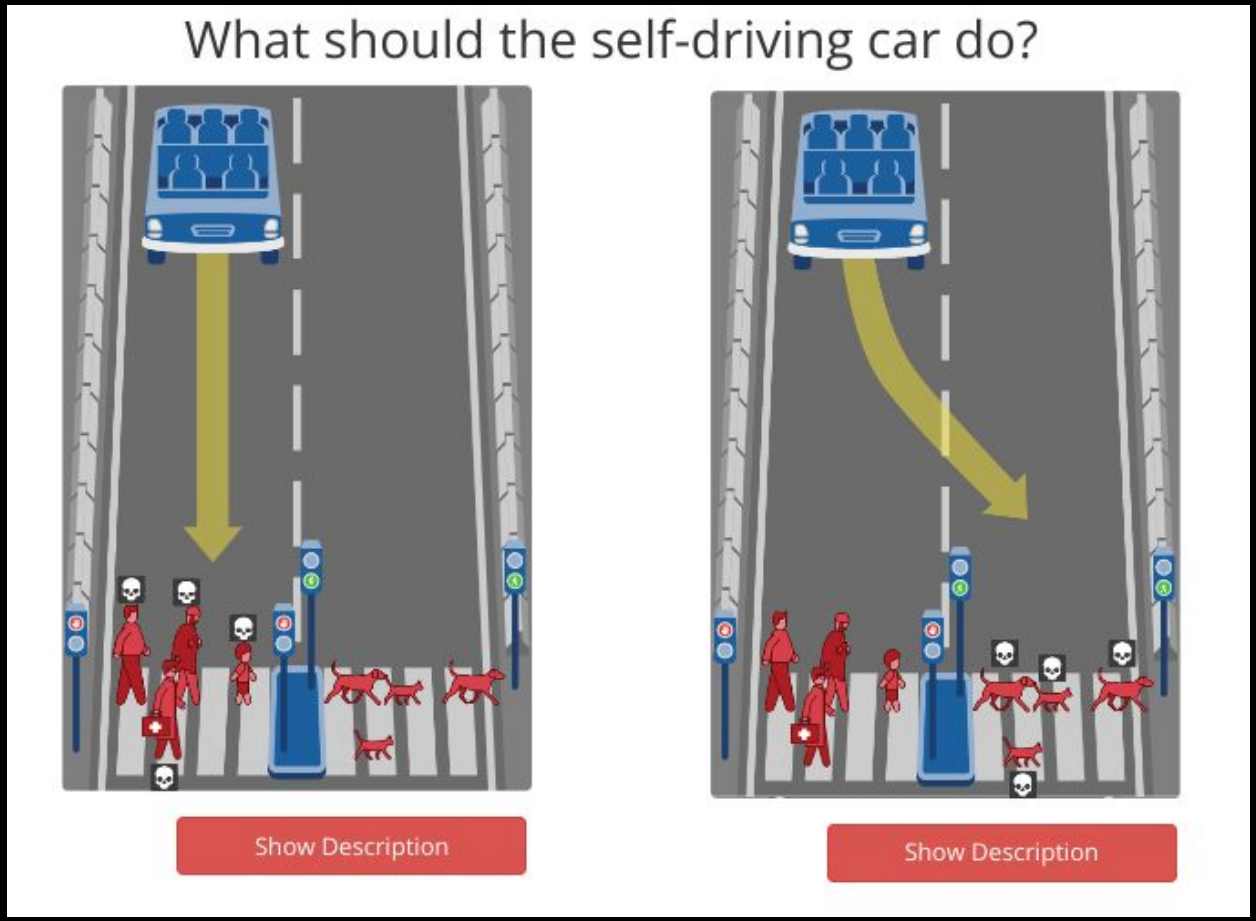
Self driving cars: How safe are they really?

- Self driving cars have a long way to go and may not be able to respond as well as a human can on a busy roadway
- Technology may still be developing but still cannot meet the ability humans possess
  - How to predict what a pedestrian will or is about to do
  - Making decisions on how to act based on given information in the roadway
    - A truck doing a 3 point turn
- Who gets to die?
  - Ethical situation: There is an old lady is crossing the street. Inside the car is a newborn baby. What should the car do?
    - Should it avoid the old lady and hit a barrier, killing the baby?
    - …***or*** should it strike the old lady and save the baby?

Self driving cars: How safe are they **really**?

- Moral machine survey developed to determine how AI should behave in an accident (https://www.moralmachine.net/)
  - Who should have preference?
    - Men vs women
    - Adults vs children
    - People crossing illegally or not
    - Old vs young
- Who should be die?
  - Views on situations like this vary from country to country
  - **GERMANY** -
    - Germans don't like to make a decision (**INACTION**)
    - Leave it up to fate…
  - **FRANCE** -
    - Sparing woman and stronger focus on children
    - DO NOT LEAVE THINGS TO FATE, machine should make the decision

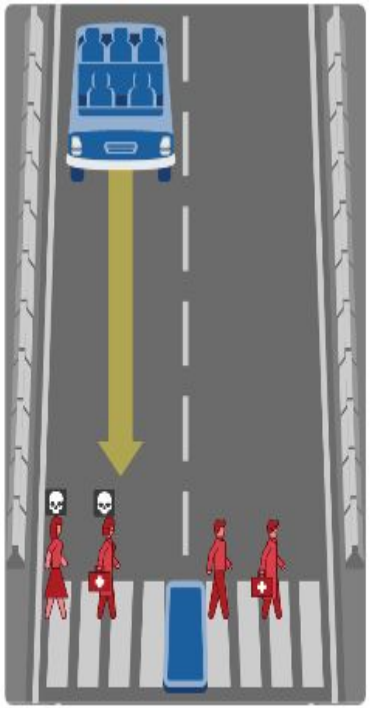
Kinds of decisions Moral Machine asks users.



www.moralmachine.net

Click link
https://forms.gle/YMCUsj7ZpxSd44Vy9

Kinds of decisions Moral Machine asks users.



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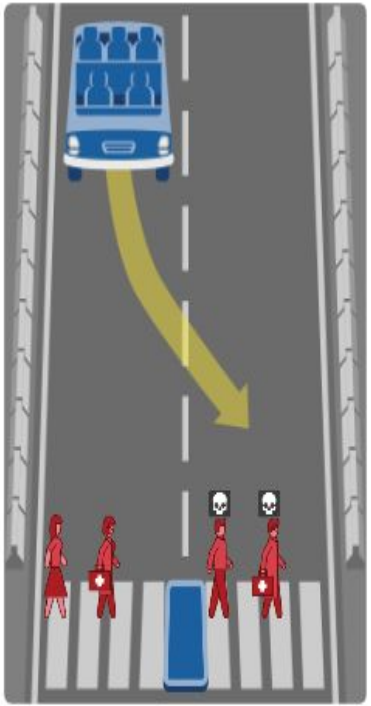

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www.moralmachine.net

Disadvantages of self-driving cars

- Increase in self driving cars
- Businesses will not react or adapt fast enough
  - Lose billions in revenue
- Revenues lost because of licensing fees, taxes and tools, and personal injury lawyers
- Sales will drop once self-driving car sales “popularize”
- Auto insurance companies could lose up to 315 billion in premiums as the number of people having cars decreases
- There are regulatory and legislative obstacles to the widespread use of self-driving cars and substantial concerns about privacy. (Who will have access to any driving information these vehicles store?)2627 There’s also the question of security, as hackers could theoretically take control of these vehicles, and are not known for their restraint or civic-mindedness

Sources

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