The Autonomous Cars' Ethics

A study on the Decision-Making Mechanism (DMM) of Autonomous Vehicles (AV)

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Pros and Cons of Autonomous Vehicles

Pros	Cons
Improves traffic safety	Employment opportunity
Increase efficiency	Privacy concern
Social equity (seniors, physically challenged)	Security issues
Greener environment	Ethical concern

World   Canada   Local ⌄   Politics   Smart Living   Money   Entertainment   Health   Commentary   Trending
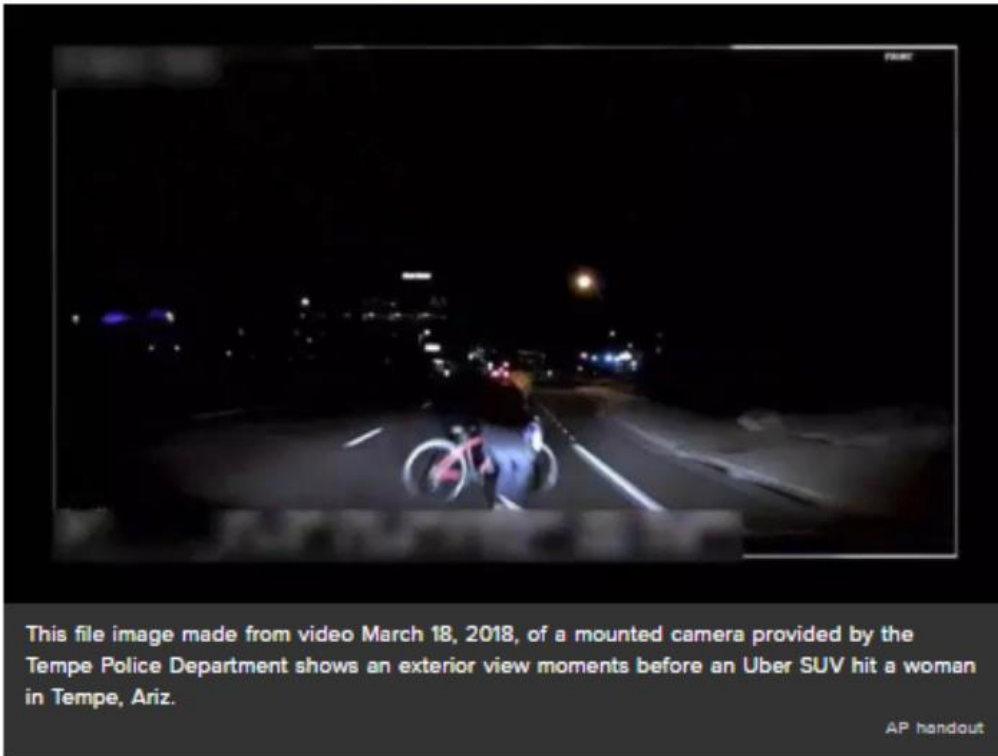
WORLD   May 24, 2018 2:19 pm

Self-driving Uber car saw pedestrian but didn't brake, causing fatal accident: report

By Tom Krisher   The Associated Press

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This file image made from video March 18, 2018, of a mounted camera provided by the Tempe Police Department shows an exterior view moments before an Uber SUV hit a woman in Tempe, Ariz.

AP handout

https://globalnews.ca/news/4229104/uber-self-driving-crash/

List of known autonomous car fatalities

2016/1/20	Hebei, China	Tesla (autopilot)	Driver fatality	1
2016/5/7	Florida, USA	Tesla (autopilot)	Driver fatality	1
2018/3/18	Arizona, USA	Uber	Pedestrian fatality	1
2018/3/23	California, USA	Tesla (autopilot)	Driver fatality	1

The report states that, to remedy an overpowering number of "false positives" — hindrances in the road that pose no real threat, like a piece of cardboard — the threshold of Uber's software was "tuned" so low, that even a grown woman with a bicycle did not trigger an immediate response

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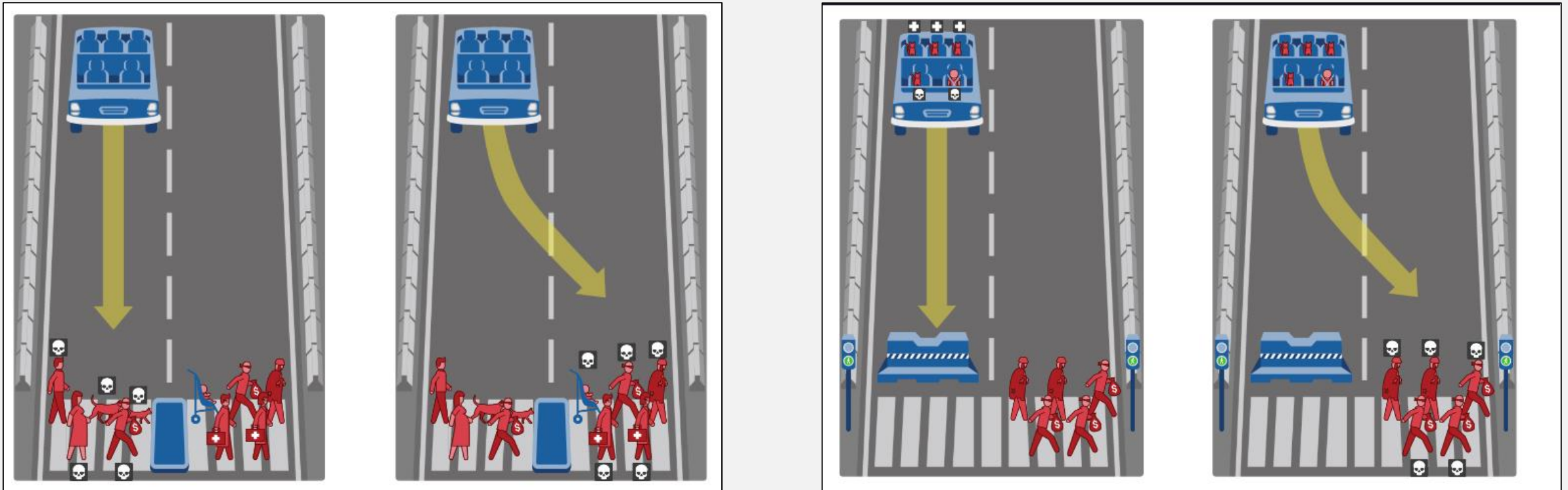(https://futurism.com/ubers-self-driving-car-decided-swerve/)

DMM (Decision-making mechanism) for AV (Autonomous Vehicle)
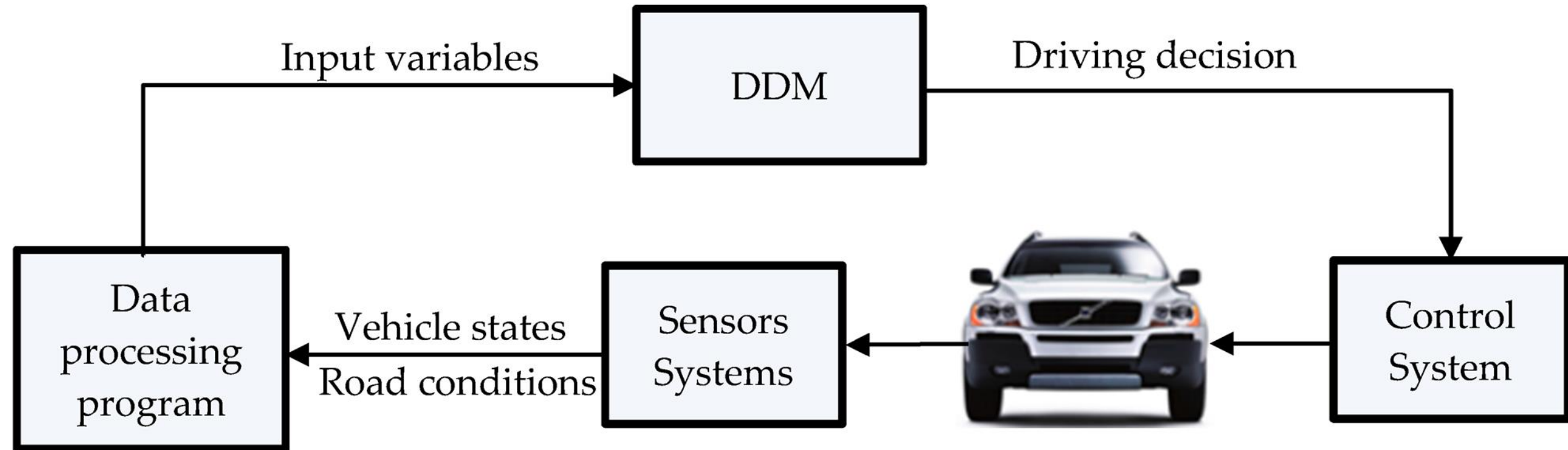
Zhang, J., Liao, Y., Wang, S., & Han, J. (2017). Study on Driving Decision-Making Mechanism of Autonomous Vehicle Based on an Optimized Support Vector Machine Regression. Applied Sciences, 8(1), 13.

Moral Machine

A platform for 1) building a crowd-sourced picture of human opinion on how machines should make decisions when faced with moral dilemmas, and 2) crowd-sourcing assembly and discussion of potential scenarios of moral consequence.

http://moralmachine.mit.edu/

More than a Trolley Problem

- Personal judgment vs. Rules definition
- Human ethics vs. Machine intelligence

Who is responsible in an AV accident?
- The driver?
- The car manufacturer?

Full knowledge of the environment and scenarios – blessing or curse?

Who can decide which choice is best?

The flaw of averages

"There was no such thing as an average pilot. If you've designed a cockpit to fit the average pilot, you've actually designed it to fit no one."(Todd Rose, 2016)

In the early 1950s, the U.S. air force measured more than 4,000 pilots on 140 dimensions of size, in order to tailor cockpit design to the "average" pilot. But it turned out the average airman didn't exist. (U.S. NATIONAL ARCHIVES / THE ASSOCIATED PRESS FILE PHOTO)

https://www.thestar.com/news/insight/2016/01/16/when-us-air-force-discovered-the-flaw-of-averages.html

How is DMM for AV determined? Machine learning from what/whom?
Any difference among: Gender? Religion? Value system?
Can the car be programmed according to the driver's ethical profile/preferences?

Question 1 – How is AV DMM working today?

- How do the manufacturers perform AV DMM today?
  - Product claims
  - Patents filed
  - Publications on algorithms and methods

- What do the public thinks today?
  - Policies
  - Public opinions

- What about DMM ethics?
  - Researches
  - Publications
  - Christians perspective

Question 2 – How will AV DMM behave with different input?

- Develop decision-making scenarios to collect input from various types of people (e.g., religion, gender, education, beliefs)

- Determine if there is a significant difference in decision making with different value systems (e.g., Christian vs. Atheist, Kantianism vs. Utilitarianism)

- Determine how different decision-making preferences affects AV DMM (with the use of simulator)

Deliverables:

The study will have the following outcomes:

- A descriptive understanding of the current autonomous cars decision-making methods,

- Empirical evidence that different value systems (e.g., Christian vs. Atheist, Kantianism vs. Utilitarianism) can affect the autonomous car's decision-making, and

- A useful tool (simulator) to further investigate the impact of different types of values in the machine ethics research.

https://www.therecord.com/opinion-story/7529630-aug-31-editorial-cartoon/