

The myth of the autonomous vehicle

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Centre for
Responsible
Innovation



RAi

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Empowering and Connecting the Responsible AI Ecosystem

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Responsible Ai UK will connect UK research into Responsible AI to leading research centres and institutions around the world. This will allow RAi UK to deliver world-leading best practices for how to design, evaluate, regulate, and operate AI-systems in ways that benefit people, society and the nation. [For more](#)

The image shows a screenshot of the RAi website. At the top is a navigation bar with the RAi logo and several menu items: "About Us", "Funding", "Research", "Events", "Skills and Innovation", "Get Involved", and "Resources". The main content area has a dark blue background with a white wireframe graphic of a hand holding a globe. The globe has the RAi logo on it. The text "Empowering and Connecting the Responsible AI Ecosystem" is prominently displayed. Below this text are two buttons: "Our Mission" and "Learn More". At the bottom of the page, there is a white footer with a paragraph of text and a link "For more".

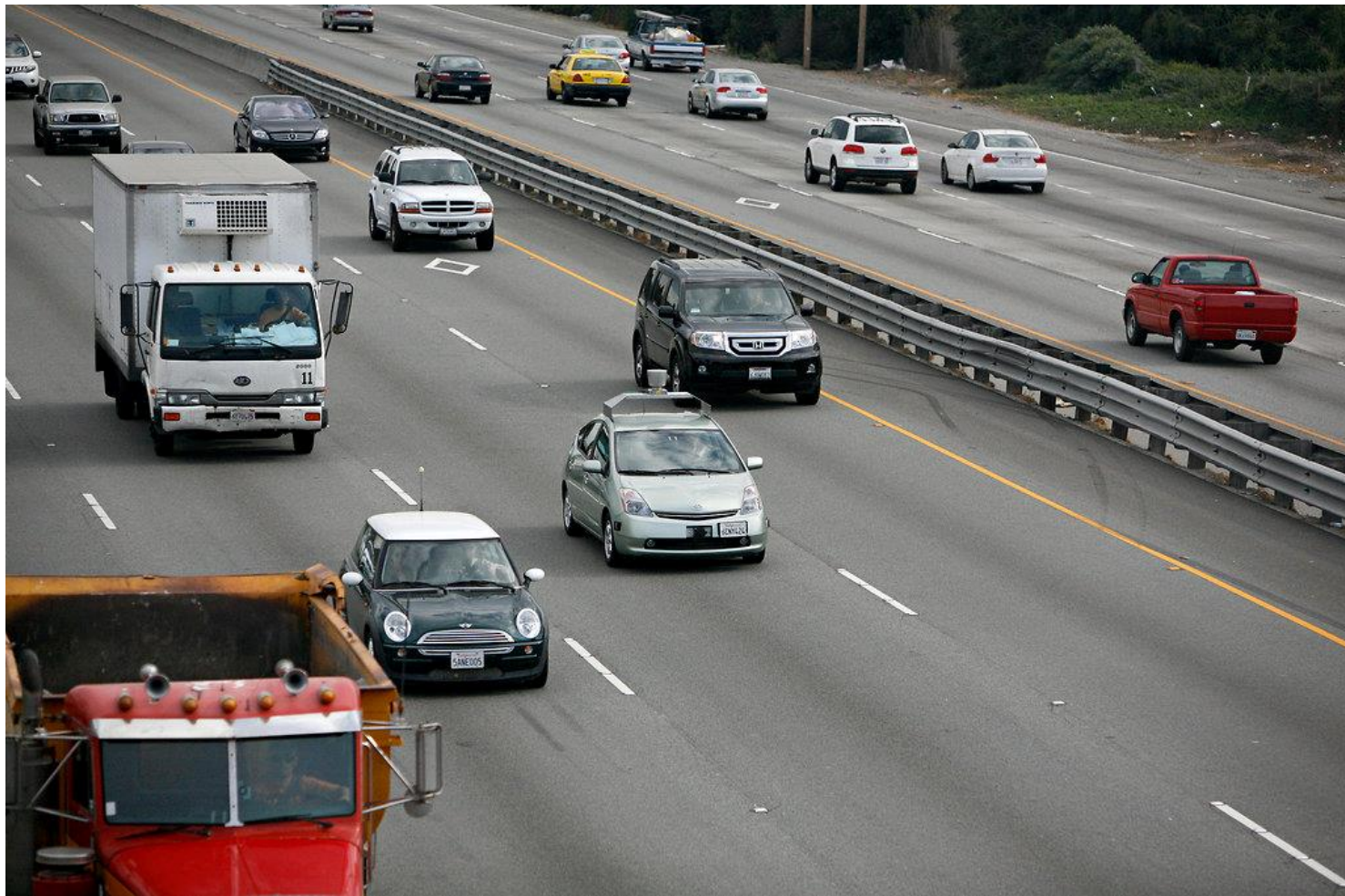
The New York Times

Google Cars Drive Themselves, in Traffic

By JOHN MARKOFF OCT. 9, 2010

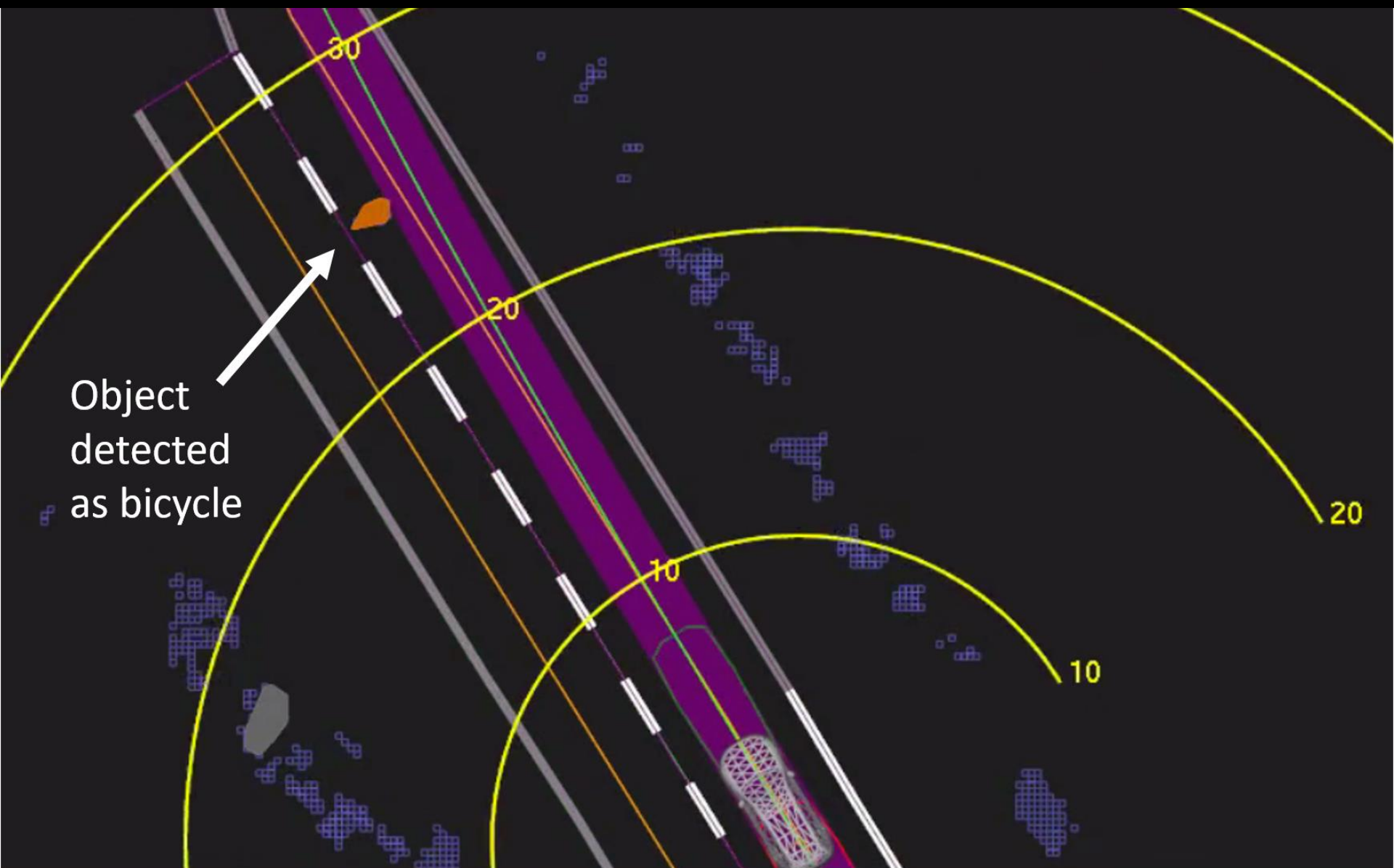


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Source: Jameson Wetmore




Object
detected
as bicycle

Baidu's robotaxi breakdown in Wuhan strands riders, raises safety concerns

Some Apollo Go self-driving cars stopped suddenly across the central Chinese city, dealing a blow to the tech giant's global ambitions

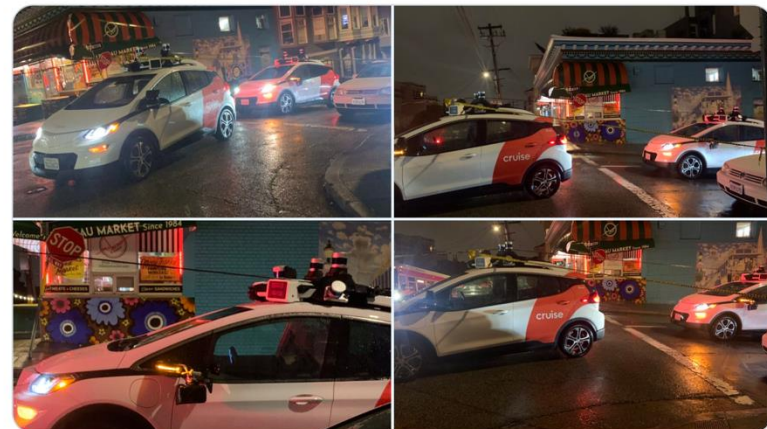
🕒 2-MIN READ 🔗 📌 💬 2 🖨️ 🎧 Listen

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 **John-Phillip** 
@PopRag

More weather drama in my neighborhood. 2 driverless cars didnt detect 1) the caution tape blocking my street and 2) the down [@SFMTA_Muni](#) wires. Now theyre tangled up like flies in sticky traps. 🌨️👤🌨️
[@SFGate](#) [@kron4news](#) [@nbcbayarea](#)



Baidu's robotaxi breakdown in Wuhan strands riders, raises safety concerns

Some Apollo Go self-driving cars stopped suddenly across the central Chinese city, dealing a blow to the tech giant's global ambitions

2-MIN READ



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WAYMO

Let's Talk Autonomous Driving



“Waymo’s ultimate goal is to develop fully autonomous driving technology that can take someone from A to B, anytime, anywhere, and in all conditions.”

“We will have complete autonomy in approximately two years.” Elon Musk, 2015

“I feel very confident predicting autonomous robotaxis for Tesla next year.”
Elon Musk, 2019

“I’m extremely confident of achieving full autonomy... next year.” Elon Musk, 2020

Myths of autonomy

- The machines will drive like humans
- They will solve the problem of human error
- The tech is just around the corner
- Everyone, everywhere will benefit
- No new infrastructure required
- No new rules required

How can we know a self-driving car is safe?

Jack Stilgoe

Ethics and Information Technology (2021) | [Cite this article](#)

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The attachments of 'autonomous' vehicles

Chris Tennant , Jack Stilgoe

First Published August 14, 2021 | Research Article | [Check for updates](#)
<https://doi.org/10.1177/03063127211038752>

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Code, Culture, and Concrete: Self-Driving Vehicles and the Rules of the Road

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Chris Tennant^{1††}, Chris Neels^{2†}, Graham Parkhurst³, Jones³, Saba Mirza¹ and Jack Stilgoe^{1†}

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Article Contents

- Abstract
- 1. Introduction: frame-breaking
- 2. Citizens' Dialogue on Driverless Mobility
- Funding
- Conflict of interest statement.
- Endnotes

Rejecting acceptance: learning from public dialogue on self-driving vehicles

Jack Stilgoe , Tom Cohen

Science and Public Policy, scab060, <https://doi.org/10.1093/scipol/scab060>
Published: 20 August 2021 [Article history](#) ▾

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Abstract

Experiments with AVs

Experimenting with...

1. Road rules
2. Acceptable risk
3. Infrastructural constraints
4. Business models
5. Scale

...while often denying these attachments

Policy paper

Responsible Innovation in Self-Driving Vehicles

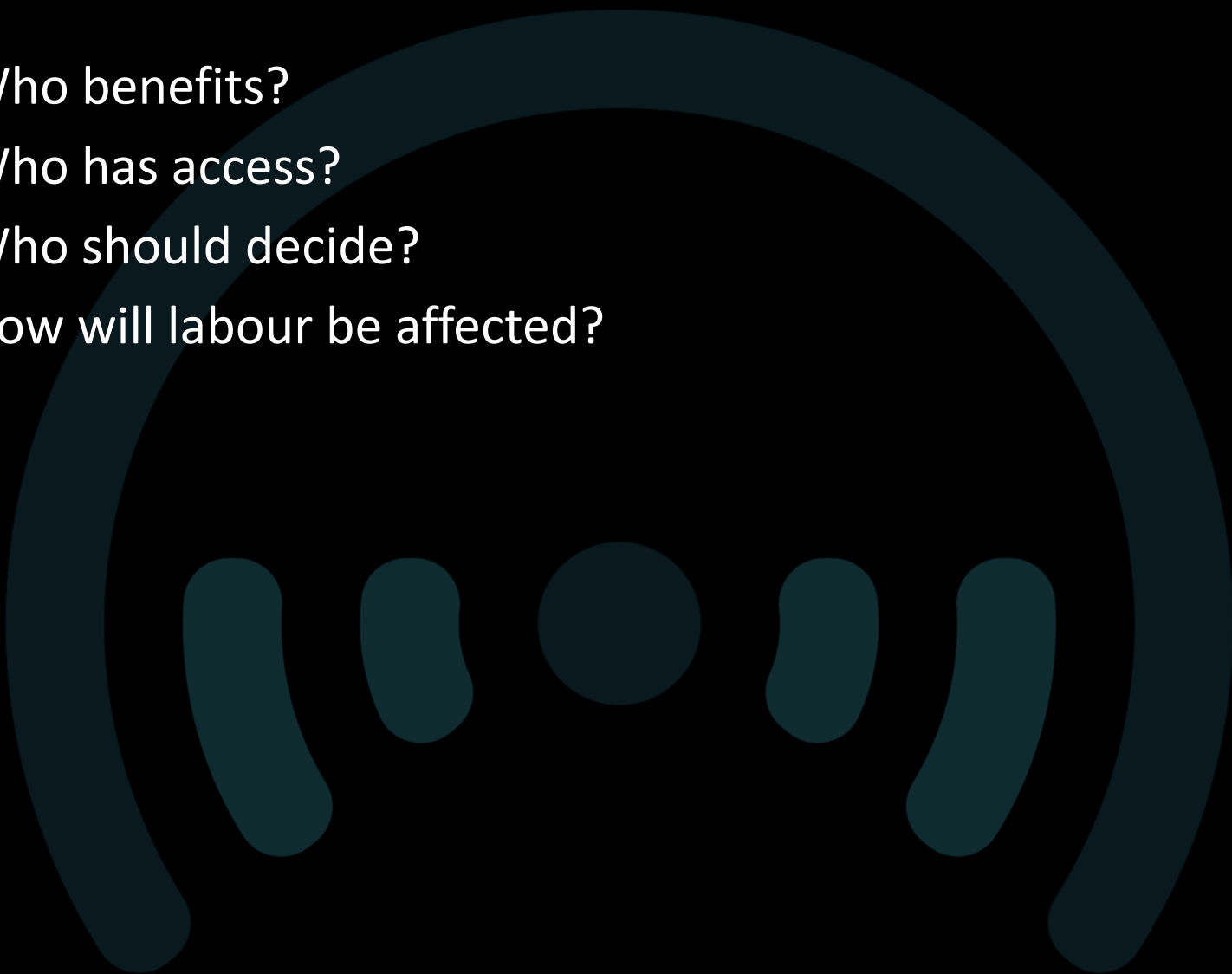
The CDEI has published a report that sets out proposals for a trustworthy approach to the regulation and governance of self-driving vehicles.

From: [Centre for Data Ethics and Innovation](#)

Published 19 August 2022

1. Road Safety
 - How safe is safe enough?
 - ODDs and system safety
 - Road rules
2. Explainability and Data Sharing
 - What is happening/what happened and why?
 - ‘Ethical black boxes’
3. Data privacy
 - Inside and outside the vehicle
4. Fairness
 - Distribution of risk
 - Vulnerable road users
 - Biases in training data
 - Accessibility and inclusion
5. Transparency
 - Labelling, terminology and public information
 - Consultation and trials

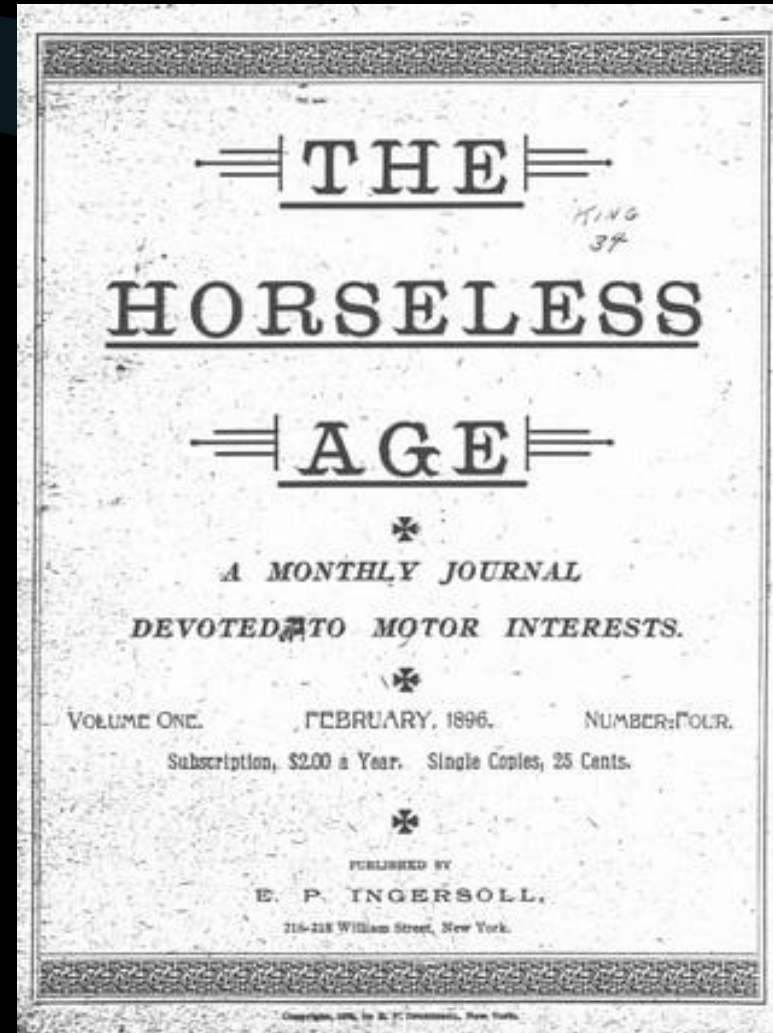
...and some wider ethical issues

1. Who benefits?
 2. Who has access?
 3. Who should decide?
 4. How will labour be affected?
- 

Rules of the road

‘Streets will be cleaner, jams and blockades less likely to occur, and accidents less frequent, for the horse is not so manageable as a mechanical vehicle.’

The Horseless Age, 1896



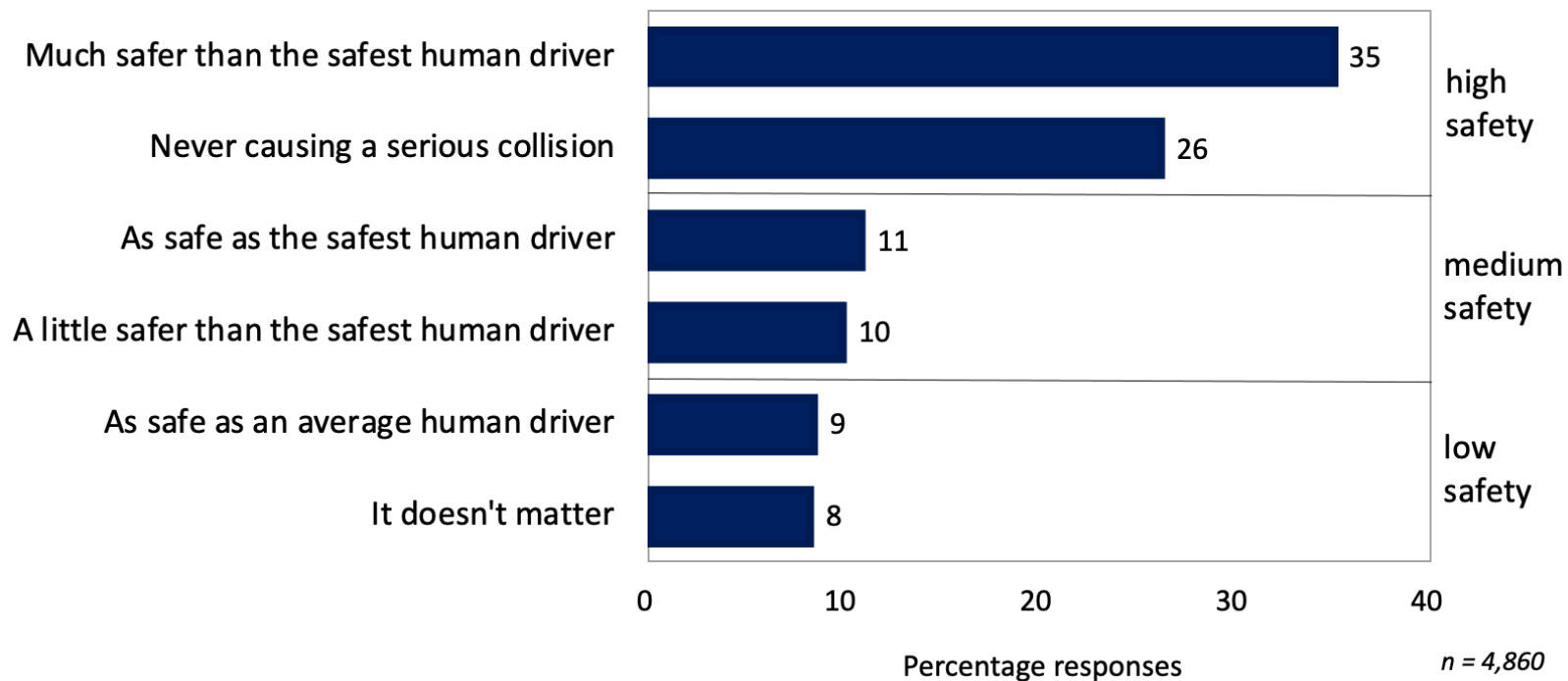
A Traffic Problem—Jay Walking



Source: Peter Norton, Fighting Traffic

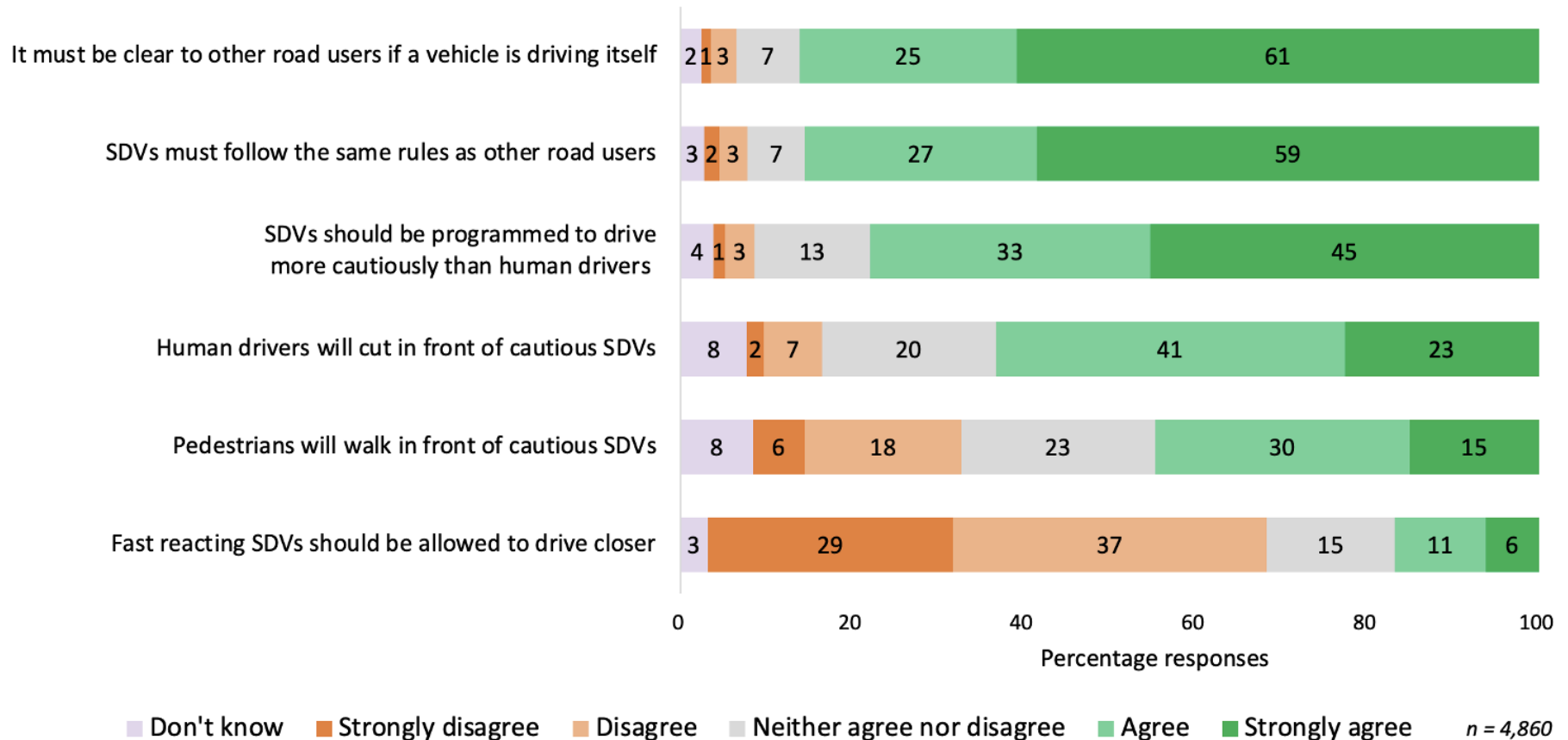


How safe do you think self-driving vehicles should be?



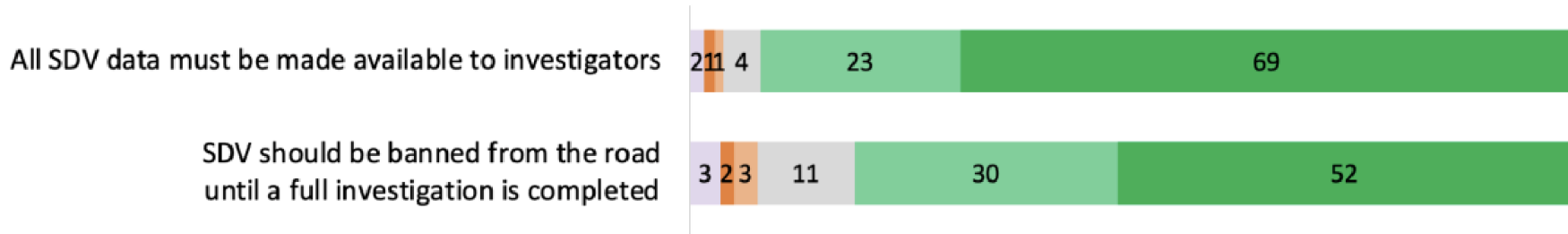
Rules of the road

Views about how SDVs might share the road with other road users

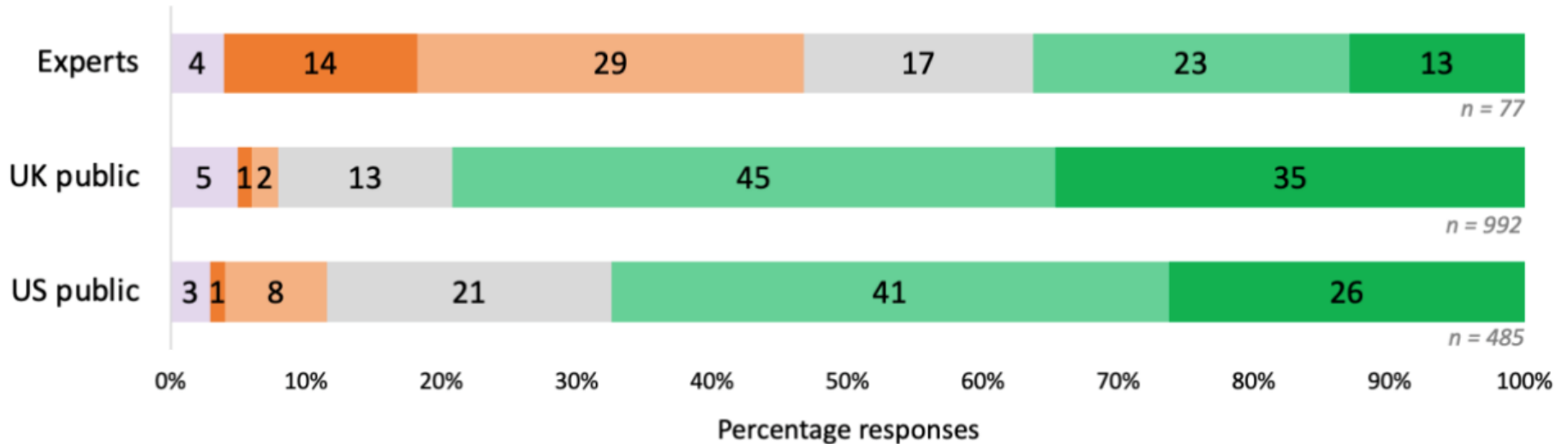


Rules of the road

Views on what should happen after a self-driving vehicle is involved in a collision



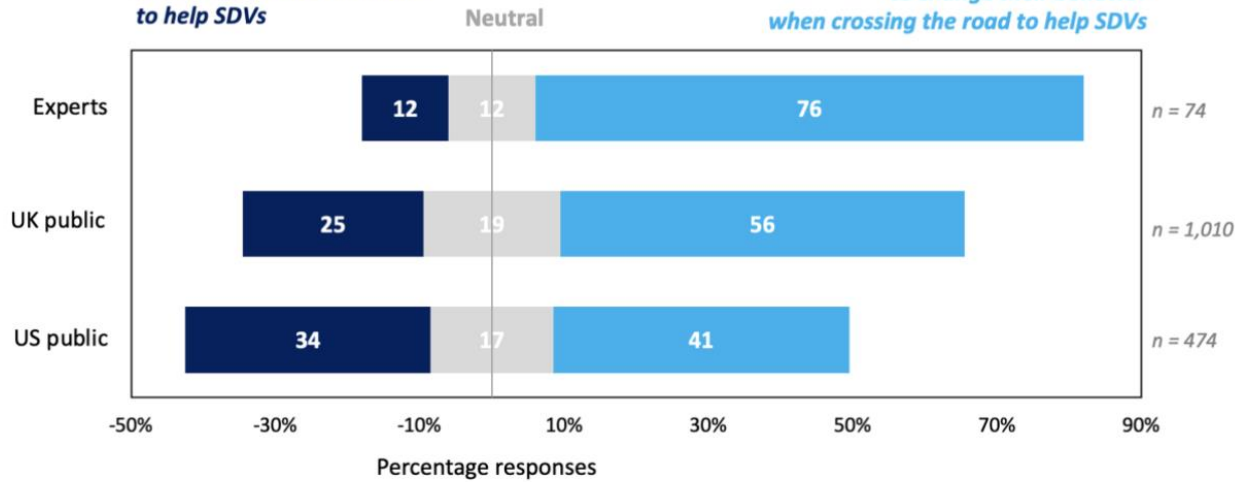
How much do you disagree or agree with the following statement? *SDVs should stick to the formal rules of the road in all situations.*



■ Don't know
 ■ Strongly disagree
 ■ Disagree
 ■ Neither disagree nor agree
 ■ Agree
 ■ Strongly agree

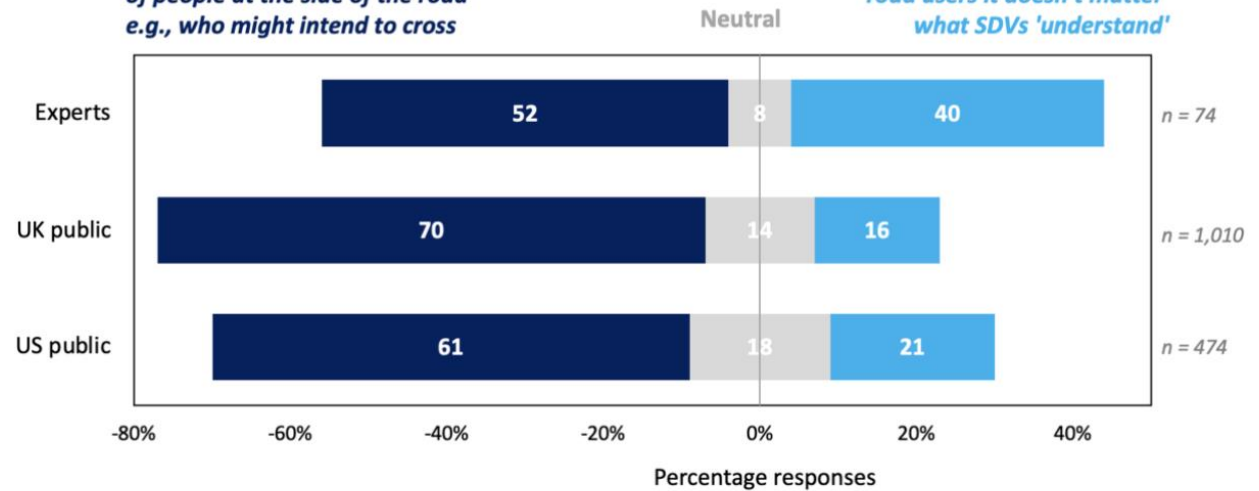
Pedestrians crossing the road should adapt their behavior to help SDVs

Pedestrians should not have to change their behavior when crossing the road to help SDVs



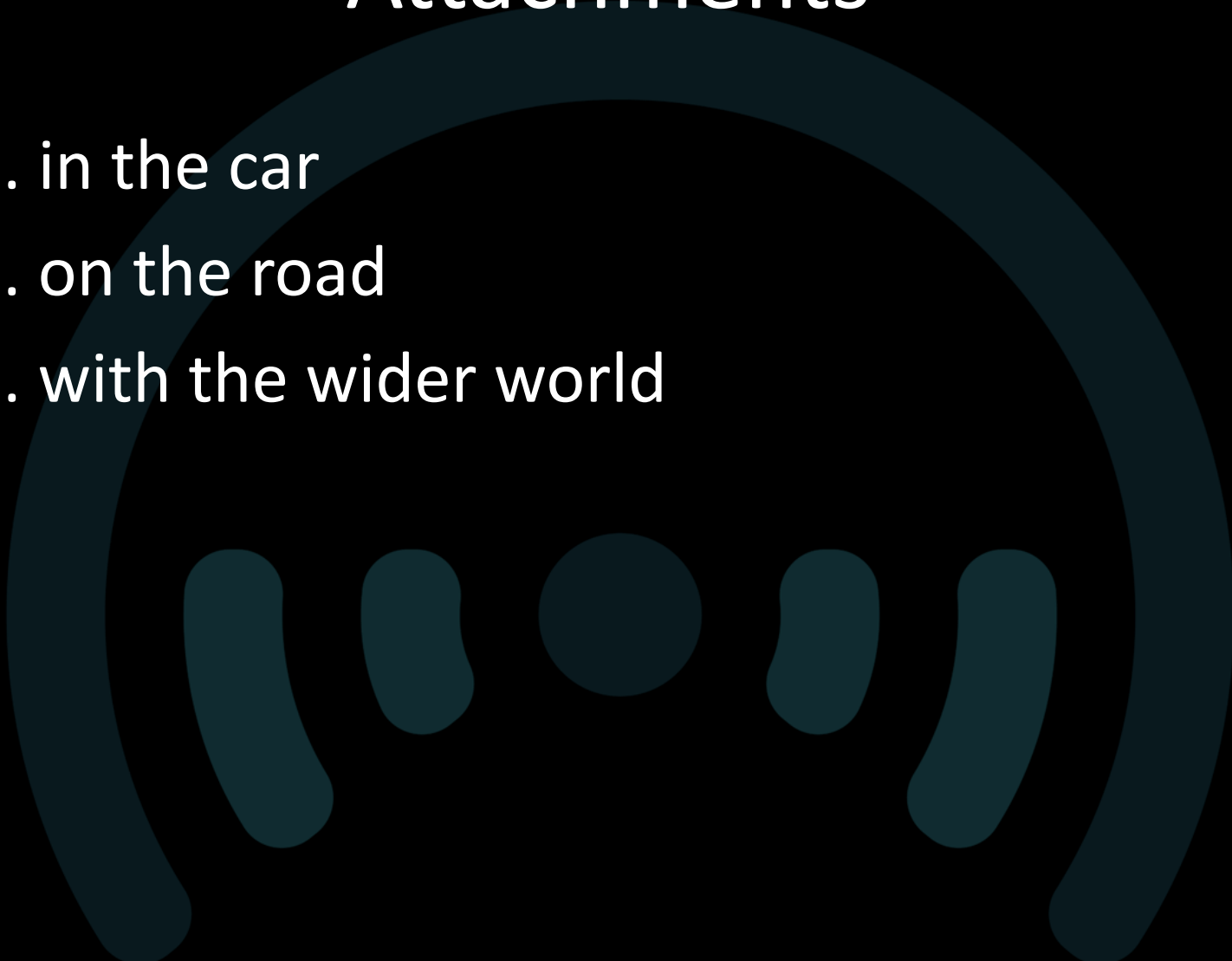
SDVs need to 'understand' the intentions of people at the side of the road e.g., who might intend to cross

As long as they don't hit other road users it doesn't matter what SDVs 'understand'

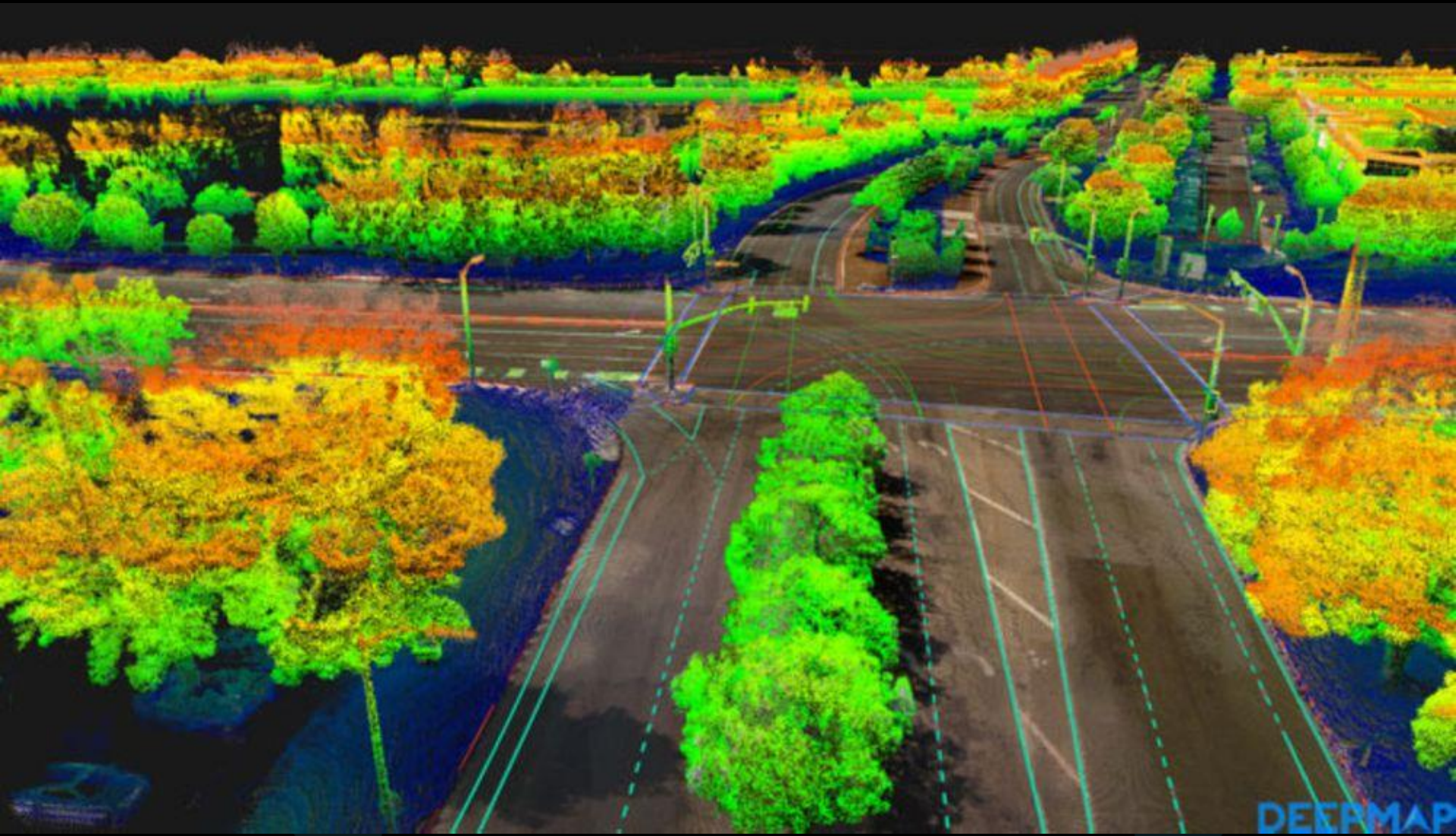


Attachments

1. ... in the car
2. ... on the road
3. ... with the wider world



Maps



DEEPMAP

Source: Deepmap

Rules of the road



**Law
Commission**
Reforming the law

Automated Vehicles:

CREATING A “DIGITAL HIGHWAY CODE”

- 9.2 Driving rules have been developed to be interpreted and applied by human drivers. Even apparently straightforward road rules are subject to many implicit exceptions, based on “common sense” driver behaviour, personal value judgements and prosecutorial discretion.
- 9.3 We consider the challenges of taking these “analogue” legal rules and developing them into a much more precise “digital highway code” to govern the actions of highly automated vehicles. We seek views on how regulators can best collaborate with developers to create road rules which are sufficiently determinate to be formulated in digital code (Consultation Question 38).⁴⁵
- 9.4 We use three practical examples to address broader questions about when automated vehicles should be allowed (or required) to depart from road rules. These relate to when automated vehicles may mount the pavement; exceed the speed limit; or edge through pedestrians.

Hyperdrive

To Get Ready for Robot Driving, Some Want to Reprogram Pedestrians

Researchers bemoan human unpredictability and back the kind of campaigns that helped Germany cut jaywalking fatalities.

By [Jeremy Kahn](#)

16 August 2018, 11:00 BST *Corrected 21 August 2018, 17:32 BST*

“What we tell people is, ‘Please be lawful and please be considerate’.”

Andrew Ng

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Ministry of Transport.

THE ORIGINAL HIGHWAY CODE



“A code of
good
manners”

Layers of rules

- Physical – you cannot
- Legal – you must not
- Advisory – you should not
- Normative – we do not

(Technologically and socially mediated)

The “perfect enforcement” of rules (Zittrain, 2008)



Concrete, code and culture



Could code colonise concrete and culture?

- Justification for innovation is clear: roads are messy and unsafe; rules are ambiguous
- But encoding the highway code means flattening, hardening, solidifying rules
- Who benefits?