AGI
Road Safety

What are we trying to achieve?

Bryn Balcombe - Future Networked Car Symposium - 23rd March 2022

UN Secretary-General's Special Envoy for Road Safety
UN Envoy on Technology
The International Telecommunication Union (ITU)
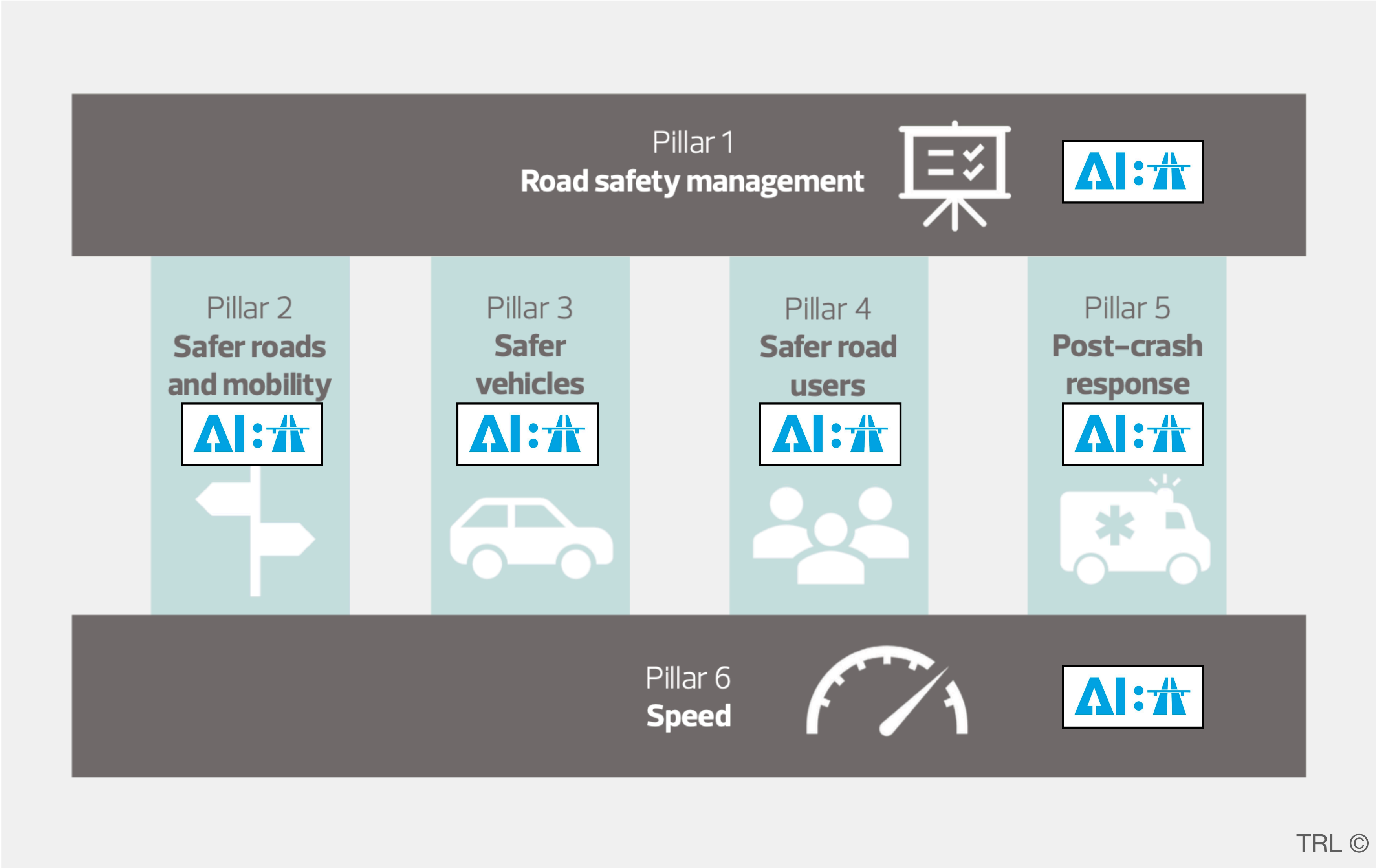
Launched 6 October 2021

↓50% by 2030

how can AI help reduce global road traffic fatalities?

3x higher

death rates in low-income countries than high-income countries

5-29 years

road traffic injury remains the leading cause of death

The Safe System Pillars - AI for Road Safety

Developed by United Nations Road Safety Collaboration (UNRSC)
to support the First Decade of Action for Road Safety (2011-2020) and
now updated for Second Decade of Action for Road Safety (2021-2030)

Pillar 3 - Safer Vehicles > Self-Driving

"I think you're going to see small-scale deployments in the next five years, and then it's going to phase in over the next 30 to 50 years"

Chris Urmson, CEO, Aurora 2019

Future of Self-driving cars - The Vergecast with Nilay Patel and Andrew Hawkins

VRU >50%

of all road fatalities are pedestrians, cyclists and motorcyclists

500,000

**fatalities averted each year
if severe injury fatality rates in low- and middle- income countries
matched high income countries**

5,000,000,000

total number of mobile internet subscribers globally by 2025
5 billion mobile users = 65% of the population
1.4 billion drivers = 18% of population

A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle.

There are no eye-witnesses.

The Molly Problem for Self-Driving Vehicles

What should happen next?

Respondents have clear expectations for the capability and behaviour of the self-driving software in the case of a pedestrian collision event.

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

97% **_to be aware_ of the collision**
2% unsure & 1% don't

94% **_to stop_ at the collision site**
4% unsure & 2% don't

97% **_to indicate a hazard_ to other road users**
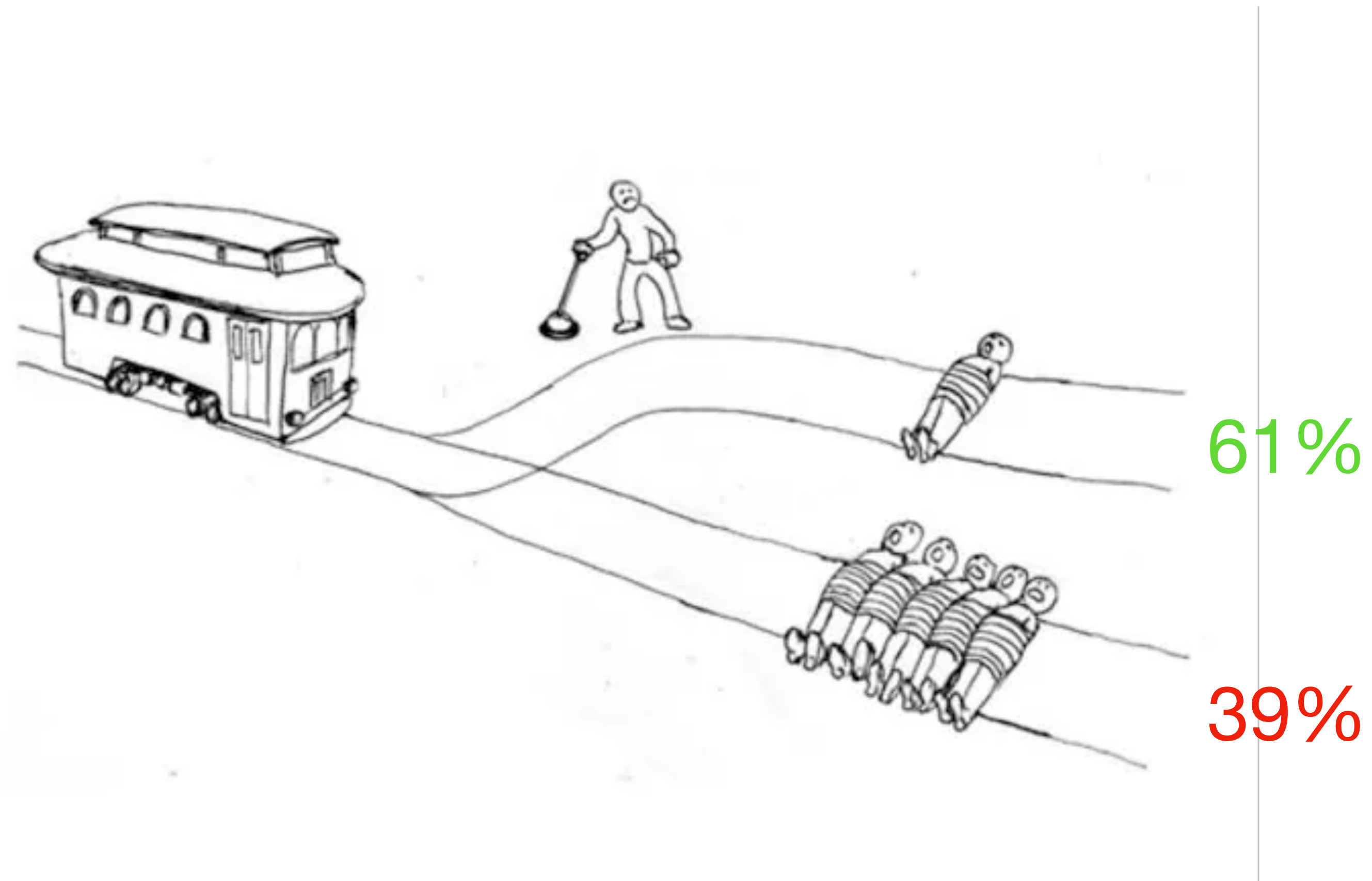2% unsure & 1% don't

94% **_to alert emergency services_**
5% unsure & 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?
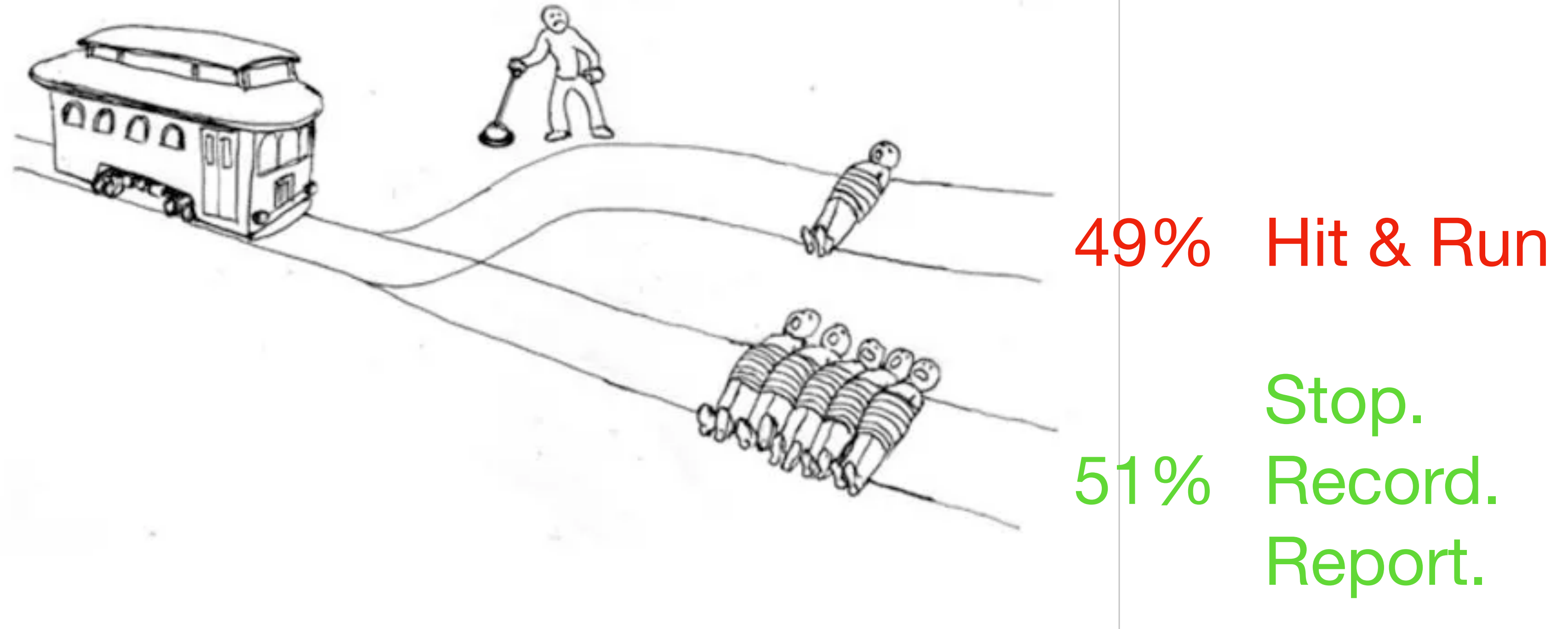
Utilitarian Ethics - pre-collision outcome based decision

The most appropriate action is the one that achieves the greatest good for the greatest number

61%

39%

Automated vehicles and the morality of post-collision behavior
Sebastian Krügel, Matthias Uhl & Bryn Balcombe

Deontological ethics - post-collision morality impact on behavior

The morality of an action should be based on whether that action itself is right or wrong based upon duty, obligation or rules.

49% Hit & Run

51% Stop.
Record.
Report.

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1968 Convention on Road Traffic

Article 31 - Behaviour in case of accident

1. Without prejudice to the provisions of domestic legislation concerning the ***obligation to assist*** the injured, ***every driver or other road-user involved in a traffic accident*** shall:

(a) ***Stop*** as soon as he can do so without causing an additional danger to traffic;

(b) Endeavour to ***ensure traffic safety at the site*** of the accident and, if a person has been killed or seriously injured in the accident, to prevent, in so far as such action does not affect traffic safety, any change in conditions at the site, including the disappearance of traces which might be useful for determining responsibilities;

(c) If so requested by other persons involved in the accident, identify himself to them;

(d) If a person has been injured or killed in the accident, ***notify the police*** and remain on the scene of the accident or return to it and wait there until the arrival of the police, unless he has been authorized by the police to leave or has to assist the injured or to receive attention himself.

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What *traces* might be useful?

In addition to post-collision behaviour respondents were asked about the information recall capabilities of the self-driving software.

The overwhelming majority had strong and clear expectations for the development of explainable AI for self-driving software.

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

Safe interaction with other road users
Explainability - ITU FG-AI4AD driving behaviour data sources

Situation

Did the AI understand the circumstance and situation?

Hazard

Did the AI understand the hazards?

Action

Did the AI execute the correct mitigating action for the hazards?

Outcome

1968 Convention Article 7 - Compliant?
Road-users shall avoid any behaviour likely to endanger or obstruct traffic, to endanger persons, or to cause damage to public or private property.

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

99%   **expect recall of the _time_ of the collision**
1% don't

99%   **expect recall of the _location_ of the collision**
1% don't

98%   **expect recall of the _speed_ at point of the collision**
1% unsure 1% don't

93%   **expect recall of _when_ the collision risk was identified**
6% unsure 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

96% **expect recall of _if_ Molly was detected**
3% unsure 1% don't

96% **expect recall of _when_ Molly was detected**
2% unsure 2% don't

91% **expect recall of _if_ Molly was detected as a _human_**
6% unsure 3% don't

90% **expect recall of _when_ Molly was detected as a _human_**
7% unsure 3% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

98% expect recall of _whether_ mitigating action was taken
1% unsure 1% don't

97% expect recall of _when_ mitigating action was taken
2% unsure 1% don't

96% expect recall of _what_ mitigating action was taken
3% unsure 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

88% expect similar recall abilities for _near-miss events_
5% unsure 7% don't

73% expect _driving_ to be _prohibited_ for software _without recall capability_

15% unsure 12% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

THANK YOU. STAY SAFE. STAY HEALTHY.

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