AI IN MOBILITY: FROM CONFUSION TO ADOPTION

Co-written by

John PORTER
john.porter@bva-group.com

Marc Eynaud
marc.eynaud@bva-group.com

Nina DE ONA
nina.deona@bva-group.com

D3.2 AI4CCAM Trustworthy Framework Documentation

Preface

Atia Cortes
PhD, Recognised Researcher,
Social Link Analytics Unit
Life Sciences Department in
BSC

As artificial intelligence (AI) becomes an integral part of Connected, Cooperative, and Automated Mobility (CCAM), discussions surrounding its implications and challenges beyond technical aspects - such as efficiency or performance - are inevitable, but also essential for guiding responsible research and innovation . Concerns about how this technology will impact safety, privacy, human agency or the responsibility chain, along with other critical issues such as biases or explainability of automated decision-making put forward the urgent need to understand the evolution of this technology from a broader perspective, identifying and analyzing the ethical, legal, socio-economic and cultural aspects of AI.

According to the Trustworthy AI guidelines from the European Commission's High-Level Expert Group on AI , the adoption of responsible practices by design are crucial to make AI-based systems ethical and legal (hence, aligned with moral values, fundamental rights and other normative), and robust (both from a technical and social point of view).
Among the requirements described in different ethical frameworks, transparency emerges as a foundational principle for ensuring trust, safety, and accountability. AI-driven mobility systems, from autonomous vehicles to intelligent traffic management, make complex, real-time decisions that directly impact human lives. Without transparency, stakeholders—including policymakers, industry leaders, and the public—struggle to assess the reliability, fairness, and ethical implications of these systems. Ensuring that AI decision-making processes are explainable, auditable, and aligned with regulatory frameworks is essential to fostering societal trust and preventing unintended consequences. Transparency is essential to identify, report and mitigate data and algorithmic bias or to justify the operational design when facing critical decision-making dilemmas.

Moreover, transparency is not just a matter of ethical responsibility—it is also a strategic enabler for innovation and widespread adoption. Without it, opacity in AI-based system's decision-making – as well as explanations about its capabilities and limitations - can lead to public skepticism, regulatory roadblocks, and technological stagnation, ultimately hindering the progress of automated mobility. A technology that is not well understood can lead to misuse, abuse or disuse, due to high user expectations. As presented in this white paper, in the context of CCAM this overreliance effect due to overstated capabilities is known as "Autonowashing" and is proved to have a negative impact on users' trust, perception and adoption of AI in CCAM. One of the purposes of the EU-funded project AI4CCAM is to provide guidance tools and recommendations of CCAM stakeholders to foster responsible research and development on AI for CCAM. In particular, this white paper highlights three key aspects to improve transparency and, hence, trustworthiness in CCAM.

Looking ahead, a united effort from governments, industry players, and researchers is crucial to establish robust transparency standards that foster both innovation and public trust. Equally, society must actively engage and remain informed, as raising awareness about the ethical, legal, and economic implications of AI in CCAM is key to shaping responsible policies and practices for a safer, more inclusive future.

[1] Dignum, V. (2019). Responsible artificial intelligence: how to develop and use AI in a responsible way (Vol. 2156). Cham: Springer.
[2] European Commission (2019). Ethics guidelines for trustworthy AI. Publications Office. https://data.europa.eu/doi/10.2759/346720.

SUMMARY

The white paper “AI in Mobility: From Confusion to Adoption” explores the challenges associated with the **acceptance of connected and automated vehicles (CAVs)**, emphasizing the importance of **transparency** and **user agency**. It examines the evolution of automation across aviation, public transport, and the automotive industry, highlighting persistent obstacles to automated vehicle adoption.

The document warns against **exaggerating capabilities (“autonowashing”)** or **downplaying risks**, as both can mislead the public and hinder adoption. It underscores the need for **clear, transparent communication** to prevent misunderstandings and foster trust.

Additionally, the white paper provides guidelines to improve public understanding, with a focus on regulation, user education, and the role of public authorities. **Its objective is to cultivate collective intelligence around AI in mobility**, ensuring that its benefits are fully realized while mitigating potential risks.

1 Automating mobility -a century-long promise

Since the public launch of ChatGPT in November 2022, AI has become a buzzword across various fields. The prospect of using automation to generate text, images, and even concepts or ideas has sparked both enthusiasm and concern. On one hand, AI offers facilitation—enabling machines to handle tasks people may be reluctant to perform. On the other, it has raised fears, including the risk of being replaced or the potential mistake of delegating intellectual tasks to a system that may not be equipped to perform them correctly.

Yet, automation itself is far from a new phenomenon. For over a century, industries have integrated automated systems to enhance efficiency, safety, and convenience. **Nowhere is this more evident than in mobility**, where automation has reshaped how we travel—whether in air travel, public transport, or automotive technologies.

Automation in Aviation

For obvious safety reasons, the advent of flying machines brought an immediate need to automate certain piloting tasks. Keeping an aircraft in flight required continuous control, creating pressure and fatigue for pilots, which soon led to efforts to alleviate their workload.

This likely explains why only a decade passed between the first powered flight (Wright Flyer, 1903) and the introduction of early automation, such as Sperry's gyroscopic stabilizer, developed in 1912 and demonstrated in 1914.

Over time, more piloting tasks became automated, culminating in Airbus's first fully autonomous takeoff using autopilot in 2020.

Automation in public transport

In public transport, automation offers the promise of enhanced services, particularly by improving access to underserved areas and reducing pressure on both private vehicle drivers and public transport operators. More broadly, automation in ground transport presents several key benefits:

Improved safety, addressing the persistent challenge of road accidents, which have been a major public policy focus over the past two decades.

Significant reductions in carbon emissions associated with passenger mobility, as it can bring public transport to areas only car currently go, and as it implies higher pace & fewer brakings in crowded areas. associated with passenger mobility, as it can bring public transport to areas only car currently go, and as it implies higher pace & fewer brakings in crowded areas.

Greater efficiency in public space utilization, as the widespread adoption of automated vehicles is expected to reduce reliance on privately owned cars.

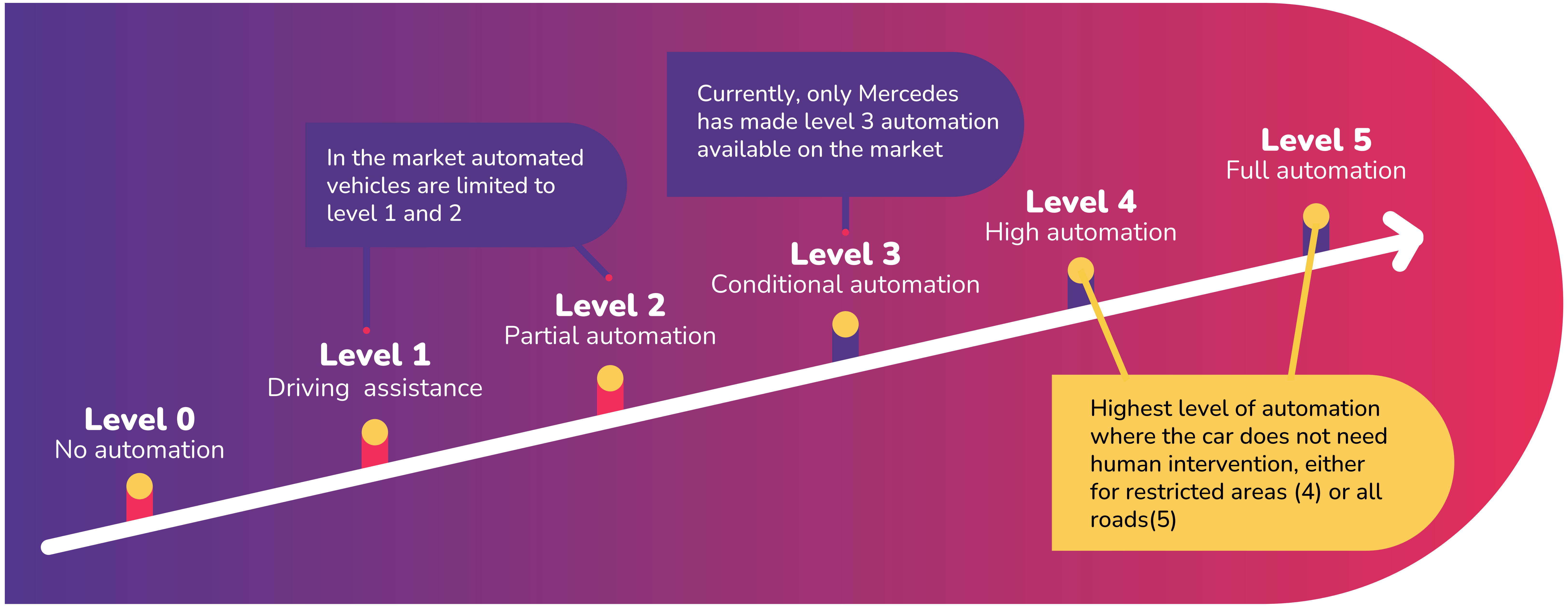
However, deploying automation in ground transport raises additional challenges. Unlike aviation, road and rail users interact directly with automated vehicles, making externalities harder to anticipate. Infrastructure itself is another critical factor—its complexity can vary significantly and must be carefully considered in automation efforts.

For instance, automating certain metro lines in the century-old Paris underground was a highly technical challenge. It required extensive adaptations to aging infrastructure not originally designed for automation, along with the installation of platform screen doors to ensure safety and efficiency.

Automation in automotive

In the automotive sector, the motivation for automation is amplified by the sheer number of users—1.4 billion worldwide, spanning both individuals and professionals (e.g., farmers, truck drivers, and delivery personnel). The potential impact on safety, comfort, traffic congestion, and CO_2 emissions is therefore immense—though so are the challenges posed by the vast number of users and external factors that automation systems must account for.

Many driving tasks have been progressively automated, with one of the earliest notable systems designed to enhance passenger comfort. This system, originally called Autopilot by Chrysler and introduced in 1958, was developed to limit a car's speed. It later became widely known as Cruise Control, a term popularized by Cadillac's successful branding. The system was invented by Ralph Teetor, a blind lawyer who was inspired to create it after experiencing the abrupt braking habits of his driver.



To help categorize these systems, the Society of Automobile Engineers[1] proposed a definition of levels of automation, adopted by the American administration for traffic safety (National Highway Traffic Safety Administration).

Since the introduction of cruise control, automation has advanced significantly, incorporating features such as power steering, park assist, and increasingly sophisticated driver-assistance systems. Many of these technologies have been progressively deployed, with some becoming mandatory to enhance road safety.

Further than these systems, widely adopted in farming machinery or logistics, telematics widely improved safety and efficiency of heavy vehicles driving.

[1] https://www.sae.org/blog/sae-j3016-update

From automation to autonomy: Where are we now?

Beyond widely adopted automation in agricultural machinery and logistics, telematics has significantly improved the safety and efficiency of heavy vehicle operations.

In the broader context of automation serving the public, the recent rise of generative AI—and the emotions it has stirred—has reignited interest in the long-standing promise of self-driving vehicles. The development of automated vehicles (AVs) has taken different trajectories in the U.S. and China compared to the European Union and Japan. A key factor behind this divergence is the legal framework: neither the U.S. nor China have signed the Vienna Convention on Road Traffic (1968) or subsequent international agreements on technical road safety rules (1997, 1998). This regulatory environment, combined with strong leadership from major tech companies (such as Alphabet, Tesla, Uber, and GM in the U.S., and Baidu and Pony.ai in China), has enabled a more experimental approach, where manufacturers bear responsibility once a vehicle is on the road.

In contrast, in the EU and Japan, vehicles must receive regulatory approval before operating in public spaces.

As a result, the industry has evolved along two distinct paths. Most major automakers have prioritized incremental advancements, focusing on transitioning from Level 2 (partial automation) to Level 3 (conditional automation)—where the driver no longer continuously monitors the road but remains ready to take control. Meanwhile, pioneering companies backed by digital industry giants in the U.S. and China have pursued Level 4 automation, which enables fully autonomous vehicles without drivers or onboard safety operators.

This divergence is also reflected in deployment strategies: while the U.S. and China have led large-scale robotaxi trials, Europe has prioritized automated shuttles and buses operating on predefined routes. This has resulted in the U.S. and China pulling ahead in Level 4 automation—though notably, Mercedes became the first automaker to receive national-level approval for Level 3 automation in the U.S.

Beyond the “Regulation vs Research” debate

Discussions on vehicle automation are often framed as a debate between regulation and innovation, whether in press articles, policy memos, or industry discourse. We find this perspective limiting. Rather than engaging in a quarrel between the Ancients and the Moderns, we believe the focus should shift to more meaningful topics—starting with transparency, which is what this white paper aims to explore.

One of the questions that drives our passion for **AI in mobility** is:

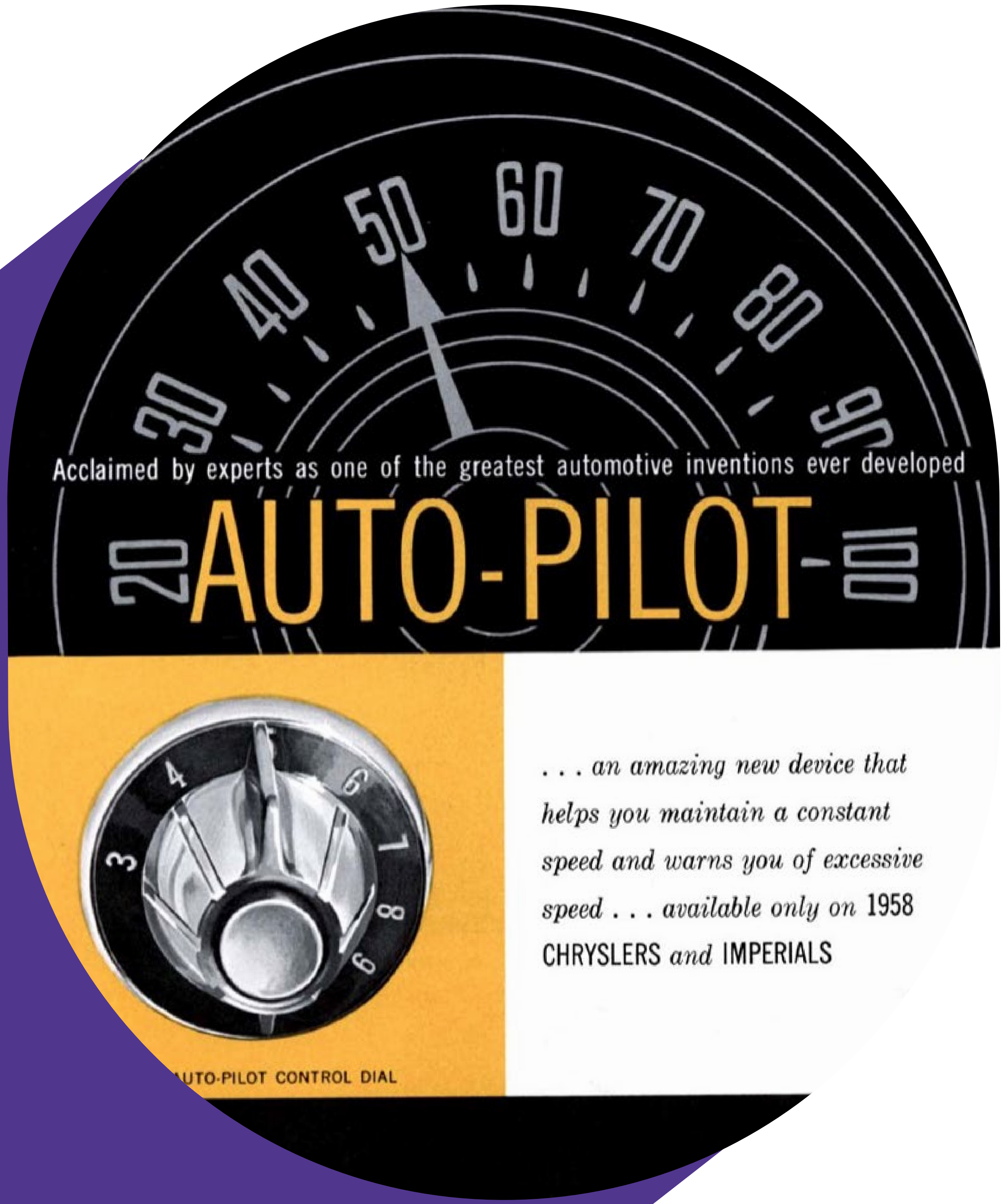
How can we ensure transparent communication about automated driving?

If, at this point, you are unsure why—beyond moral considerations—transparency is essential for the adoption of automated driving, we invite you to continue reading. This white paper will explore not only why transparency matters but also how it can accelerate adoption.

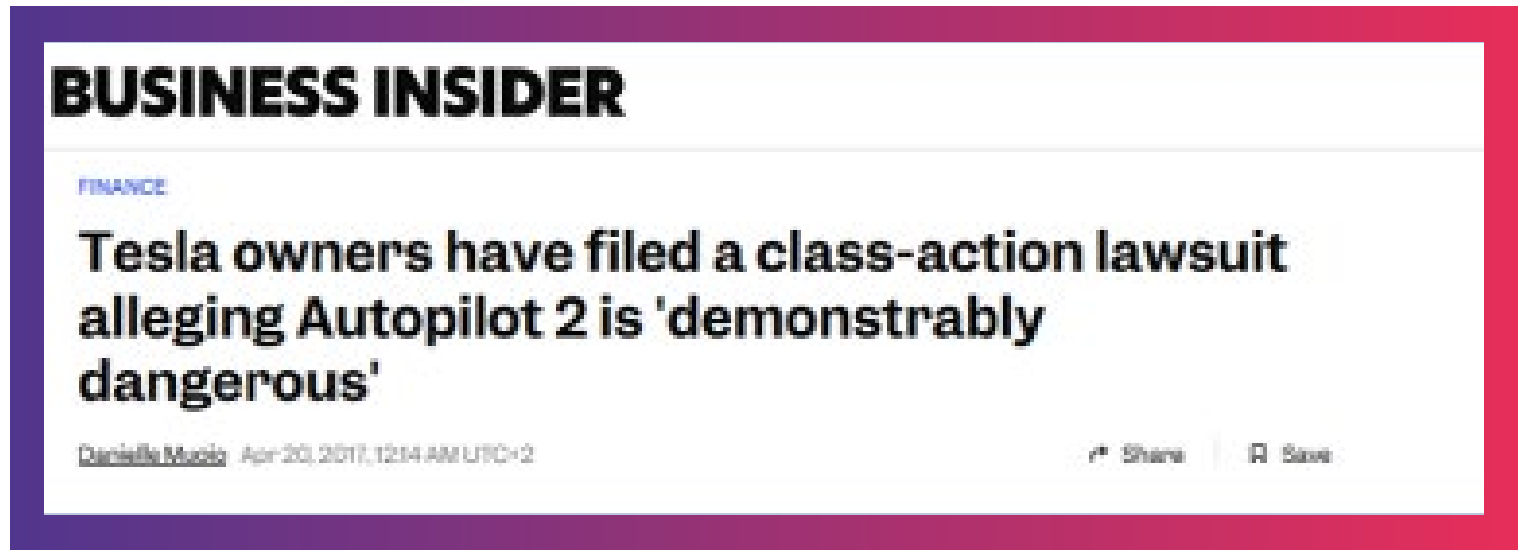
2 The hype, hope, and headaches related to AV discourse

2.1 Overstating capabilities: how misuse leads to safety concerns in public perception

Over the past decade, Tesla's **Autopilot** has revived a promise introduced by Chrysler in 1958: bringing the automotive industry closer to the aviation sector in terms of driver comfort and automation.



Tesla's CEO, Elon Musk, stated during a 2014 demonstration, "It brakes by itself," while speaking to a journalist. This announcement helped position Tesla as a leader in driving automation—despite the reality that the technology was still evolving. A controversy eventually broke out, stemming from allegations that Tesla's **Autopilot 2.0**, introduced in October 2016, was "essentially unusable and demonstrably dangerous" (Dean Sheikh et al. v. Tesla Inc., 2017). In this class-action lawsuit, Tesla owners claimed the company **misrepresented** the system's capabilities, accusing it of **false advertising** and seeking financial compensation for their purchases.



BUSINESS INSIDER

FINANCE

Tesla owners have filed a class-action lawsuit alleging Autopilot 2 is 'demonstrably dangerous'

Danielle Muoio Apr 20, 2017, 12:14 AM UTC+2

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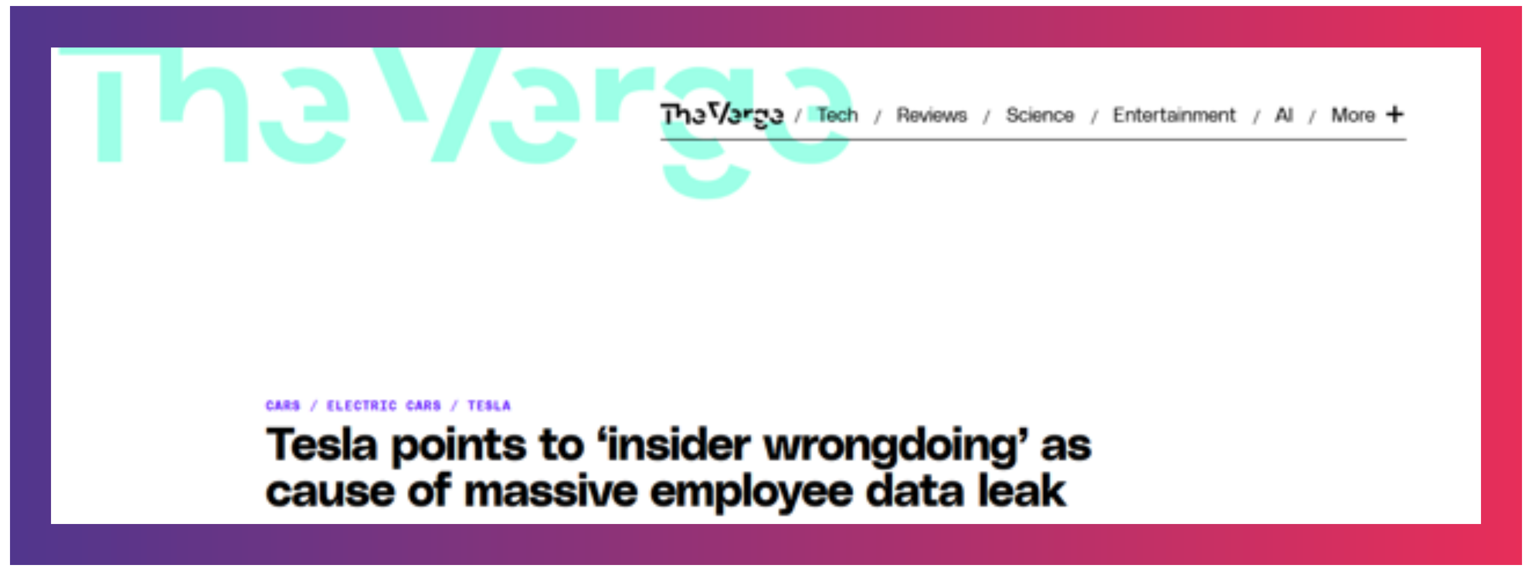
May 2023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Tesla points to 'insider wrongdoing' as cause of massive employee data leak

In May 2023, a data leak from Tesla in Germany exposed several flaws in their handling of customer data, raising concerns about ethical standards. These issues included privacy, but also extended to accountability, social well-being, and transparency.

December 2023


BBC

Home News Sport Business Innovation Culture Arts Travel Earth Video Live

Elon Musk's Tesla recalls two million cars in US over Autopilot defect

13 December 2023

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In December 2023, Tesla recalled 2 million vehicles equipped with the so-called "Autopilot" functionality. This feature has long been criticized, particularly for its overstatement of vehicle autonomy and the confusion it has caused regarding drivers' understanding of their role in using the system.

May 2024


The Washington Post

Democracy Dies in Darkness

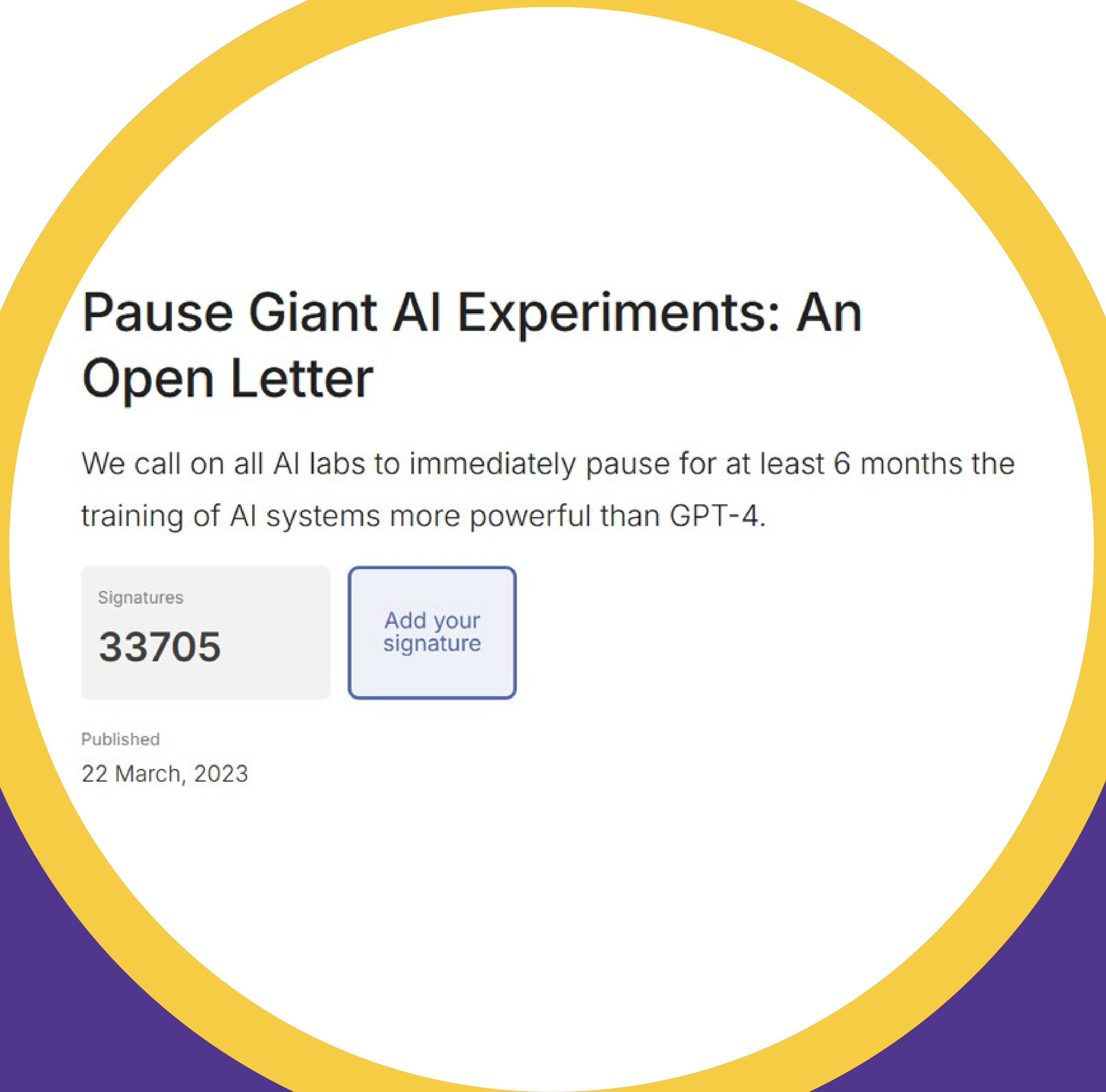
Tech Help Desk Artificial Intelligence Internet Culture Space Tech Policy

Lawsuits test Tesla claim that drivers are solely responsible for crashes

Multiple civil cases — and a federal investigation — contend that Tesla's technology invites 'drivers to overly trust the automation'

April 28, 2024

The initial case was resolved through a settlement, which acknowledged Tesla buyers as beta testers. However, as of May 2024, Tesla is once again in court, facing a **US-wide class action** lawsuit for failing to deliver on 2016 claims that their "self-driving technology" would become fully functional. This is occurring amidst ongoing probes and investigations by federal organizations (NHTSA, NTSB) into fatal crashes, phantom braking incidents, and driver engagement monitoring—some of which have led to recalls and mandated updates.

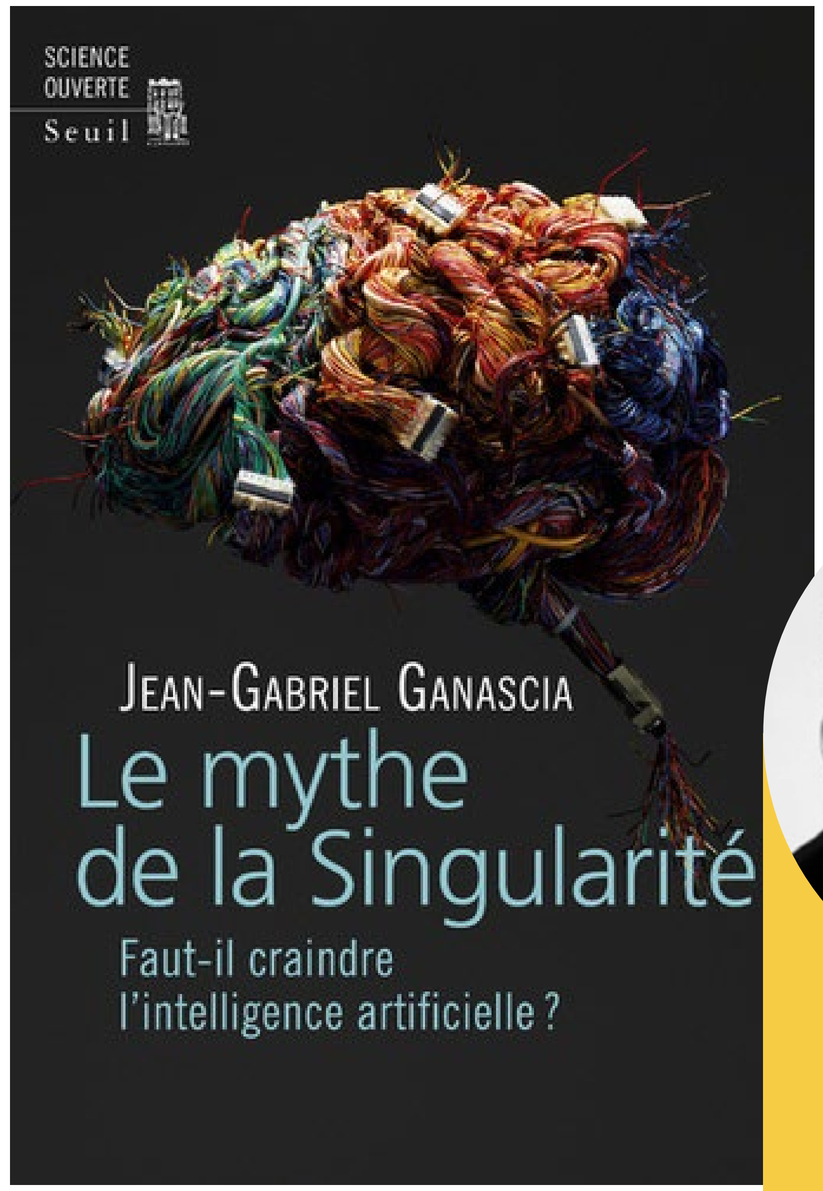


A recent example of the "pyromaniac firefighter" attitude is the recent Pause requested by Steve Wozniak, Yoshua Bengio or Elon Musk following GPT-4 release.

Pause Giant AI Experiments: An Open Letter - Future of Life Institute

Such claims are not unique to Tesla. Many companies **have made bold promises** about self-driving cars over the past decade, often aimed at attracting investors and positioning themselves as leaders in technological advancement.

Industries can significantly benefit from **overstating their capabilities**, and at times, this even extends to **exaggerating the risks of AI.**



In Le Mythe de la Singularité, Professor Jean-Gabriel Ganascia, president of the CNRS Ethical Committee and a member of the Ethical and Scientific Advisory Board of AI4CCAM, compares those involved in the industrialization of these technologies to pyromaniac firefighters. **They set the fire, raise alarms about the danger, and then present themselves as the only ones capable of extinguishing it. This tactic shifts responsibility, consolidates authority, and obscures the fact that major tech companies are creating new forms of power.**

Perhaps questioning these new forms of power is the first step toward defining the conditions under which the public can truly benefit from driving automation.

2.2 Downplaying risks: avoiding oversight from citizens and regulators

The question of the real benefits of automated vehicles is one that warrants serious debate. The deployment of any technology comes with both costs and benefits.

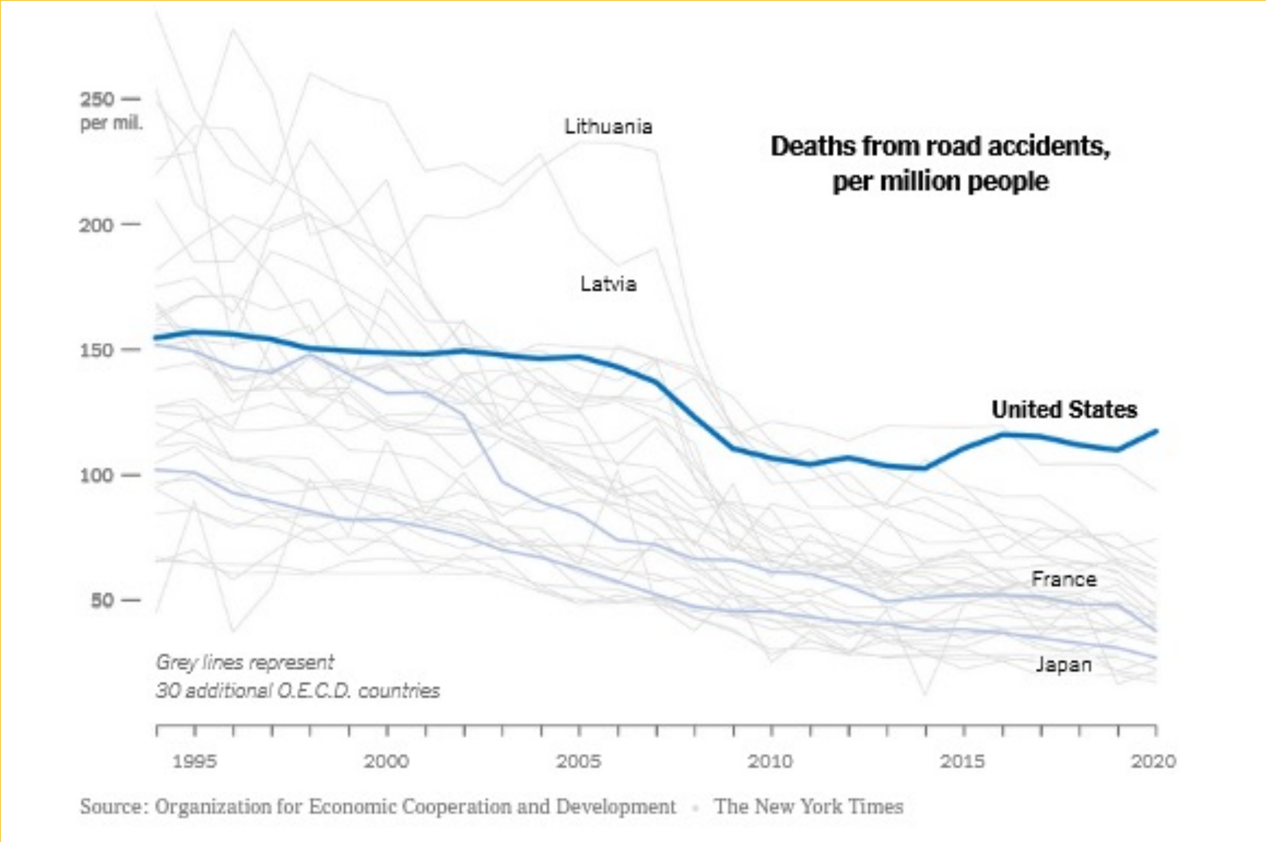
When evaluating AVs and the ethical dilemmas they present, **the trolley problem** often comes to mind. This famous thought experiment—rooted in philosophy, ethics, and psychology for over a century—forces a choice about whom to sacrifice in an unavoidable accident. It became a viral academic topic when applied to automated vehicles, attracting over two million participants. However, critics argue that focusing on extreme scenarios distracts from more pressing real-world issues, such as regulatory oversight, liability, and systemic road safety challenges.

This raises an important question: **Is determining the victim in a car accident really the first issue we should address?**
Do we even consider this when we take driving lessons? And would we have information in such an experiment about the potential victims?

Criticism[2] of this research has pointed out that it diverts attention from more pressing issues surrounding AVs, ultimately distracting both researchers and the public from the more critical challenges these technologies present.

Vehicle automation and road safety do not necessarily go hand-in-hand

Rules in different regions could be rewritten, and infrastructures redesigned to prioritize certain transport modes over others, either enabling or restricting AVs. The infrastructure surrounding the personal car distributes **benefits and risks unevenly**. Car-based systems make alternative modes of transportation more difficult and contribute to what Sheller (2018) refers to as **'mobility injustices.'**



Deaths from road accidents in the US, per million people, The New York Times / reporting Organization for Economic Cooperation and Development (2023)

Looking at recent traffic safety history, despite advancements in technology to protect users, not all countries have experienced a decrease in road accident fatalities

[2] https://mindmatters.ai/2020/03/the-moral-machine-is-bad-news-for-ai-ethics/

Road safety is currently marked by **injustices** (Culver, 2018), some of which are exacerbated by technological innovations. Drivers have benefited from improvements to their vehicles, which are now heavier and equipped with better protective gear and automated safety systems. In contrast, pedestrians have seen few technological advancements and have become victims of the **moral hazard** created by others' perceived safety. For instance, some research suggests that, since 2000, roads in the U.S. have become safer for drivers but more dangerous for pedestrians (Tyndall, 2021).

Sarah Lochlann Jain (2004) argued that the car is now often seen as a neutral tool rather than a dangerous object, leading to the redesign of landscapes with little consideration for anyone but drivers.

Greg Pajo|Car and Driver

It's particularly ironic that in the history of ground vehicle automation, two automakers chose to reference the **aircraft industry** when naming their driving automation features. This choice of terminology, as well as design decisions like the **Cybertruck's** (which is prohibited in Europe due to its sharp, angular lines deemed hostile to VRUs*), seems to disregard the direct environment of other road users—treating the vehicle as if it were in the air, far removed from pedestrians.

Improving Public Transport or Increasing Comfort for a Few?

Relying solely on a car for one's mobility needs, without alternatives, can be classified as a form of transport poverty. Rather than liberating humanity from the system of automobility, AVs risk individualizing and intensifying the existing automobility regime (Currie, 2018; Grindsted et al., 2022).

Previous EU research projects, such as Cartre & Arcade, identified several scenarios where AI could be operated by public authorities or in market-operated vehicle-sharing contexts.

However, scenarios involving market-operated private AVs were deemed to create too many negative externalities, such as safety concerns, space usage, CO2 emissions, and water footprints.

These trade-offs are critical to consider ahead of the deployment of AI in mobility, particularly when addressing local, specific issues. Since mobility is situated in a given spatial environment, it is crucial for this technology to offer an appropriate and well-balanced approach to transport users' needs.

As mobility is often organized at the local level, it is essential to educate a wide range of citizens about AI and its applications to mobility. Many will be involved in decision-making, and, not to mention, all road users will be impacted by these decisions.

*VRUs= vulnerable road users in the automated vehicle's environment, such as pedestrians, cyclists, or persons with disabilities.

2.2 Downplaying risks: avoiding oversight from citizens and regulators

A brief technical primer to clarify key concepts that impact transparency.

Concept	Definition	Source	Implication
Acceptance	Acceptance is defined as the act of accepting or a favorable reception and is often used considering the introduction of new technologies.	Collins dictionary	In its policy brief (2018), UITP[3] made clear that acceptance implies direct and transparent communication. We also recommend bilateral communication, and this implies education ahead of participation to the debate, given we highlighted many blind spots from urban car drivers in our qualitative research (on governance, data privacy, accountability or accessibility).
Acceptance	Adoption implies a free decision and a welcoming attitude.	Collins dictionary	In this document we will favor the word adoption over acceptance, as the word acceptance implies tolerance over an imposed decision.
Transparency	In the scope of AI for Avs, transparency can be defined as ensuring that three criteria are addressed to both internal users (drivers and/or passengers) & external road users (pedestrians, other drivers…). These three criteria being: - Traceability - Explainability - Communication	High-Level Expert Group on Artificial Intelligence[4]	In recent years, transparency has emerged as a key theme in work on the societal implications of AI and was define as one of the seven ethical key-requirements by the High-Level Expert Group on Artificial Intelligence.
Explainability	Given a certain audience, explainability refers to the details and reasons a model gives to make its functioning clear or easy to understand.	Barredo-Arieta and et al., 2020[5]	In addition to the numbers mentioned for traceability, automated vehicles bear black boxes, meaning we know inputs and outputs that play into deep learning systems, but we know very little about the how, which can become a real barriers to give reasons on a model's functioning.

[3]https://cms.uitp.org/wp/wp-content/uploads/2020/06/1810-ENG-PolicyBrief_EmpoweringCities-web.pdf
[4]https://digital-strategy.ec.europa.eu/en/policies/expert-group-ai
[5]Barredo-Arieta, A. and et al., 'Explainable arti_cial intelligence (xai): Concepts, taxonomies, opportunities and challenges toward responsible ai', Information Fusion, Vol. 58, 2020, pp. 82_115.

Concept	Definition	Source	Implication
Traceability	The ability to relate uniquely identifiable system artefacts created and evolved during the development of a system, maintain these relationships throughout the development life cycle and use them to facilitate system development activities	Mora 2017[6]	The number of artefacts related to conventional vehicles account for around 100k artefacts, but with Avs it could go up to 10M. Conventional cars consists of features including 100 million lines of code, and systems specifications of a 2004 car reached about 20,000 pages. Growing complexity of the technology behind our vehicles' codes will only improve these figures requiring us to improve traceability.
Communication	The High-Level Expert Group on AI tackles high-level information delivered to users. They distinguish informing external users they are to interact with an AV and delivering benefits & risks to users of such vehicles.	High-Level Expert Group on Artificial Intelligence[7]	In a perspective of involving citizens in decision-making around mobility, we could extend the communication of risks & benefits to non-users (for decision-making around ecological impact for instance).
Human agency	Agency can be defined as the feeling of control over actions and their consequences.	Moore, 2016[8]	This requires that AI systems should both act as enablers to a democratic, flourishing, and equitable society by supporting the user's agency and foster fundamental rights and allow for human oversight.
Human oversight	Human oversight helps ensuring that an AI system does not undermine human autonomy or causes other adverse effects.	High-Level Expert Group on Artificial Intelligence	Oversight may be achieved through governance mechanisms such as a human-in-the-loop (HITL), human-on-the-loop (HOTL), or human-in-command (HIC) approach.

[6]Mora-Cantallops, M., Sánchez-Alonso, S., García-Barriocanal, E. and Sicilia, M. A., 'Traceability for trustworthy ai: A review of models and tools', Big Data Cogn. Comput., Vol. 5, 2021.
[7]https://digital-strategy.ec.europa.eu/en/policies/expert-group-ai
[8]Moore, J. W., 'What is the sense of agency and why does it matter?', Frontiers in Psychology, Vol. 7, No 1272, 2016.

3 Guidelines for improved tranparency

3.1 CLARITY OVER EMOTION: THE IMPORTANCE OF LANGUAGE

According to our qualitative research[9], we found that wording has a significant influence on shaping people's perceptions and framing their comparative mindset.

Words like "autonomous" and "self-driven" anchor the idea that the automated vehicles (AV) might possess a will similar to that of a human, capable of "intelligence."

This leads people to emotionally compare autonomous driving to human driving.
In this context, using wording that anchors the vehicle in a mechanical context helps reduce the comparison to human driving, which could potentially aid in the adoption of AVs. By focusing on the technical aspects, it reframes the discussion away from human-like qualities.
Furthermore, comparing automated vehicles to existing public transport solutions can be an effective strategy to associate AVs with concepts like autopilot, safety, and comfort. It helps potential users envision themselves as carefree passengers, no longer needing to monitor the road. Instead, they can use the time to engage in other activities, such as sleeping, reading the news, checking emails, or even playing games.

"There I find that it is as if we give the AV a spirit, an intelligence and there it is the door open to many things. But let's imagine for an animal, will it stop too? Will it stop for just a few people?"
– Tech Moderate, FR

"If there is a dense crowd of pedestrians, as a human, I can distinguish who appears to be arriving and crossing the street or just walking straight ahead. How can the automated vehicle distinguish between a person who has the intention to enter the street and the people who are simply walking as pedestrians?"
– Tech Enthusiast, GE`

[9] https://www.thebvafamily.com/en/webinar-on-the-roads-of-tomorrow/

On the other hand, comparing autonomous vehicles to human driving presents a significant barrier, as a human perspective tends to anchor the idea that driving is about sensations and feelings. Those who naturally make such comparisons often associate driving primarily with the notion of pleasure.

When thinking of autonomous vehicles as a replica of human driving, it prompts users to desire control over the vehicle and position themselves in the role of the driver. This comparison evokes the belief that AVs could possess the same reflexes as humans driving on the road.

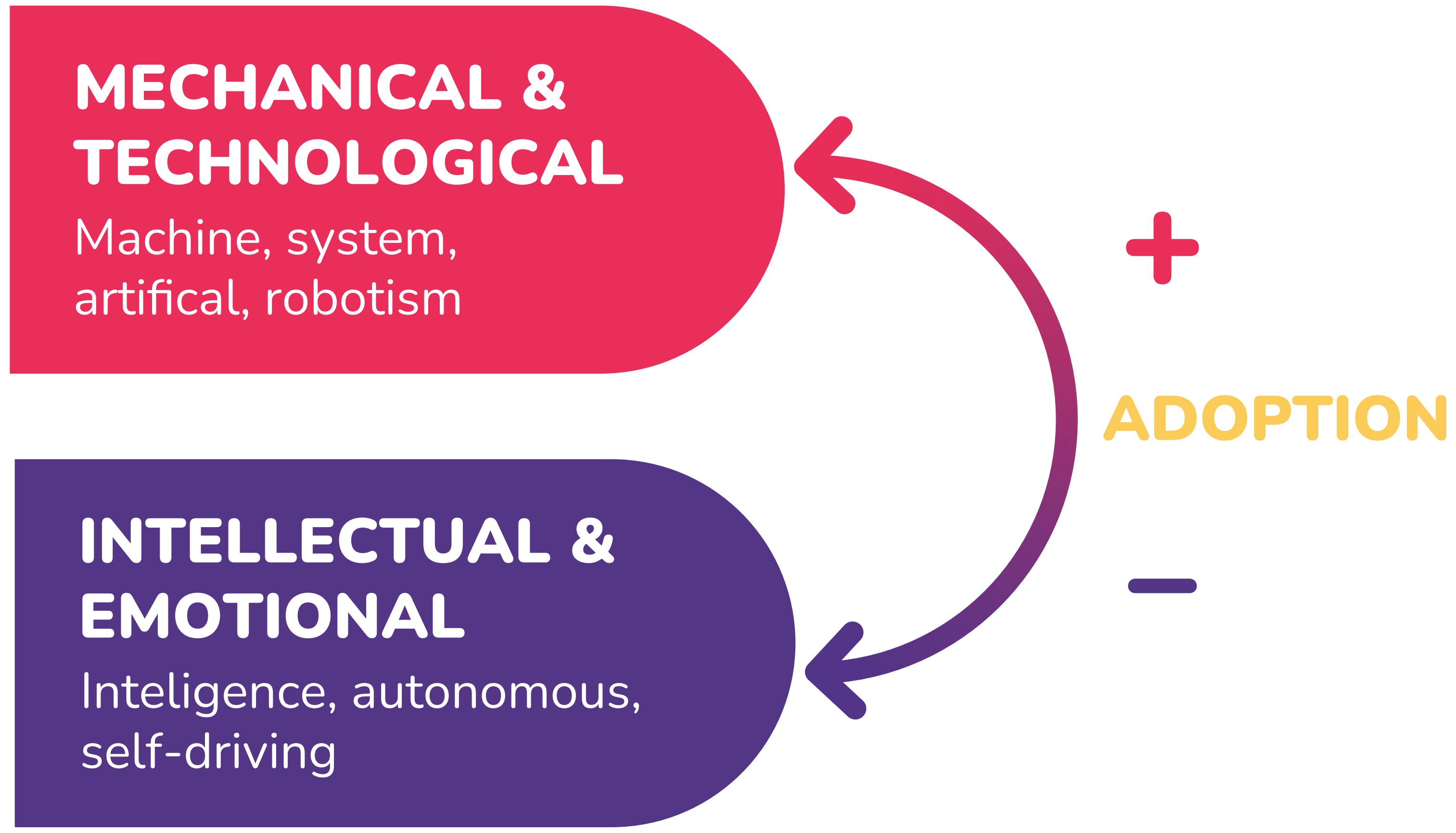


Figure 1 – source: BVA Xsight, Qualitative report AI4CCAM : favoring mechanical & technological wording in favor of adoption

When the **comparison favors AI, rational and objective elements drive the reasoning.** The primary criteria used to assess AVs are the technical aspects of the vehicle, highlighting its efficiency and performance over human drivers. For instance, the vehicle's sensors can be viewed as thousands of eyes, vastly more capable of collecting sensory data than the human driver's vision. In this light, AVs are considered more trustworthy than human-driven cars.

However, when the **comparison shifts in favor of the human driver, emotional and subjective elements dominate the reasoning**. Respondents view driving as an inherently human activity that involves sensations, emotions, and human agency. They often project a robotic, dehumanized driving style onto AVs. Some even wish for the ability to select from a preset of driving styles that mirror their own, such as soft or sporty styles. In this context, AVs are criticized for being emotionless, lacking personality and character.

There is a growing consensus that the **term autonomy should be avoided**, a view affirmed by the AI4CCAM ethical board. For instance, we found only one mention of autonomy in a reference glossary for the industry (Connected Automated Driving website[10]). and it was used solely to distinguish it from **automation**, a term much more frequently referenced in this glossary. The word self is entirely absent. We should also critically assess the term intelligence, as its multiple meanings can create confusion.

[10] https://www.connectedautomateddriving.eu/glossary-and-taxonomies/glossary/

On this note, the Horizon 2020 Arcade website, further enriched by the Fame project, proved particularly valuable for this research. It should be maintained over time to help align stakeholders on language, project objectives, and data sharing.

In the scope of the AI4CCAM project, we also participate to building this common language, enriching existing taxonomy from this Fame project with feedback emerging from citizens and specialists[11].

Despite consensus among European experts, the term autonomous has gained widespread use in public discourse. Browsing vehicle automation on Wikipedia, for instance, reveals clear semantic confusion. Even among experts, we find ourselves referring to a project as being about autonomous vehicles, as was the case with AI4CCAM.

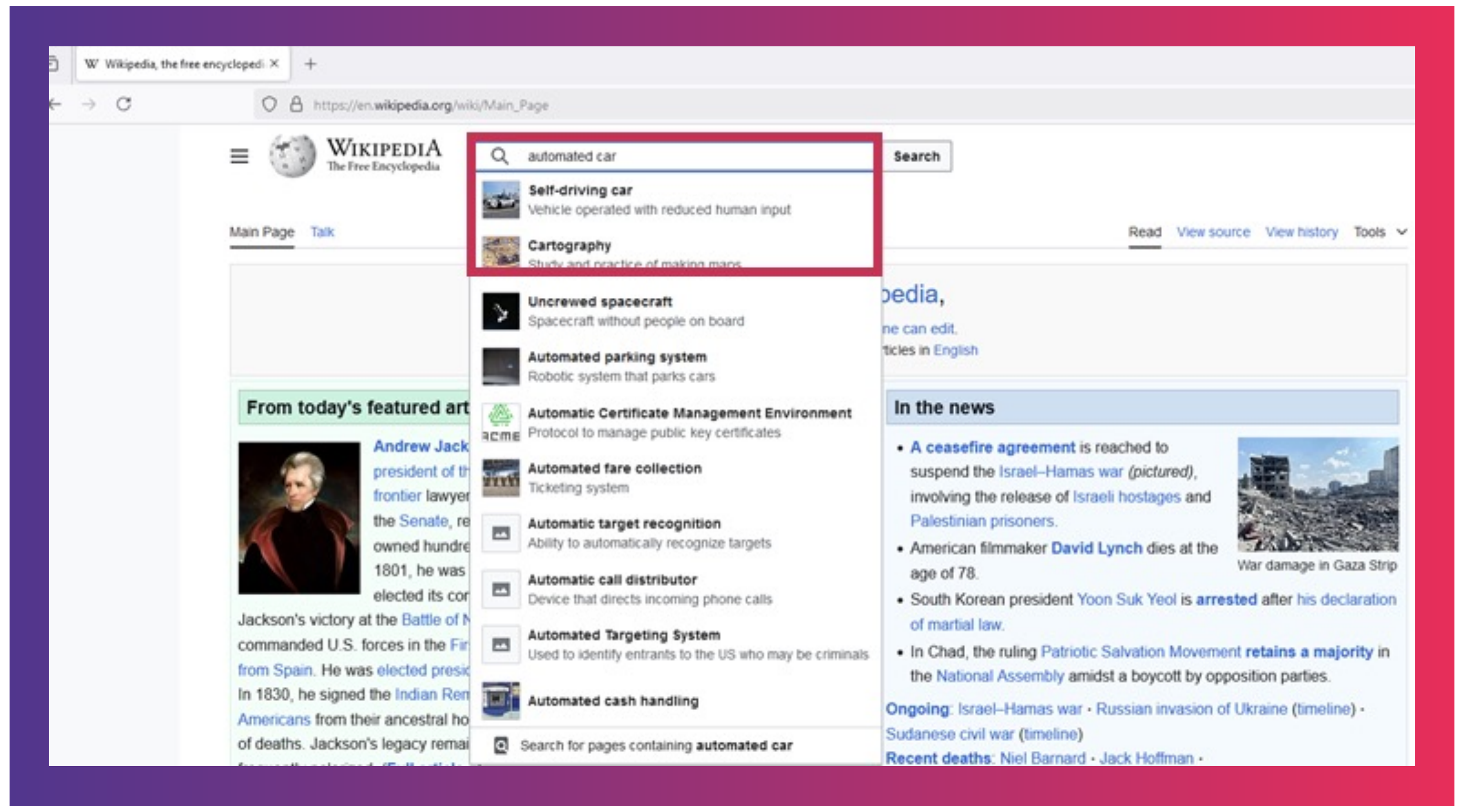


Figure 2 : Typing automated car, first proposal from Wikipedia

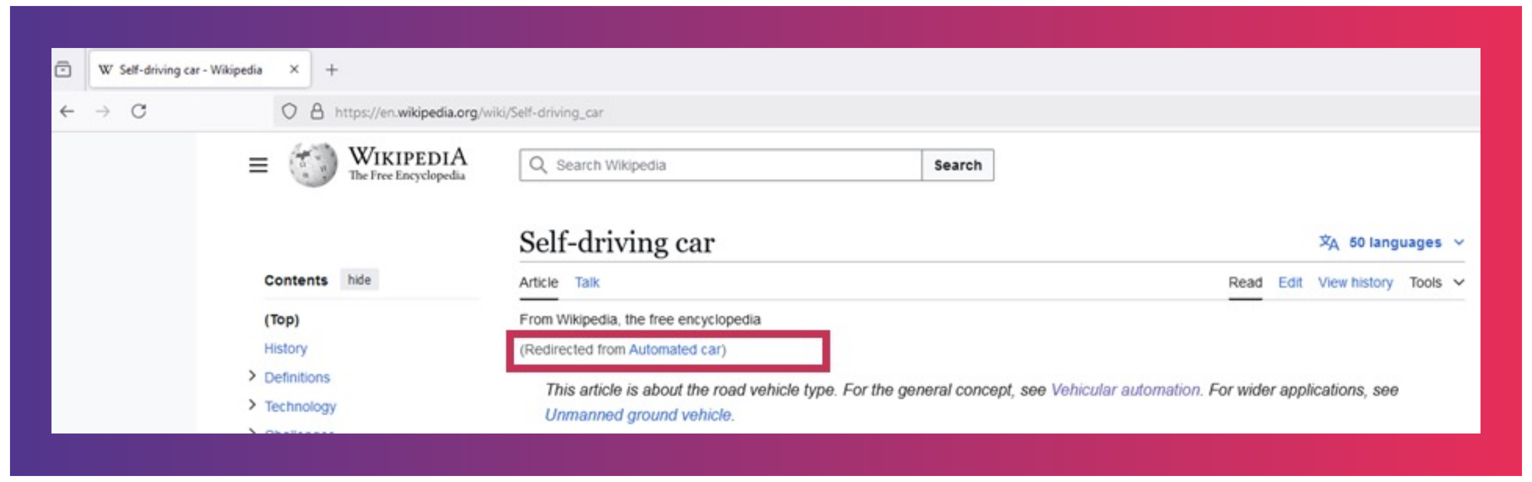


Figure 3 : Same goes for redirection when searching for Automated car.

We therefore advocate for prioritizing technical terminology. This approach should be reflected not only in regulation but also in the spaces where information about automated driving is delivered. It's crucial to emphasize that vehicles with Levels 2 & 3 automation are not "self-driving."

Emotion, on the other hand, proves more effective in advertising, particularly when appealing to both consumers and investors. This raises concerns about its use by certain manufacturers, as well as the practice of **overclaiming** capabilities—commonly referred to as **autonowashing**.

[11] Lien à ajouter (bug sur le site actuel)

3.2 Avoid autonowashing at all costs

There are significant economic incentives for OEMs and service providers (both public and private) to overclaim user agency and AI capabilities in the context of CCAM. These overstatements can mislead the public and create unrealistic expectations. This, in turn, highlights the **critical role that regulators must play in overseeing and guiding communication in this space.**

Familiarity to current representation clearly favours car makes... and more specifically brands leading the conversation

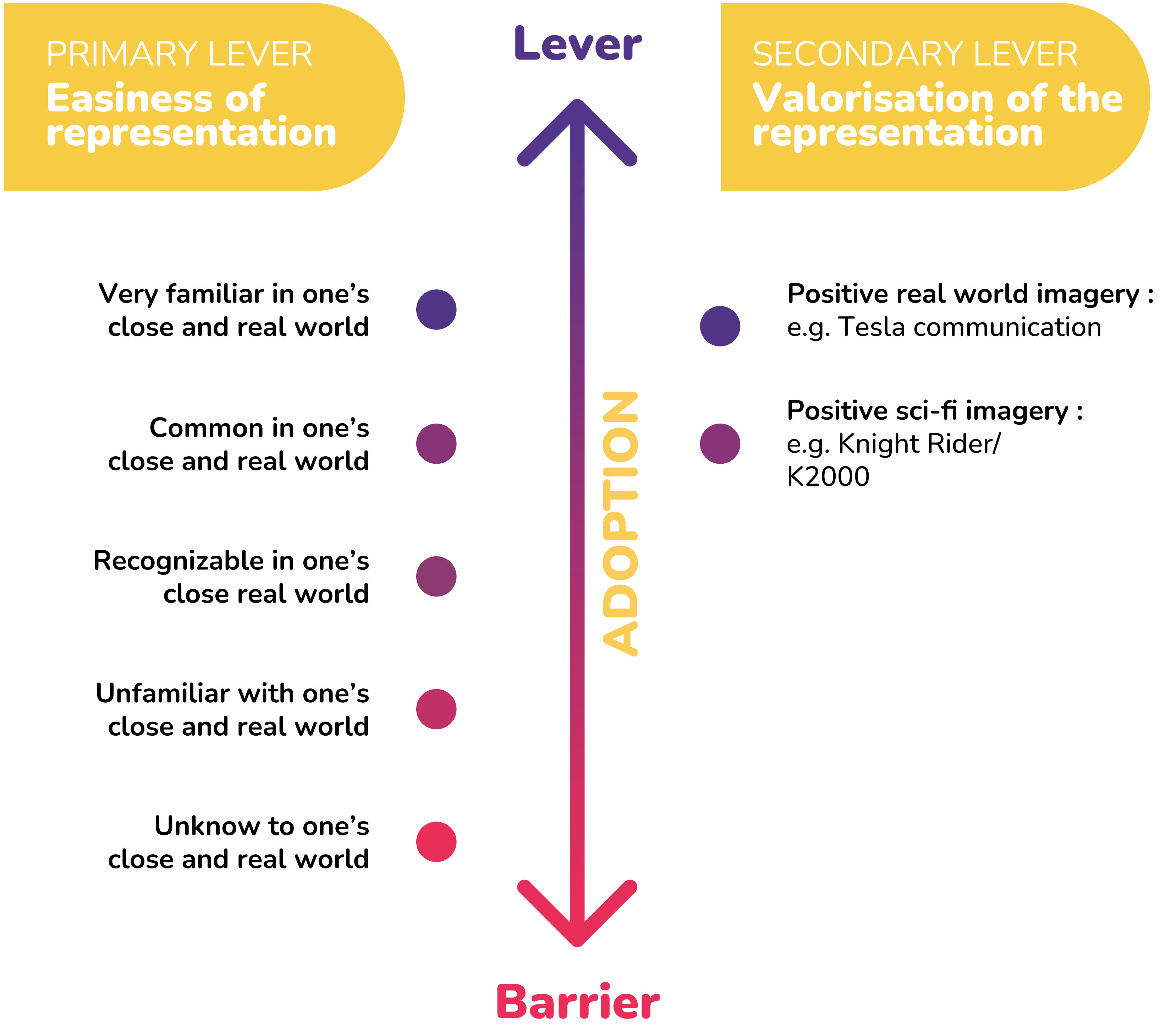


Figure 4 : BVA Xsight Qualitative Research: car makers are favored by easiness of representation

The risk of misleading marketing and the exaggeration of autonomous system capabilities can create false expectations among users. Cases like the lawsuit against Tesla underscore the ethical dilemma faced by companies that misrepresent the capabilities of their autonomous systems. Such overstatements may result in users developing unrealistic expectations and placing undue trust in technology beyond its actual capabilities. Tesla's experience serves as a direct example of what EU regulators in the CCAM space should aim to prevent.

The seminal work of L. Dixon on the topic of 'Autonowashing'[11] (Dixon, 2020) remains the international benchmark on the subject and is highly relevant here. Dixon argues that media and marketing often overstate the capabilities of vehicle automation, which directly influences user perceptions and interactions with AI systems. She coins this overstatement "autonowashing." According to Dixon, a lack of public awareness regarding this practice can negatively impact trust calibration and hinder the safe adoption of vehicle automation—an argument supported by the Tesla case cited earlier.

[11] https://lizadixon.com/Autonowashing

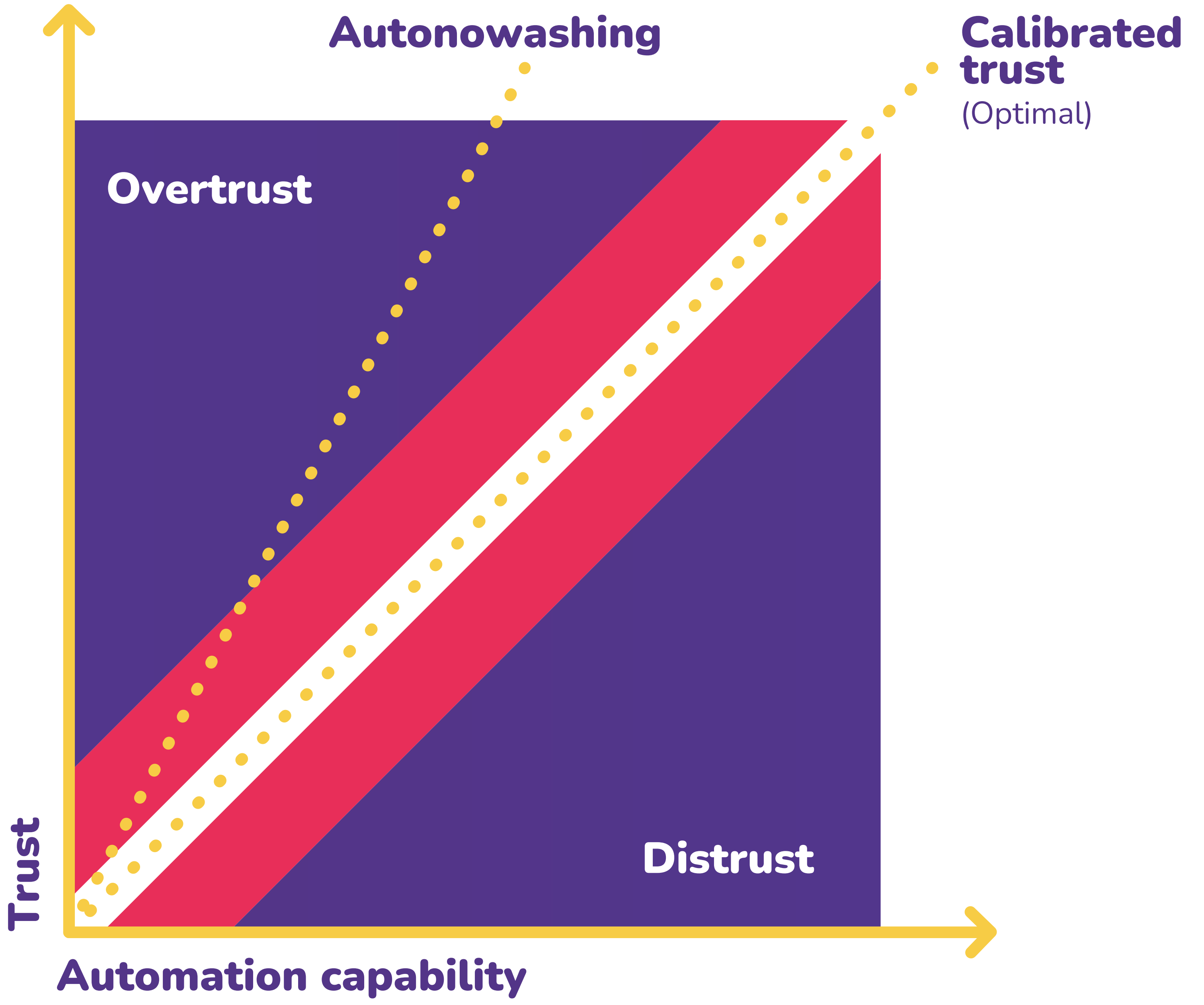


Figure 5 - source: Dixon, L. (2020).

Table 2
The five signs of autonowashing, their description, and an example of their application in the real world.
Adapted for autonowashing from TerraChoice Environmental Marketing Inc. (2007).

Sign	Description	Example
Vague language	A term or claim that is poorly defined, misaligned with standards or so broad that its real meaning is likely to be misunderstood by the user.	"Autopilot" or "Level 2.5/2 + "
No proof/fibbing	Deceitfully making a claim about a system's capabilities; Claiming to have autonomous capabilities which have not been verified by a third party.	"Full-Self Driving capability"
False idols	When inappropriate reliance/system misuse is modeled to an audience by a figure of influence or authority.	Tesla CEO's interactions with Autopilot during multiple televised interviews (Bloomberg, 2014; CBS News, 2018; McPherson, 2018) (see Fig. 3).
Utopian media	Inappropriate media headlines or technology demonstrations which feature idealized functionality of automated systems operating successfully with little to no human supervision or interaction.	Video footage of steering wheels moving independently, photos of users reading books or watching a movie in the driver's seat (Tesla Inc., 2016b). (See also Table 1).
Hidden trade-off	Focusing attention on one particular attribute, concealing some crucial information, especially from the human supervision point of view.	"Driver assistance systems make driving safer" [...provided they are appropriately supervised].

Figure 6 – five signs of autonowashing: Dixon, L. (2020).

Previous work on the topic has also highlighted the risks of creating unrealistic expectations for self-driving technologies, as exemplified by the Tesla case in the US. Expectations driven by provider overclaims can act as significant barriers to long-term adoption, especially when users are confronted with the limitations and shortcomings of the system (Beggiato & Krems, 2013)[12]. In other cases, .

Dixon's conclusions remain fully relevant and applicable to the guidelines presented here:

"OEMs and service providers must be held accountable for their role in calibrating trust in vehicle automation. "[Trust] … must be positioned by OEMs as a core principle in the functional design of systems, their testing, and evaluation"; in the context of this paper, we would go further to say that regulators have a responsibility as regards the limits to marketing such AI systems in the CCAM space."

Inaccurate perceptions can lead to driver complacency and present real safety risks (Banks et al., 2018)[13]

[12] https://www.sciencedirect.com/science/article/pii/S2590198220300245?via%3Dihub
[13] https://pubmed.ncbi.nlm.nih.gov/29409628/

Even though early communication allows to lead the discussion, misleading marketing can become a barrier to adoption

Last, regulators should prohibit and audit the handover (via sale, rental, or one-time use) of an automated or semi-automated vehicle to any driver who has not been fully briefed on the vehicle's systems capabilities and notably, limitations.

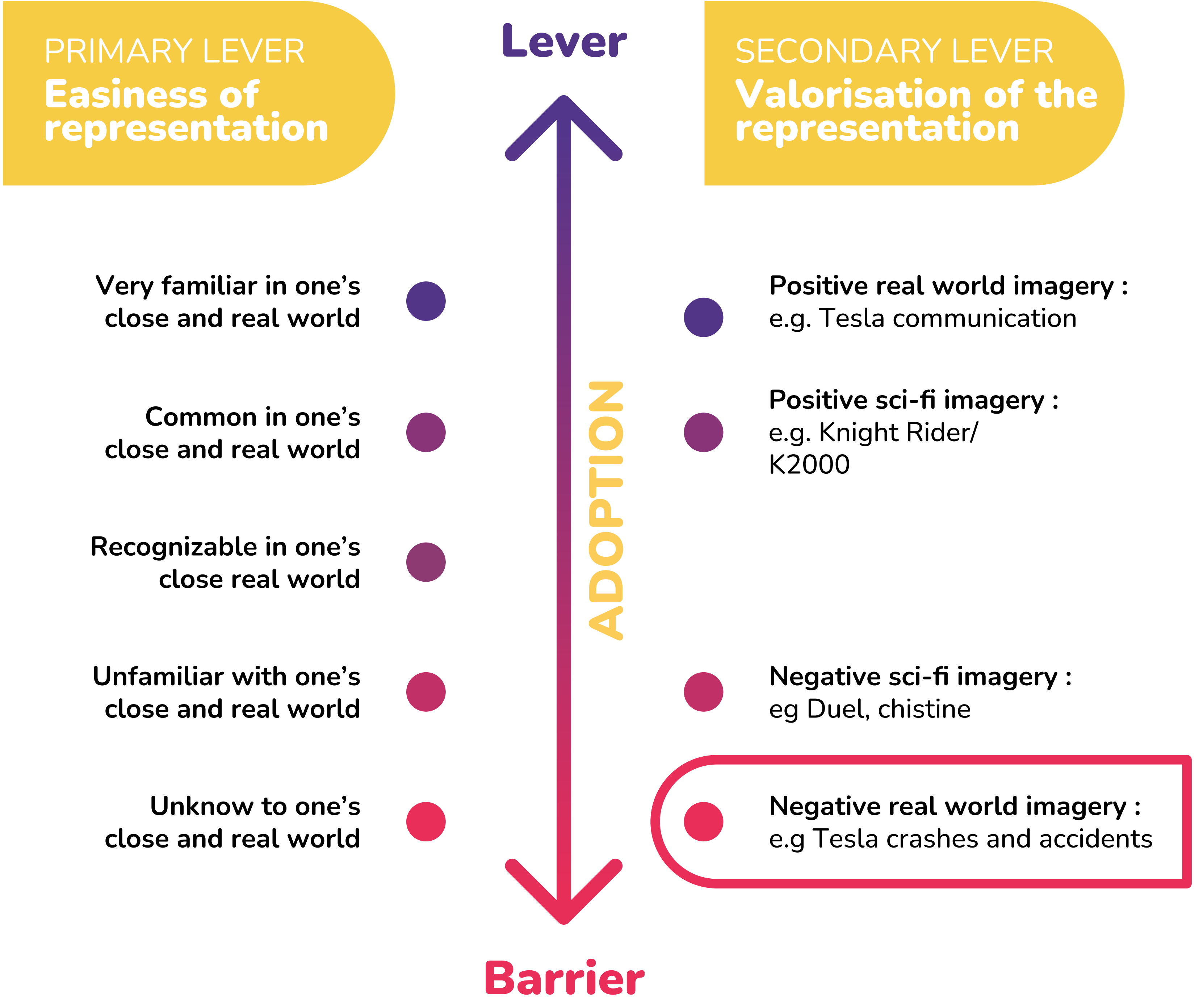


Figure 7: BVA Xsight Qualitative Research: misleading marketing, a barrier to adoption, as it promotes misuse, and can further generate disuse

3.3 FROM AWARENESS TO ACTION: EDUCATING ALL ROAD USERS

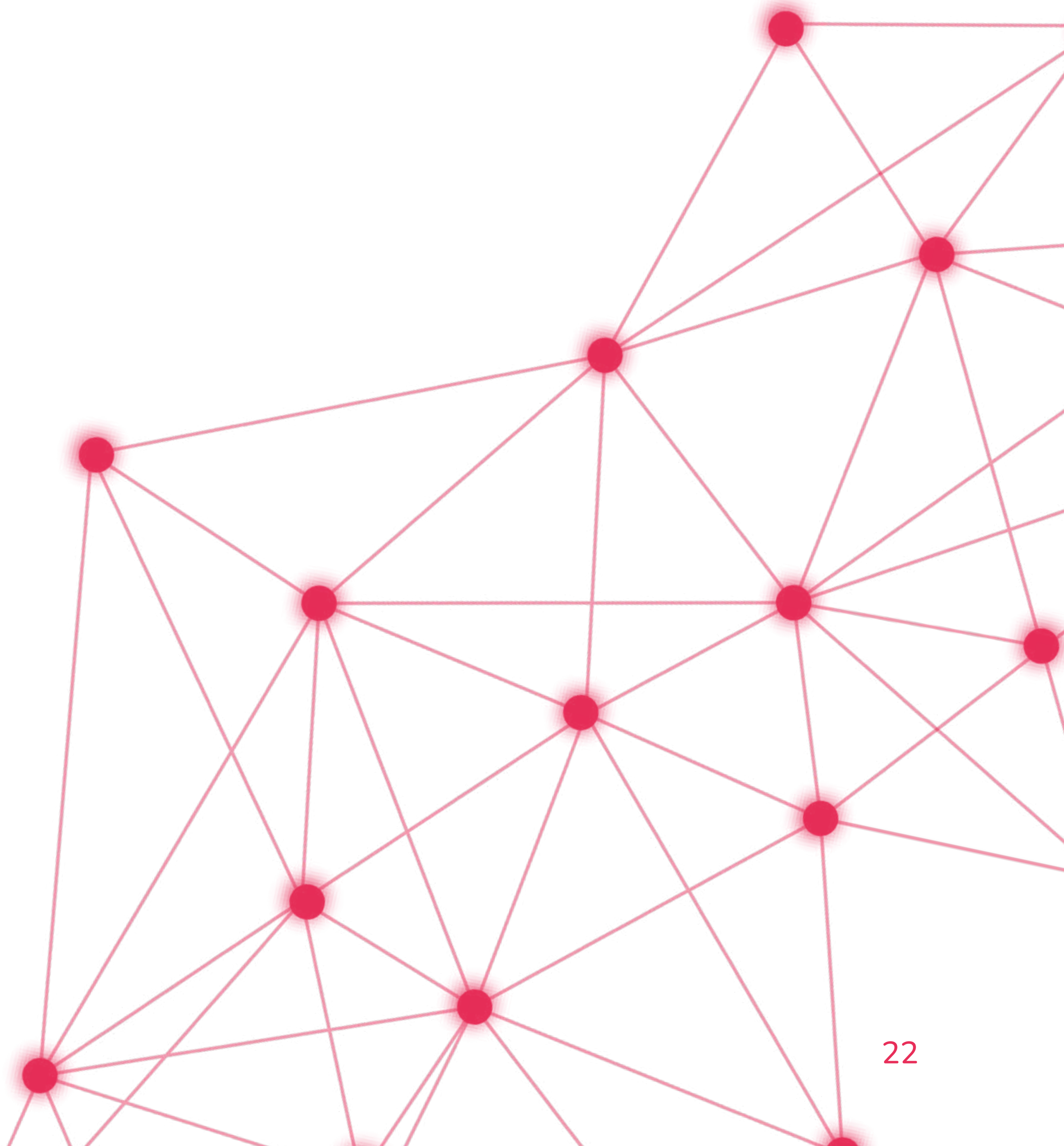
For improved user agency and acceptance, it is essential to implement comprehensive educational initiatives focused on AI in general, and more specifically on its application in mobility. Previous European research projects have emphasized the need for campaigns addressing data usage, privacy, and liability. Additionally, as human drivers are expected to remain involved in the driving process through 2035 (including remote control tasks), driver training must be adapted to reflect new roles and responsibilities both inside and outside of automated vehicles.

Starting with Updates to Current Driver Education

Automated vehicle operation or usage lessons—whether digital, in-person, or through VR—are integral to educating users on Human Agency and Oversight in a world with increasing automation. In our qualitative research, some respondents specifically advocated for the chance to engage in training or test sessions within a controlled environment before using these vehicles in real-world situations.

There should be some training for pedestrians, for cyclists, on how to behave in relation to such cars. There would need to be a huge lesson in changing habits, we need to start teaching children, because it will already be difficult for us to switch.
– Tech Enthusiast, PO

I would drive on a circuit first. I'm not against it, but others would have to try it first.
– Tech Moderate, FR



Innovations such as M12 signs in France, need to come with education to all road-users for their adoption to be successful.

The respondents most enthusiastic about AVs also expressed a strong desire to learn how these systems work and how to interact with them—both as drivers and as other Vulnerable Road Users (VRUs). They advocated for quick, targeted training to ensure safety and understanding. For those more hesitant about AVs, seeing others use these vehicles first could provide reassurance. Collective training sessions could help create a sense of shared experience and reduce the perception of risk when testing autonomous vehicles.

Our research shows that training and test sessions are powerful tools for fostering adoption, especially when they are mandatory for all road users, including both drivers and VRUs.

An existing initiative that could serve as a model is the SHOW program, which "aims to support the deployment of shared, connected, and electrified automation in urban transport to advance sustainable urban mobility." During this project, real-world demonstrations in 20 cities across Europe integrated fleets of automated vehicles into public transport, demand-responsive transport (DRT), Mobility as a Service (MaaS), and Logistics as a Service (LaaS) schemes.

SHOW also proposed online courses on automated mobility[14] for the general public. These courses explored the various types of automated vehicles, the levels of automation available, and how these systems are expected to evolve in the near future. Such initiatives offer a valuable blueprint for the broader educational efforts needed for AV adoption.

[14] https://hit-projects.gr/Show_elearning/login/index.php#section-3

4 Harnessing collective intelligence

The AI4CCAM research project began with a keynote by Professor Jean-Gabriel Ganascia, President of the CNRS Ethical Committee and a member of the Ethical and Scientific Advisory Board of AI4CCAM. In his keynote, he emphasized how the term “Artificial Intelligence” , with its polysemic nature, often serves as a barrier to the adoption of AI-based technologies. The complexity and ambiguity surrounding the concept of intelligence—when applied to machines—can create confusion and fuel skepticism, making it harder for people to fully understand, trust, and embrace AI technologies, particularly in the context of automated vehicles.

In a recent podcast he discussed polysemy of intelligence again[15]:

“When we talk about artificial intelligence, what is intelligence? This is the real question. It’s always the scary thing. The term intelligence is highly polysemic.

Here, the intelligence that this is about was introduced in the 19th century [...] and corresponds to the regroupment of our mental faculties, our abilities. It is our perception, our reasoning, our memory, the ability to communicate, to talk... Intelligence is the result of all these faculties. And what does artificial intelligence do? It proposes to use machines to better understand these faculties, by modeling them, simulating them on these machines, and then confronting what the machine does with what humans do. Once these faculties are modeled, we are then capable of simulating them in many technologies.”

[16] https://next.ink/152427/jean-gabriel-ganascia-avec-lia-lespace-public-est-en-train-de-disparaitre/

Jérémy Pennors- Une convention citoyenne sur l'intelligence artificielle à Montpellier- 05/06/2023- lamarseillaise

To clarify, when we refer to "intelligence" in the context of machines, we mean statistical and model-based capabilities, not will, spirit, or human-like cleverness. The application of "intelligence" to machines can often mislead and create confusion, which is why clear communication is so crucial.

In sections 3.1 and 3.2, we advocate for stronger regulation and better communication from industries, especially regarding the design of vehicles and the way automation systems (like ChatGPT) should be integrated to ensure explainability and transparency. Some automakers, like Mercedes, have made strides in this direction by incorporating clear indicators—such as specific lighting—to make the automated nature of their vehicles transparent to users. However, not all manufacturers have taken this level of care.

In section 3.3, we emphasize the importance of education, particularly in developing a critical mindset toward these technologies. Citizens must understand the systems they interact with daily, but beyond that, it's crucial that operators, authorities, and workers also receive training. These individuals will ultimately be responsible for decision-making and ensuring these systems are functioning as intended. Beyond the technology, human intelligence, critical

thinking, and foresight will be necessary to tackle the ethical and regulatory challenges that arise as these technologies evolve.
Interestingly, during our interviews, citizens expressed a desire for collective training sessions focused on AI. One compelling example comes from Montpellier, where a Citizen Convention on AI took place[16]. This initiative went beyond just providing information; it empowered citizens through collective sessions, showing that for education to truly be effective, it must be a long-term, iterative process.

This leads to a thought-provoking question: could another form of intelligence be harnessed to effectively navigate and maximize the benefits of this technology? As Daron Acemoğlu, Nobel Prize-winning economist, noted during his recent talk at The BVA Family HAC conference[17] **"There is nothing automatic about new technologies bringing widespread prosperity. Whether they do or not is an economic, social, and political choice."**

[16] https://participer.montpellier.fr/sites/default/files/2024-03/Avis%20Convention%20Citoyenne%20-%20Montpellier%20%C3%A0%20l'heure%20de%20l'IA.pdf
[17] https://www.youtube.com/watch?v=ugoDYngq1rA

Glossary of Technical Terms and Acronyms

AI - (Artificial Intelligence)
The use of technology to perform tasks that traditionally require human intelligence.

Autonowashing
The practice of exaggerating the autonomy capabilities of vehicles, particularly in marketing and communication.

AV - (Automated Vehicle)
A vehicle that integrates automated driving technologies.

CCAM - (Cooperative, Connected, and Automated Mobility)
A mobility ecosystem that combines connected, cooperative, and automated transport solutions.

HITL - (Human-in-the-loop)
An approach where humans actively participate in decision-making within an automated system.

HOTL (Human-on-the-loop)
A model where humans oversee an automated system but intervene only when necessary.

HIC (Human-in-command)
A framework where humans maintain full control over an automated system.

L2, L3, L4 Automation
Levels of vehicle automation as defined by SAE (Society of Automotive Engineers):

L2
Partial automation (the driver remains responsible).

L3
Conditional automation (the driver can delegate tasks but must be ready to take over).

L4
High automation (no driver required in specific conditions).

MaaS (Mobility as a Service)
A concept integrating multiple transport modes into a single mobility service.

NHTSA (National Highway Traffic Safety Administration)
The U.S. agency responsible for road safety.

NTSB (National Transportation Safety Board)
An independent U.S. agency investigating transportation accidents.

OEM (Original Equipment Manufacturer)
A company that produces components or vehicles for use by other brands.

Telematics
Technologies that monitor and optimize vehicle performance and driving behavior through data collection.

Trolley Problem
An ethical dilemma where a choice must be made between two potentially fatal outcomes.

AI4CCAM

This whitepaper is created by le studio of BVA Family and insights teams of BVA Xsight