

REGULATING ARTIFICIAL INTELLIGENCE IN THE EU – THE CASE OF AUTONOMOUS VEHICLES

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Mark my words —
A.I. is
far more
dangerous
than nukes.

Elon Musk

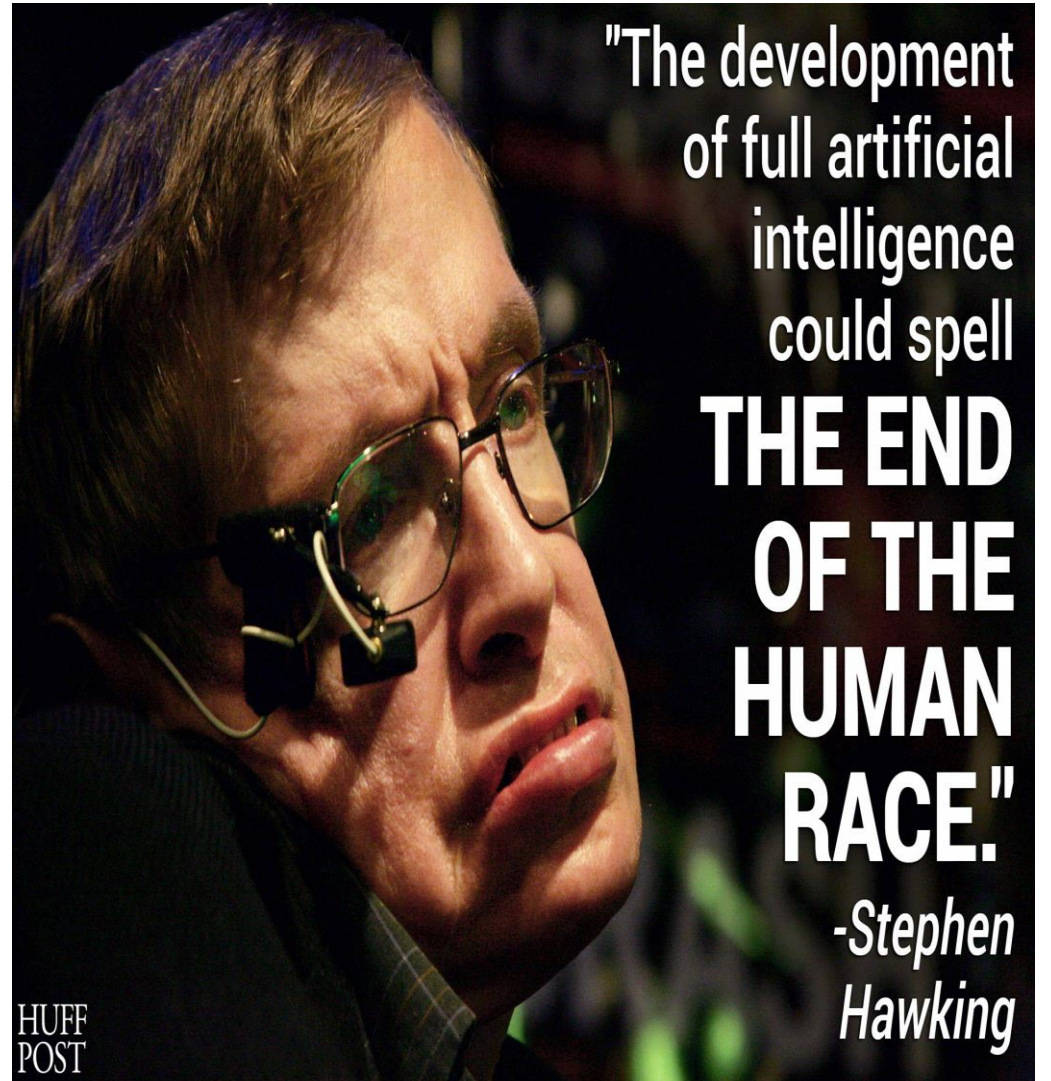
BILLIONAIRE TECH
ENTREPRENEUR



"The development
of full artificial
intelligence
could spell
**THE END
OF THE
HUMAN
RACE.**"

-Stephen
Hawking

HUFF
POST



OUTLINE

- Defining AI and robots: the 'European' way
- Legal framework on AI in EU
- Assessing framework with autonomous vehicles as case study
- Multi-stakeholder approach necessary
- Conclusions

DEFINING CONCEPTS IN EU

- Many definitions of AI ('AI hype')
- 'Easy questions to ask, a hard one to answer'
- Artificial AND intelligence
- Complex as legal scholars and lawyers often not computer scientists
- Influence movies and stories on perceptions AI and robots

DEFINING AI

➤ Definition AI in the European Union

- Communication on AI for Europe (2018)
 - High Level Expert Group on AI (2019)
- } 'rationalistic approach'

→ systems that display intelligent behaviour by analysing environment and taking action with some degree of autonomy to achieve specific goals

- EC in White Paper on AI (2020)

→ definition needs to be sufficiently flexible while also being precise

→ main elements that compose AI: “data” and “algorithms”

→ algorithms trained to infer certain patterns based on set of data to determine actions needed to achieve a given goal

DEFINING ROBOTS

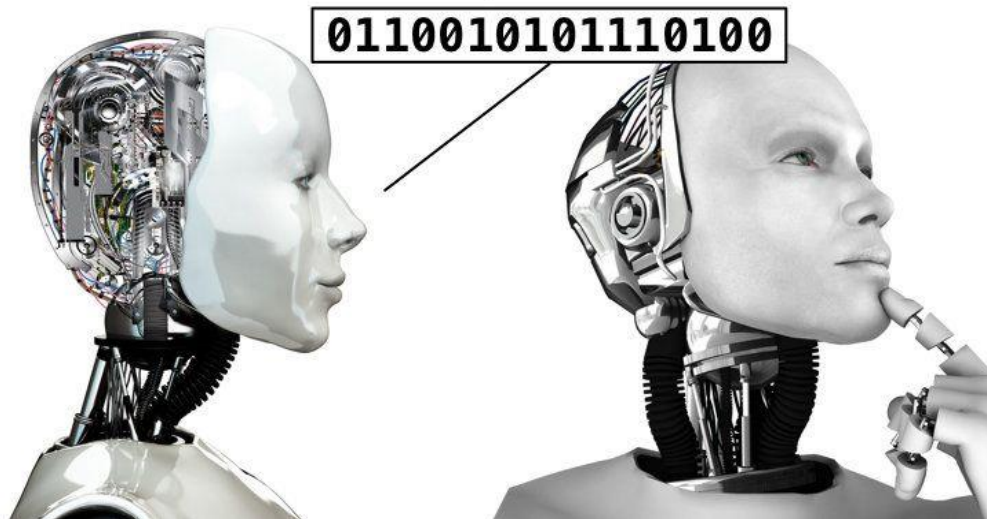
➤ Robots

- any type of automation of a process by machine
- machines capable of doing physical tasks

➤ Definition here: physical entity or system using AI

➤ EU Parliament Civil Law Rules on Robotics

- ability to make decisions without any human interference, independently of external control or influence



BENEFITS & CHALLENGES AI

➤ Benefits

- more accurate and efficient (e.g. robots in surgery)
- increased productivity
- perform many tasks better than humans
- access to more data thus *better* decisions
- sector-specific: safety and time efficiency autonomous vehicles

➤ Challenges



AI GOVERNANCE



may be done



should be done



can be done

REGULATORY FRAMEWORK

- Considering importance AI, many initiatives
- Reports, recommendations, guidelines from companies, governments, think tanks, academic institutions,...
- Similar topics and issues
 - defining AI
 - risks and benefits
 - ethical considerations and need for legal framework
 - role public/private sector and researcher
 - need for investments in AI
 - center of excellences and leading role

→ Focus on legal situation in European Union

FRAMEWORK ON ARTIFICIAL INTELLIGENCE IN EU

- There is no such thing as ‘AI law’ (yet) in the EU
 - ‘AI law’ as a separate body of rules in future?
- This does not imply that AI is unregulated
 - some laws do already apply to AI (e.g. product liability directive, GDPR,...)
 - no need for ‘AI law’ as such
- Limits to what can be solved with existing laws
 - confusion about applicability existing rules and on how to interpret them in light AI
 - ‘step by step’ incremental approach
- Multi-stakeholder approach is necessary to tackle AI challenges

THERE IS NO 'AI LAW'

➤ European Approach to Artificial Intelligence and Robotics

- being ahead of technological developments and encouraging uptake by public and private sectors
- prepare for socio-economic changes created by AI
- ensure an appropriate ethical and legal framework

➤ Coordinated Plan on AI

➤ High-Level Expert Group on Artificial Intelligence (AI HLEG)

- support implementation of European Strategy on AI
- Ethics Guidelines on Artificial Intelligence (cf. Trustworthy AI)
- Policy and Investment Recommendations

THERE IS NO 'AI LAW'

➤ Ethics Guidelines on Artificial Intelligence

- promote 'trustworthy' AI: lawful, ethical & robust
- development and use AI systems have to meet 7 key requirements
 - (1) human agency and oversight
 - (2) technical robustness and safety
 - (3) privacy and data governance
 - (4) Transparency
 - (5) diversity, non-discrimination and fairness
 - (6) environmental and societal well-being
 - (7) accountability

THERE IS NO 'AI LAW'

TRUSTWORTHY AI ASSESSMENT LIST (PILOT VERSION)

1. Human agency and oversight

Fundamental rights:

- ✓ Did you carry out a fundamental rights impact assessment where there could be a negative impact on fundamental rights? Did you identify and document potential trade-offs made between the different principles and rights?
- ✓ Does the AI system interact with decisions by human (end) users (e.g. recommended actions or decisions to take, presenting of options)?
 - Could the AI system affect human autonomy by interfering with the (end) user's decision-making process in an unintended way?
 - Did you consider whether the AI system should communicate to (end) users that a decision, content, advice or outcome is the result of an algorithmic decision?
 - In case of a chat bot or other conversational system, are the human end users made aware that they are interacting with a non-human agent?

Human agency:

- ✓ Is the AI system implemented in work and labour process? If so, did you consider the task allocation between the AI system and humans for meaningful interactions and appropriate human oversight and control?
 - Does the AI system enhance or augment human capabilities?
 - Did you take safeguards to prevent overconfidence in or overreliance on the AI system for work processes?

Human oversight:

- ✓ Did you consider the appropriate level of human control for the particular AI system and use case?
 - Can you describe the level of human control or involvement?
 - Who is the "human in control" and what are the moments or tools for human intervention?
 - Did you put in place mechanisms and measures to ensure human control or oversight?
 - Did you take any measures to enable audit and to remedy issues related to governing AI autonomy?
- ✓ Is there is a self-learning or autonomous AI system or use case? If so, did you put in place more specific mechanisms of control and oversight?
 - Which detection and response mechanisms did you establish to assess whether something could go wrong?

THERE IS NO 'AI LAW'

➤ Translating Ethics Guidelines in hard law

- ethical principles can (to some extent) be addressed by existing laws (on condition of more detailed interpretation and/or revision)
 - ✓ privacy and security → data protection law...
 - ✓ reliability and safety → product liability, tort law, medical devices regulation, toy safety directive
 - ✓ fairness → competition law, consumer protection law, non-discrimination law, private international law
 - ✓ transparency and accountability → data protection law, tort law, product liability directive
- AI can also be used to actively promote ethical values
- need for certification of trustworthy AI but how and who?

THERE IS NO 'AI LAW'

➤ European Commission White Paper on AI

- creating ecosystem of excellence: e.g. developing skills, investing in research, uptake AI by public sector,...
- creating ecosystem of trust: need for solid EU regulatory framework for trustworthy AI
 - assess whether legal framework can be enforced adequately to address risks AI systems or whether adjustments needed to specific legal instruments
 - new legislation specifically for high risk AI-systems may be needed
 - new regulatory framework should be risk-based: sector and use (but also certain exceptional instances)
 - for high-risk AI applications: training data, keeping records and data, information provision, robustness and accuracy, human oversight, specific requirements for remote biometric identification
 - need for certification/conformity assessment

AI IS ALREADY REGULATED IN EUROPEAN UNION

➤ Some laws already apply to AI

- AI and GDPR
- AI and product safety
- AI and consumer protection rules
- AI and Directive 2019/2161 (cf. personalised pricing)

➤ Challenges & limits to what can be solved with existing laws → need for solutions

- e.g. GDPR: personal data? Purpose limitation? Right of explanation automated decisions?
- e.g. product liability and autonomous vehicles

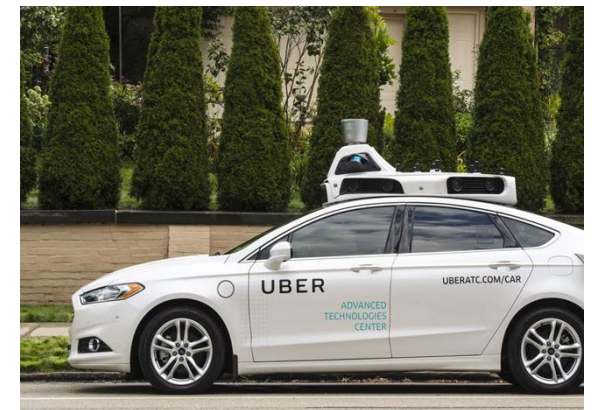
AI IS ALREADY REGULATED IN EUROPEAN UNION

- Autonomous vehicles as case study
 - important application AI/robots
 - some facts and evolutions
 - autonomous vehicles: what's in a name
 - liability issues

SOME FACTS

➤ Evolutions

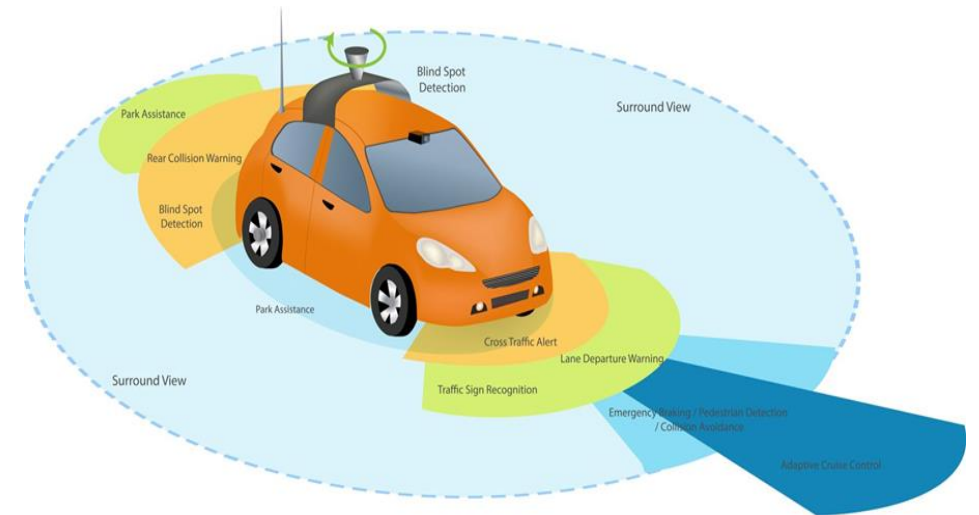
- test projects Uber, Tesla, Volvo,...
- tests in EU Member States
- EU initiatives (e.g. CONCORDA)
- commercialisation fully autonomous vehicles five to twenty years?



SOME FACTS

➤ Legal framework

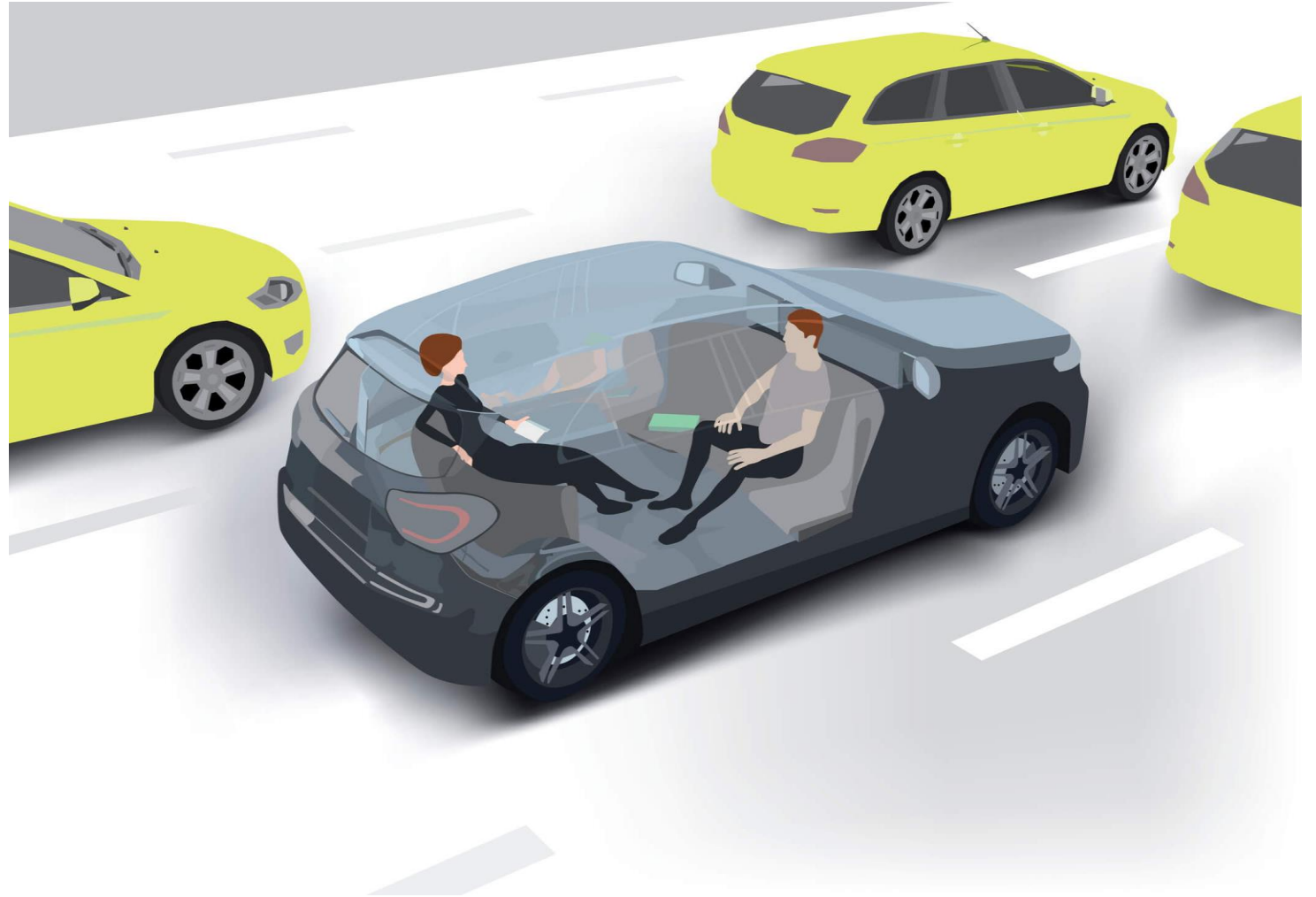
- EU: e.g. High Level Group GEAR 2030 report
 - ✓ tasks vehicle and driver should be clarified/regulated
 - ✓ essential: what can and should we still expect from users/drivers
 - ✓ PLD sufficient for systems expected by 2020 but ...
- National initiatives
 - ✓ e.g. article 59/1 Belgian Highway Code
 - ✓ changes Dutch Road Traffic Act



SOME FACTS

➤ Benefits

- efficiency
- safety
- social



AUTONOMOUS VEHICLES

- Preliminary considerations: 'driver' <-> 'user'
- Five stages in human operating process of a vehicle
 - localisation
 - perception
 - interpretation
 - decision
 - execution
- User assisted or replaced by technology during each stage: GPS, Lidar, sensors, software (algorithms)

AUTONOMOUS VEHICLES

Stages in the operating process	Technology
Localisation	GPS, Lidar and digital maps
Perception	Sensors and digital maps
Interpretation	
Decision	Software: algorithms
Execution	

AUTONOMOUS VEHICLES

- Technology will gradually take over user's control of vehicle
 - providing information to user
 - *automatisation*: implementing instructions user
 - *autonomisation*: vehicle takes own decisions
- Essence autonomous vehicle: making own decisions (cf. robot)

AUTONOMOUS VEHICLES

- Challenges for autonomous vehicles
 - job losses
 - public infrastructure
 - decline 'crash economy'
 - ethical aspects (cf. moral machine, <http://moralmachine.mit.edu/>)
 - legal challenges: who is driver, role driver,... (cf. software as driver?)
 - liability for damage caused by autonomous vehicles

Google self-driving car collides with bus in California, accident report says

If it is determined the Google vehicle caused the crash, it would be the first time one of its SUVs caused an accident while in autonomous mode



A Google self-driving car was trying to navigate some sandbags when it collided with a public bus. Photograph: DDP USA/Rex/Shutterstock

One of Google's self-driving cars has collided with a public bus in Mountain View,

Tesla driver dies in first fatal crash while using autopilot mode

The autopilot sensors on the Model S failed to distinguish a white tractor-trailer crossing the highway against a bright sky



Joshua Brown, the first person to die in a self-driving car accident. Photograph: Facebook

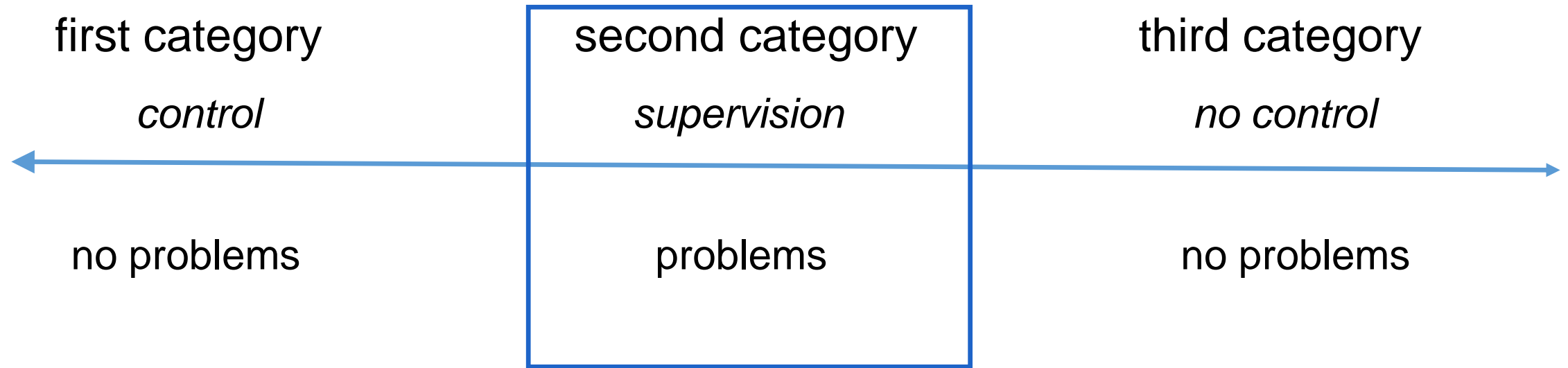
The first known death caused by a self-driving car was disclosed by [Tesla Motors](#) on Thursday, a development that is sure to cause consumers to second-guess the trust they put in the booming autonomous vehicle industry.

The 7 May accident occurred in Williston, Florida, after the driver, Joshua Brown, 40, of Ohio put his Model S into [Tesla's autopilot mode](#), which is able to control the car during highway driving.

FAULT-BASED LIABILITY

- many jurisdictions: categories of interaction
 - control
 - ✓ no interaction user/technology (not problematic)
 - supervision (*overruling*)
 - ✓ interaction between computer and user vehicle (problematic)
 - no control/supervision
 - ✓ no interaction between computer and user vehicle (not problematic)

FAULT-BASED LIABILITY



FAULT-BASED LIABILITY

- Application fault-liability in second category challenging
 - violation statutory rule of conduct
 - ✓ driver?
 - ✓ attribution acts autonomous vehicle to driver?
 - ✓ accident as force majeure?
 - negligence
 - ✓ predicting the behaviour of autonomous vehicles?
 - ✓ autonomy vehicles triggers risky and dangerous behaviour
 - ✓ switch between software system and human?

FAULT-BASED LIABILITY

- Liability for damage caused by autonomous vehicles
 - fault-based liability unlikely → other regimes
 - who *can* and *should* be held liable for damage caused by AVs?
 - alternatives in national law: custodian of 'defective object' in Belgium (Article 1384 Code Civil)
 - EU: Directive 85/374 concerning liability for defective products

PRODUCT LIABILITY

- Producer liable for damage caused by defect in product
 - producer of autonomous vehicle or material parts
 - producer of software as *cheapest-cost avoider* (cf. law & economics)
 - producer of software has information, expertise and resources to increase safety of autonomous vehicles
 - application of Product Liability Directive problematic for software producers

PRODUCT LIABILITY

- Producer liable for damage caused by defect in product
 - product: “all movables [...] even though incorporated into another movable or into an immovable [...]. Product includes electricity.”
 - software as product – debatable
 - ✓ no: service
 - ✓ no: only for tangible goods (cf. inclusion electricity)
 - ✓ yes: software captured on tangible medium or device (cf. European Commission)
 - ✓ yes: wide material scope Directive (teleological interpretation)
 - solution

PRODUCT LIABILITY

- Producer liable for damage caused by defect in product
 - ‘consumer expectations test’: product defective when it does not provide the safety that a person is entitled to expect, taking all circumstances into account
 - ✓ legitimate expectations
 - ✓ broad and vague criterion
 - ✓ difficult to assess: new products, innovative products
 - elements taken into account
 - ✓ presentation of autonomous vehicle
 - ✓ aversion towards new risks
 - ✓ reasonable use of autonomous vehicle

PRODUCT LIABILITY

- Producer liable for damage caused by defect in product
 - ‘consumer expectations test’: almost absolute safety
 - producer autonomous vehicle or software exposed to large liability risk
 - impact on technological evolutions (cf. deterring effect tort law)
 - solution: ‘risk-utility test’
 - ✓ liability if safety risks product higher than accepted in comparison social benefits
 - ✓ reasonable safety expected from producers according to objective standards

PRODUCT LIABILITY

- Producer of product not liable if
 - defect which caused the damage did not exist at the time when product was put into circulation; or
 - defect came into being afterwards

- Problematic in context autonomous vehicles
 - software updates
 - self-learning operating systems

- Solutions

LIABILITY AND AI: RECENT INITIATIVES

- EC Report New Technologies Formation “Liability for Artificial Intelligence and other Emerging Digital Technologies” (November 2019)
 - liability regimes in Member States ensure at least basic protection for victims
 - characteristics technologies make it more difficult for victims to claim compensation
 - allocation of liability may be unfair or inefficient
 - certain adjustments necessary to EU and national liability regimes
 - but: impossible to come up with single solution suitable for entire spectrum of risks

LIABILITY AND AI: RECENT INITIATIVES

- EC Report New Technologies Formation “Liability for Artificial Intelligence and other Emerging Digital Technologies” (November 2019)
 - no legal personality autonomous systems
 - operators should continue to bear (strict) liability
 - producers face strict liability even if defect appeared after product was put into circulation as long as producer was still in control of updates to or upgrades on technology
 - provisions on reversal burden of proof: allowed in certain circumstances but general rule is that victim carries burden of proof
 - compulsory third party insurance for ‘emerging technologies’
- still fundamental questions: qualification software and when is it defect?

LIABILITY AND AI: RECENT INITIATIVES

➤ EC White Paper on product liability

- difficult to prove defect in product, damage that occurred and causal link between the two
- uncertainty about how PLD applies for certain types of defects (e.g. resulting from weaknesses in cybersecurity of the product)

➤ Report on safety and liability implications of AI, IoT and robotics

- broad definition product but scope further clarified to better reflect complexity emerging technologies and ensure compensation for damage
- alleviating/reversing burden of proof required by national liability rules?
- 'putting into circulation' could be revisited to take into account products may change

MULTI-STAKEHOLDER APPROACH

- Multi-stakeholder debate/approach
- Flanders: Knowledge Center Data & Society (Action plan AI)
 - knowledge hub & monitoring AI-related developments
 - three existing research centers: imec-SMIT, imec-MICT, Centre for IT & IP Law
 - enable stakeholders (e.g. companies, policy-makers, citizens and regulators) to achieve greatest social and/or economic benefits AI
 - provide practical information on AI
 - develop an appropriate legal and ethical framework
 - issue policy recommendations
 - deliverables 2020: AI & GDPR, ethical tools, surveys,...
- Cross-border: Ghent University, KU Leuven and UQ?

CONCLUSIONS

- AI raises many legal and ethical issues
- Much going on at different levels (cf. EU White Paper)
- Importance certification and conformity
- Entire new framework for AI or not?
 - embracing benefits and reducing risks AI
 - adapt legal framework accordingly
 - assessing whether existing rules sufficient to govern AI
 - minimal steps might sometimes already be sufficient
 - example of Product Liability Directive
 - additional requirements for high-risk AI applications

Thank you for your attention!

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