Legal Framework of AI and IoT

University of Vienna, 2020
Prof. Dr. Georg Borges

- Professor, Chair of Civil Law, Legal Informatics, German and International Business Law, Legal Theory, Saarland University
- Director, Institute of Legal Informatics, Saarland University
- Judge, Oberlandesgericht Hamm (2012-2015)
- Chairman of the Board, Working Group Identity Protection on the Internet (Arbeitsgruppe Identitätsschutz im Internet, a-i3)
- Member of the Board, EDV-Gerichtstag e.V.
- Member of the Board, Stiftung Datenschutz
- Fellow, Center for IT-Security, Privacy and Accountability (CISPA)
- Member, EU Commission Expert Group „Liability for New Technologies“
Overview. Legal issues of AI
Overview

Emerging Technologies
Emerging Technologies
Impact of Artificial Intelligence
Overview

The Call for a Legal Framework of Artificial Intelligence / Autonomous Systems / Emerging Technologies
The Resolution of the European Parliament 2017

European Parliament
2014-2019

TEXTS ADOPTED

P8_TA(2017)0051
Civil Law Rules on Robotics
European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL))

The European Parliament,

− having regard to Article 225 of the Treaty on the Functioning of the European Union,
− having regard to Council Directive 85/374/EEC1,
The EU Commission’s Communication of 2018


Artificial Intelligence for Europe

(SWD(2018) 137 final)
The EU Commission’s Report 2020

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE

Report on the safety and liability implications of Artificial Intelligence, the Internet of Things and robotics
"AI: Intelligent Machines, Smart Policies", Paris, 26-27 October 2017 > Conference agenda

The complete programme including list of confirmed speakers will be available shortly.

Thursday 26 October: AI developments and applications

Session 1. State of AI research
9:45-11:00
This session will introduce the distinctive characteristics of artificial intelligence and machine learning. It will provide an overview of milestones to date in AI development and expected future milestones. For example, standalone AI is expected to evolve towards networks in which AIs communicate.

Session 2. AI applications and case studies
11:30-12:45
This session will illustrate how AI is being applied to make better decisions, reduce costs and improve productivity in a variety of domains. In environmental applications, AI can find complex causality among environmental variables and optimise resource use.

Session 3. Close-up on AI in space applications
13:45-15:00
In the space industry, new and improved satellite data and signals combined with AI are powering innovative products and services in sectors such as finance, agriculture, land use, and disaster management. In this session, innovative start-ups, space agencies...
National debate

Maas schlägt digitales Antidiskriminierungsgesetz vor

Wenn Software allein entscheidet, was mit Menschen passiert, kann das schlimme Folgen haben. Der Justizminister fordert deshalb mehr Transparenz von den Entwicklern.

Von Patrick Beuth

3. Juli 2017, 21:38 Uhr / 98 Kommentare
Elon Musk warnt vor 3. Weltkrieg durch Künstliche Intelligenz

VON JONAS Jansen - AKTUALISIERT AM 04.09.2017 - 15:44

Tesla-Chef Musk hat zwar selbst ein KI-Unternehmen, gehört aber zu den größten Kritikern einer unregulierten Forschung. Sein neues Untergangsszenario ist pessimistischer als je zuvor.
Overview

Legal Challenges posed by autonomous systems
Creativity and the creation of something of value

- **Edmond de Belamy** is a generative adversarial network portrait painting constructed in 2018 by Paris-based arts-collective Obvious.

- It is signed at the bottom right with
  \[
  \min_{G} \max_{D} E_{x} \left[ \log(D(x)) \right] + E_{z} \left[ \log(1 - D(G(z))) \right]
  \]
  which is part of the algorithm code that produced it. The algorithm was trained on a set of 15,000 portraits from online art encyclopedia WikiArt, spanning the 14th to the 19th century. [Wikipedia]
Doctrines of Legal Transactions

40 litres of milk
Responsibility for autonomous systems
New Legal Institutions

European Parliament resolution (2015/2103(INL))
No. 59

Calls on the Commission, when carrying out an impact assessment of its future legislative instrument, to explore, analyse and consider the implications of all possible legal solutions, such as:

f) creating a specific legal status for robots in the long run, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons responsible for making good any damage they may cause, and possibly applying electronic personality to cases where robots make autonomous decisions or otherwise interact with third parties independently;
New Legal Institution

- „Partnership“ of humans and machines?
- Partial equality of autonomous systems and humans
Law Enforcement
Liability for Autonomous Systems
Liability for Autonomous Systems

Damage caused by Autonomous Systems
Damage caused by Autonomous Systems
Damage caused by Autonomous Systems

"... killed by an Uber self-driving SUV"
Damage caused by Autonomous Systems
Introduction

The debate on liability for Autonomous Systems
The debate on liability for Autonomous Systems

European Parliament
2014-2019

TEXTS ADOPTED

P8_TA(2017)0051
Civil Law Rules on Robotics
European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL))

The European Parliament,
− having regard to Article 225 of the Treaty on the Functioning of the European Union,
− having regard to Council Directive 85/374/EEC¹,
The debate on liability for Autonomous Systems

Brussels, 25.4.2018
COM(2018) 237 final


Artificial Intelligence for Europe

{SWD(2018) 137 final}
The debate on liability for Autonomous Systems

- **Expert Group on Liability and New Technologies / New Technologies Formation**
  - Report “Liability for Artificial Intelligence”, Nov. 2019

- **European Commission**
  - Report on the safety and liability implications of Artificial Intelligence, the Internet of Things and robotics, COM(2020) 64 final, 19.2.2020

- **European Parliament, Committee on Legal Affairs**
  - Draft Report with recommendations to the Commission on a Civil liability regime for artificial intelligence, 2020/2014(INL), 27.4.2020
Report “Liability for Artificial Intelligence”

- Key findings
  - Strict liability in certain cases
  - Duties to properly monitor technology

EP Committee on Legal Affairs, Draft Report

- Proposal for a Regulation of the European Parliament and the Council on liability for the operation of Artificial Intelligence-systems

Liability for Autonomous Systems

Compensation to victims
Compensation of victims

- Principle: Risks arising out of the use of new technologies should not be borne by the victim

- Conclusion: Compensation for damages should be guaranteed
Models of compensation

### Compensation funds
- Compensation funds replacing liability
- Compensation funds filling gaps when liable party cannot compensate

### Liability
- Fault-based liability
- Strict liability in a broad sense (e.g. product liability; requirement of a violation of a norm, e.g. defect)
- Objective liability (for any damage caused within a defined sphere of risk, e.g. operation of a car)

**Conclusion:** Need for objective liability to guarantee compensation in certain cases
Parties and roles

Producer

Operator
(e.g. registered keeper of a car)

Seller

User
(e.g. driver of a car)
Liability for Autonomous Systems

Liability for autonomous cars
Roles and Participants

- Driver
- Registered Keeper
- Insurer
- Manufacturer
Liability of the Registered Keeper

Section 7 Paragraph 1 German Road Traffic Law
Liability of the registered keeper, clandestine operation of a vehicle

If, during the operation of a motor vehicle or a trailer to be carried along by a motor vehicle, a person is killed, the body or health of a person injured, or property is damaged, the holder of the vehicle is obligated to compensate the injured person for the damages arising therefrom.
Liability of the Driver

Section 18 paragraph 1 Road Traffic Act (Straßenverkehrsgesetz; StVG)
Obligation of the driver to pay compensation

In the cases where section 7 paragraph 1 applies, the driver of the vehicle or trailer is also obliged to pay compensation pursuant to the provisions of sections 8 to 15. The obligation to pay compensation is excluded if the damage is not caused by the fault of the driver.
Compulsory Insurance

- **Section 1 Compulsory Insurance Act (Pflichtversicherungsgesetz; PflVVG)**
  - The duty of the registered keeper to maintain compulsory insurance

- **Section 115 I 1 No. 1 Insurance Contracts Act (Versicherungsvertragsgesetz; VVG)**
  - The injured party can claim against the insurer directly

- **Section 116 I 1 Insurance Contracts Act (Versicherungsvertragsgesetz; VVG)**
  - Sole liability of the insurer in the internal relationship
Interim Conclusion

- Regulation of accidents involving vehicles occurs via a system of compulsory insurance
- Focus of liability is on the vehicle’s registered keeper
Liability for Autonomous Systems

The liability of the operator
The liability of the operator

- Thesis:
  
  “The operator should be liable to compensate the victim.”

- Rationale:
  - The operator benefits from the use of the technology
  - The operator is very often best in place to control the risks of the technology
  - The operator (rather than the producer) can be addressed by the victim

- Expert Group key finding:
  
  [10] Strict liability should lie with the person who is in control of the risk connected with the operation of emerging digital technologies and who benefits from their operation (operator).
The liability of the operator
The liability of the operator
The liability of the operator

Section 833 German Civil Code
Liability of animal keeper

If a human being is killed by an animal or if the body or the health of a human being is injured by an animal or a thing is damaged by an animal, then the person who keeps the animal is liable to compensate the injured person for the damage arising from this. Liability in damages does not apply if the damage is caused by a domestic animal intended to serve the occupation, economic activity or subsistence of the keeper of the animal and either the keeper of the animal in supervising the animal has exercised reasonable care or the damage would also have occurred even if this care had been exercised.
Regulatory approaches

- Liability for “AI-systems”
- Liability for “dangerous AI-systems”

Specific Liability Regulation

- Sector-specific?
- Technology-specific?
- “List”-Approach (exhaustive list of systems)

Conclusion: ...
The liability of the operator

Art. 4 Potential Regulation on AI-system Liability

Liability of AI-system Operator
If a human being is killed by an AI-System or if the body or the health of a human being is injured by an AI-System or a thing is damaged by an AI-System, then the operator of such AS-system is liable to compensate the injured person for the damage arising from this.

Or

Liability of High Risk AI-system Operator
If a human being is killed by an High Risk AI-System or if the body or the health of a human being is injured by a High Risk AI-system or a thing is damaged by a High Risk AI-system, then the operator of such AI-system is liable to compensate the injured person for the damage arising from this.
Proposal for a Regulation of the European Parliament and the Council on liability for the operation of Artificial Intelligence-systems

Chapter II
High-risk AI-systems

Article 4
Strict liability for high-risk AI-systems

1. The deployer of a high-risk AI-system shall be strictly liable for any harm or damage that was caused by a physical or virtual activity, device or process driven by that AI-system.

2. The high-risk AI-systems as well as the critical sectors where they are used shall be listed in the Annex to this Regulation. [...] 

3. The deployer of a high-risk AI-system shall not be able to exonerate himself or herself by arguing that he or she acted with due diligence or that the harm or damage was caused by an autonomous activity, device or process driven by his or her AI-system.
Chapter III
Other AI-systems

Article 8
Fault-based liability for other AI-systems

1. The deployer of an AI-system that is not defined as a high-risk AI-system, in accordance to Article 3(c) and, as a result is not listed in the Annex to this Regulation, shall be subject to fault-based liability for any harm or damage that was caused by a physical or virtual activity, device or process driven by the AI-system.

2. The deployer shall not be liable if he or she can prove that the harm or damage was caused without his or her fault, relying on either of the following grounds:

(a) the AI-system was activated without his or her knowledge while all reasonable and necessary measures to avoid such activation were taken, or
Proposal for a Regulation of the European Parliament and the Council on liability for the operation of Artificial Intelligence-systems

Chapter III
Other AI-systems

*Article 8*

Fault-based liability for other AI-systems

2. The deployer shall not be liable if he or she can prove that the harm or damage was caused without his or her fault, relying on either of the following grounds:

[...], or

(b) due diligence was observed by selecting a suitable AI-system for the right task and skills, putting the AI-system duly into operation, monitoring the activities and maintaining the operational reliability by regularly installing all available updates.

The deployer shall not be able to escape liability by arguing that the harm or damage was caused by an autonomous activity, device or process driven by his or her AI-system. The deployer shall not be liable if the harm or damage was caused by force majeure.
The responsibility of the producer
The responsibility of the producer
The responsibility of the producer

The New York Times

"... that killed the driver"
The responsibility of the producer

Product Liability and Manufacturer Liability
Product Liability Law

Section 1 paragraph 1 1st sentence
(Product Liability Act; Produkthaftungsgesetz, ProdHaftG)

Liability

In such case as a **defective product** causes a person's death, injury to his body or damage to his health, or damage to an item of property, the producer of the product has an obligation to compensate the injured person for the resulting damage.

- Defect (of the product) and causal link are required to establish liability
- Liability is similar to Section 823 I BGB (German Civil Code)
Manufacturer Liability (Produzentenhaftung)

Section 823 paragraph 1 German Civil Code (Bürgerliches Gesetzbuch; BGB)

Liability in damages

A person who, intentionally or negligently, unlawfully injures the life, body, health, freedom, property or another right of another person is liable to make compensation to the other party for the damage arising from this.

- Breach of duty (fault) and causal link are required to establish liability
Manufacturer as the Driver of the Vehicle?

- Manufacturer controls driving behaviour

- Machine (car) controls driving behaviour
  - Manufacturer only indirectly controls driving behaviour (programming)
  - Breach of duty by the machine or by the manufacturer (programming)?

- Analogous application of Section 18 StVG has no real practical relevance due to Section 116 PfIVG
The responsibility of the producer

Product liability and Artificial Intelligence
Behaviour as a defect?

- **Question**
  - Is an individual occurrence of defective behaviour in itself a defect of the product which generated such defective behaviour?

- **Examples**
  - A driving error by an autonomous car
  - An incorrect answer given by a Robo-Advisor
Product liability and Artificial Intelligence

- **Concepts**
  - Defective behaviour constitutes a product defect
  - Defective behaviour is not a product defect
  - Autonomous cars are not defective when they are, on average, better than human drivers

- Monitoring and updating of systems
- Technical development and defect
The responsibility of the producer

New approaches
Adressing Producers

- Goal: Liability rules should incentivise the producer to provide safe products and services
- Challenge: The operator is not necessarily best in place to control the risks
  - „Consumers“ as end users may have little capacity to control risks
  - Producers may have strong control over the use of the product
Objective Liability of the Manufacturer of self-driving cars

- **Proposal (Borges):**
  Introduction of objective liability for the manufacturers of self-driving cars

- **Reasoning:**
  - Liability should address the party which is best in place to control the risk and to minimise damage
  - Manufacturers of self-driving cars is best in place to control the risk

- **Relationship to liability of registered keeper**
  - Liability of registered keeper will remain
  - Joint and several liability of the external relationship
  - Internal settlement between the registered keeper and the manufacturer
Liability for Autonomous Cars

- **Bitkom-Survey** on liability for autonomous vehicles
  - The question posed was, who should be liable in the case of accidents caused by self-driving cars?
  - 1,006 people over the age of 14 years were asked

![Pie chart showing responses: Software-provider (38%), Vehicle manufacturer (35%), Operator (19%), Registered keeper (0%), No answer (8%)](image-url)
Liability for Autonomous Cars

- **Bitkom-Survey** on liability for autonomous vehicles
  - The questions posed was, who should be liable in the case of accidents caused by self-driving cars?
  - Survey of: **177 Business involved in the automobile industry**

- **Software-provider (41%)**
- **Vehicle manufacturer (19%)**
- **Operator (21%)**
- **Registered keeper (12%)**
- **No answer (7%)**
Fundamental Principles
of Objective Liability

- Goals / Effects:
  - Minimisation of damage
  - Protection of the injured party
  - Compensation for damage
  - Efficient level of activity
  - Reduction/elimination of litigation risks
Fundamental Principles of Objective Liability for Vehicles

Section 7 paragraph 1 Road Traffic Act (StVG)
Liability of the registered keeper, joyriding

If during, the use of a motor vehicle or a trailer which is intended to be towed by a motor vehicle, a person's death, injury to a person’s body or damage to his health, or damage to an item of property is caused, the registered keeper has an obligation to compensate the injured person for the resulting damage.

- Goals of Section 7 StVG
  - Allocation of risk according to controllability
  - Protection of the injured party
  - Effectiveness of compulsory insurance
Objective Liability of the Manufacturer de lege ferenda

Arguments:

- Manufacturer is best in place to control risks of autonomous cars
- Liability incentivizes Manufacturers to produce safe cars
- Risks arising out of road traffic are foreseeable
- Liability can be combined and shared with operator’s liability
- Introduction of objective liability of the manufacturers of self-driving cars
The concept of a second operator

- Suggestion of the expert group: Producer as a Second Operator

- Expert Group key finding:
  
  [11] If there are two or more operators, in particular
  (a) the person primarily deciding on and benefitting from the use of the relevant technology (frontend operator) and
  (b) the person continuously defining the features of the relevant technology and providing essential and ongoing backend support (backend operator), strict liability should lie with the one who has more control over the risks of the operation.
Conclusion and theses
Need for further development of the Legal Framework

1. There is a need for a specific legal framework for AI and the IoT,

2. The existing liability system contains gaps and must be developed further.
Need for further development of the Legal Framework

3. A new system of liability for autonomous systems should be introduced to guarantee compensation for victims.

4. Objective liability should be a central element of the liability system for new technology.
Need for further development of the Legal Framework

5. As an element of the liability system duties to adequately train and monitor autonomous systems based on machine learning should be recognised and clarified.
Thank you very much!

Prof. Dr. Georg Borges
georg.borges@uni-saarland.de
www.rechtsinformatik.saarland