InnoRobo 2015 Ethical Legal and Societal Issues in Robotics



RoboLaw The EU FP7 project on robotics and ELS

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Outline



- · What Robolaw is and what it is not
- Fundamental ideas and perspectives
- · Our methodology
- The cases and our conclusions
- The impact of Robolaw
- The future of Robolaw





What Robolaw is not: defying the science fiction lure



We do not intend to develop the code of robotics, the laws of robots, or discuss robot rights (and duties)





The RoboLaw Project has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement no. 289092

Factual vs. Fictional





Factual: safety, liability, ethical concerns of human enhancement, legal personhood of robots, standardization, impact on job market, regulating innovation, managing risk, equality of access, self-determination

Fictional: positronic brain, robots will take over society, robots as persons





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What Robolaw is:



Technical Legal and Ethical Analysis of some kinds of robotic applications

Aimed at providing the European Union with guidelines (and immediately applicable suggestions) on if, when and how to regulate robotics, With great power comes {

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Project acronym:	RoboLaw	
Project title:	Regulating Emerging Robotic Technologies in Europe: Robotics Law and Ethics	s facin
Funding scheme:	Collaborative project (CP), FP7-SiS-Challenge 1-3: Regulating er scientific and technological developments	nergin
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(Uncle Ben to Peter, Spider-Man)

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Fundamental ideas:



- Robot is an a-technical term. There is no single unifying trait that allows us to identify or define robots unitarily
- Hence we cannot develop solutions that are applicable to all robotic applications indifferently (no code of robotics)
 - Bottom up and functional approach to the regulation of robotics is necessary

"With great power comes great responsibility" (Uncle Ben to Peter, *Spider-Man*)



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Definitions offered are unsatisfactory

Merriam Webster Dictionary:

1a: a machine that looks like a human being and performs various complex acts (as walking or talking) of a human being; *also*: a similar but fictional machine whose lack of capacity for human emotions is often emphasized ... 2: a device that automatically performs complicated often repetitive tasks; 3: a mechanism guided by automatic controls.





A step back: what Robots are and how they shall be defined



There is not an all-encompassing definition

More insight is gained by identifying differences







A functional approach to the regulation of robotics



Profound technical differences



A case-by-case approach

Similar technological traits do not raise the same legal issues



Identify the societal impact of single applications

Same legal issue may require different solutions



Devise the right incentives based on desirability

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Methodology (1)



4 case studies: Novelty, Impact, Imminence

- 1. driverless cars
- 2. surgical robots
- ^{3.} prosthetics and exoskeletons
- 4. robot companions





Methodology (2)



Structure:

- 1. Technological analysis
- 2. Ethical analysis Policy considerations
- 3. Legal analysis





Driverless vehicles



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Legal issues: 1 Definition 2 Liability

Volkswagen Automotive



Nevada Assembly Bill n° 511 -March 1st, 2012



- Defines an autonomous vehicle as: "a motor vehicle that uses <u>artificial intelligence</u>, sensors and global positioning system coordinates to drive itself without the active intervention of a human operator."
- Defines AI as: "the use of computers and related equipment to enable a machine to duplicate or mimic the behavior of human beings".



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Liability



- · Technology chilling effect of liability rules
- Alternative liability schemes to better apportion liability between user and producer
 - 1. Compulsory insurance schemes
 - 2. No-fault plans



Surgical Robots

Legal issues:

 Reshape professional requirements for surgeons
Informed consent: specify the alternative
Medical nability and conflict of laws
Access to data generated by the operation
Incentivize competition (eventually by introducing safe harbour shielding from DPD), lowering costs and increasing access



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Robotic Prostheses & Exoskeletons



Ethical issues: how to define Human Enhancement and what criterias can be found to guide us through its diffusion

- Legal issues
 - 1. Safety
 - 2. Liability
 - 3. Managing Human Enhancement



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Legal issues



- Do product liability rules increase safety?
- Do they chill innovation?
- Do they provide adequate compensation?
- · May we identify preferable liability schemes?
- Rethink standardization



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Contd.



- How do we balance opposing interests on human enhancement given existing constitutional principles?
- May we define human dignity ?
- Enhancement: fostering equality or increasing inequalities?
- Freedom to circulate across Europe



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Equality of access Prevent is plation dehum. In zation of patie

bot companions

oster independent living

Liability: develop Long Term Care Insurance Contracts Privacy by design



gal issue



Impact at the institutional level



Presentation at the European Parliament JURI committee on 'Regulating Robotics: a Challenge for Europe' (Bertolini-Palmerini 2014)



European



Commission





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The RoboLaw series







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The Future of Robolaw



- A New Case Study: Civilian Drones
- Risk Management Strategies: Rethinking Insurance Law and Contracts
- Empirical Law & Economics Study of Liability Rules: RE-LIABLE



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Civilian Drones



• ENAC regulated drones:

Legal issues:

- Shall a licence be required to fly a drone? Of what kind?
- 2. Compulsory insurance? How do we assess risk?
- Regulatory: shall I flight plan be demanded under all circumstances?



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The problem of risk management





We do not know exactly which risks may materialize



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Identify Risks



- Scenarios in which the product will be used
- Different ways in which it will be used
- Potential malfunctionings
- Possible (material) consequences of their occurral

Material Risks

Legal Risks

- Identify (liability) rules that may be applied
- Determine how they might be applied (analogy)
- Possible (legal) consequences of the verification of the possible risk



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Risk Assessment:



Lack of statistically relevant data prevents exact assessment of risk.

Premium = f(probability*damage)

It is hard if not impossible to insure risks deriving from the diffusion of technologies



Technology-chilling Effect

"With great power comes great responsibility" (Uncle Ben to Peter, Spider-Man)





A Methodology in Light of Existing Law



- Undergo technological risk-assessment studies for specific technologies
 - Determine applicable rules and weigh possible outcomes

Elaborate insurance contracts/determine most suitable property regime



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RELIABLE













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IS THE LEGAL SYSTEM READY

SFOR THE OHALLENGES POSED?

Do Liability Rules provide adequate and desirable incentives to the development and diffusion of BLEs?

• Medium-to-Long Run:

What legal criteria could guide the choice between human enhancement practices?



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ELABORATE A PREFERABLE SYSTEM

- **Objective:**
 - **.** Verify assumptions about PLR
 - Assess the effectiveness of alternative liability models

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Elaborate a preferable alternative

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• How:

Thank You!





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