Artificial intelligence
&
autonomous decisions

From *judgelike* Robot to soldier Robot

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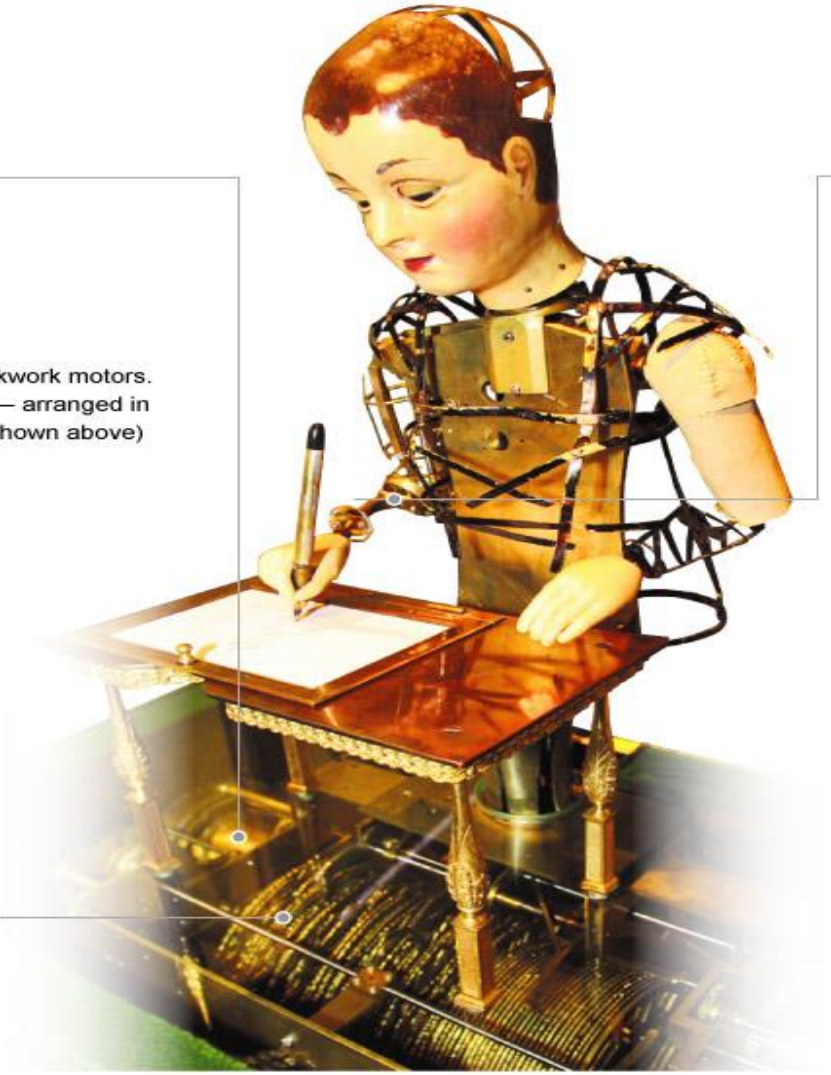
Issues

Up to now, it has been assumed that machines were not able to act by themselves

An automaton that writes poems

1. The writing hand is powered by two clockwork motors. One turns a set of brass disks — or cams — arranged in banks of three dedicated sets. The other (shown above) moves the cam assembly left and right.

2. Each of the writing hand's 72 cams has a pattern cut into its edge corresponding to specific arm movements. As the cams rotate, metal styluses read the data.



3. The styluses in turn drive a series of rods, providing motion. There is a separate stylus for each direction: forward and back, side to side and up and down.

4. The head, eyes and left arm are controlled by an integrated mechanism that takes its cues from a pair of cams. The cams are operated by the same rota- tional motor as the drawing cams.

But with Artificial Intelligence,
our machines have bridged the gap
and
become **AUTONOMOUS**

What function?

- To correct a defect : a prosthesis
- To increase a capacity: a data base

To simulate a (professional) skill or a decision maker : a judge, a physician, a soldier

J*udgelike* robot : law machine, 1960

Judge's Decision is based on expertise

Rules, concepts, standards, principles, human judgment

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→Competence

Determinism

Calcul

Algorithms

Logic programming

Deep learning

Margin of Appreciation

Discretion

Qualification

AUTONOMY

is about

Artificial Intelligence

is about

programming expertise

1-

Legal issues for robot

Law as an expertise

- **Law** in the loop (compliance)
- **Law** out of the loop (framework)
- Law in the code (*Code is law*)

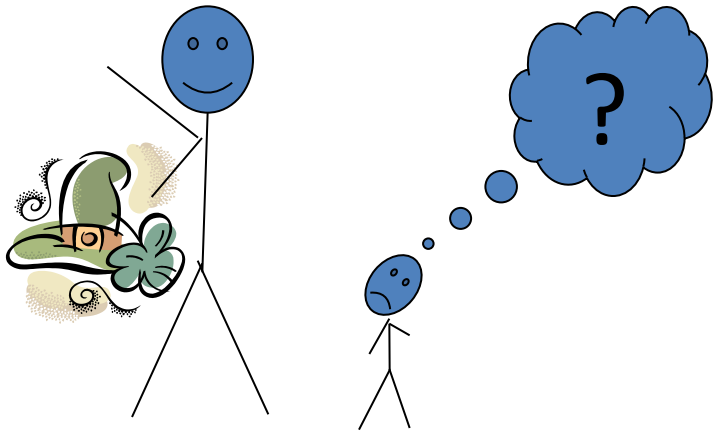
Law in the loop

The judge robot expertise

- Represents expertise and / or knowledge : legal rules, principles, cases.
- Simulates tasks considered "smart" : specifically human with adapted models
- **Includes** Discretionary power
- In the name of Institutions and functions

The 2 main models of legal reasoning (HART)

1- by cases or examples : artificial neural networks



2- by rules: expert system

IF

< Enter > < bus >

THEN

< Take off> < hat>

Programming about rules and cases

BRUITLOG : aid for mayor to make decision on noise

NEUROLEX : on the cases of Conseil d'Etat in the field of traffic policy and Law & Order

Neuronal networks on Court of Appeal (Versailles) in Labor law (dismissal)

Law out the loop

- In public law
- In private law

Law on *artificial decisions* (1978) Article 10 (new)

"No court decision involving an appraisal of the behavior of a person can not be based on automated processing of personal data intended to evaluate certain aspects of his personality.

No other decision which produces legal effects in respect of a person can not be taken solely on the basis of automated processing of data intended to define the profile of the person concerned or to evaluate certain aspects of his personality.

Directive 95/46/EC on right to be subject to an artificial decision

Article 15 Automated individual decisions

1. Member States shall grant the right to every person not to be subject to a decision which produces legal effects concerning him or significantly affects him and which is based solely on automated processing of data ...

Private Law of robots

No lacuna in law

In Criminal law : robots can be assimilated to animals or hazardous activities

In Contract law : robots are tools binding person in whose name they act

In Tort law : analogy with the behaviour of children and employees

« *The more robotics advanced and becomemore sophisticated the more likely it is that such machines will need a legal regime of their own* »

U Pagallo, *The law of robots*, 2013

Alternative 1

- Robots could be considered as « accountable » for their own behaviour.
- No tools but « proper agents »

- « Virtual person » in the cyberspace : not an individual person, nor a moral person?

Alternative 2 : Law in the code

« Code is law « (Lawrence Lessig)

Writing laws *in silico*

Humanitarian law –by-design

Other legal regimes

- Dealing with complex decision

(Administrative law)

- Beyond traditional causality link

- Think differently at the digital age

2-

Ethical issues for robots

Expertise of a autonomous robot is designed on **the capacity to operate** independently from human operator in a complex and changing environment.

Programs governing the behaviour of an autonomous robot are designed to interpret information/rules, to determine relevant and compliant actions, to calculate actions that should be carried out.

The French CERNA's ethic Recommendation on Robots

http://cerna-ethics-allistene.org/

- institutional ethics committees for ICT research with a mission to address operational questions of expertise
- Raising awareness of researchers
- Involving all relevant stakeholders in ethical deliberation in research projects that may have a direct impact on society.

Field of research

- Article 36 - New weapons

  In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine ….

7 Recommendations

for researchers

and designers

on … Autonomy

1- To take over control

Researchers should investigate the capacity of the operator or of the user to take over control from the robot and that of the machine to take over control from the human.

2- No Decisions made without operator's awareness

Researchers must ensure that robotic decisions are not made without operator's knowledge, in order to avoid gaps in the operator's situational awareness.

3- Effects on operator's behaviour

Researchers should be aware of the trust bias, i.e., operator's tendency to exhibit excessive confidence in robotic decision-making procedure, and of the moral buffer, i.e., operator's tendency to morally disengage from robotic actions or behaviour.

4- Programming limits

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Researcher should evaluate interpretative and decision-making software and be able to explain its limits, in particular, with so-called moral behaviour and discretion;

5- Situational distinction

With regard to interpretative robotic software, researchers should evaluate the extent to which it can correctly characterize a situation and distinguish between apparently similar situations.

It is also necessary to evaluate the methods of accounting for uncertainties.

6- Predictability of a human-robot system

More generally, researchers should analyse the predictability of a human-robot system by considering uncertainty in interpretation and action, possible robotic or human failures.

7-Traceability and accounting

Researchers should develop tracing tools at the design stage of a robot. These tools will facilitate accounting and explanation of robotic behaviour, at the various levels intended for experts, operators and users.

3 experts :

:Drone for inspection

By Law April 11, 2012

Medical robot (DA VINCI)

Lab of Cyberjustice (U. Montréal)

Main reflexions

- More and more complex applications on autonomous robots
- Autonomous Robots based on software + knowledge base (AI) + human intervention
- Humanitarian law is not enough as legal base
- Law by design must be tested
- The control must begin from the design step
- The KB must include human expert of the field
- Autonomy is a graduation
- Civil sector needs your reflexions on AI