Smart
Technologies
and the
End(s) of
Law

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LIVING WITH ALGORITHMS
THE PATH**S** OF THE LAW

LIVING WITH ROBO'S
A 'READING' FROM 2046

Smart Technologies and the End(s) of Law

Mireille Hildebrandt

LIVING WITH ALGORITHMS
THE PATH*S* OF THE LAW

■ algorithms increasingly (in)form the **environment of the law**

■ they also increasingly (in)form the **law itself**:

- *legal intelligence*
- *smart contracts*
- *computational law*

LIVING WITH ALGORITHMS
THE PATH*S* OF THE LAW

- this raises the question of ***machine agency*** and how it affects ***human agency***

- but also the question of whether ***law is***, can be or should be ***algorithmic***
  - *is the attribution of legal effect, if certain legal conditions are fulfilled, algorithmic?*
    - *does law count as law if one cannot disobey it?*
  - *where does law end and discipline or public administration begin?*

LIVING WITH ALGORITHMS
THE PATH*S* OF THE LAW

- living with **two types of algorithms**: IFTTT and ML
- whicht are their ***different effects*** on the mode*s* of existence of law?
  - *what role can or should lawyers play here?*
  - *what if computer scientists are the new architects of our artificial world?*

WHAT'S NEXT?

1. IFTTT and ML
2. The paths of law and technology
3. Legal protection by design or law by design?

IFTTT AND ML

Every day a piece of computer code is sent to me
by e-mail from a website to which I subscribe called IFTTT.
Those letters stand for the phrase "if this then that,"
and the code is in the form of a "recipe" that has the power to animate it.
Recently, for instance, I chose to enable an IFTTT recipe that read,
"if the temperature in my house falls below 45 degrees Fahrenheit,
then send me a text message."
It's a simple command
that heralds a significant change in how we will be living our lives
when much of the material world is connected—like my thermostat—to
the Internet.

Sue Halpern, 2014

IFTTT

- **computer systems as closed systems**
- **deterministic execution of preconceived code**

- **transparency, comprehensibility**
- **accountability of rule-maker, those who translated into code, those who employed it**
- **rigidity, non-adaptive control**
- ➢ *need for contestability: of the machine's interpretation of the rule* **and** *of our behaviour*
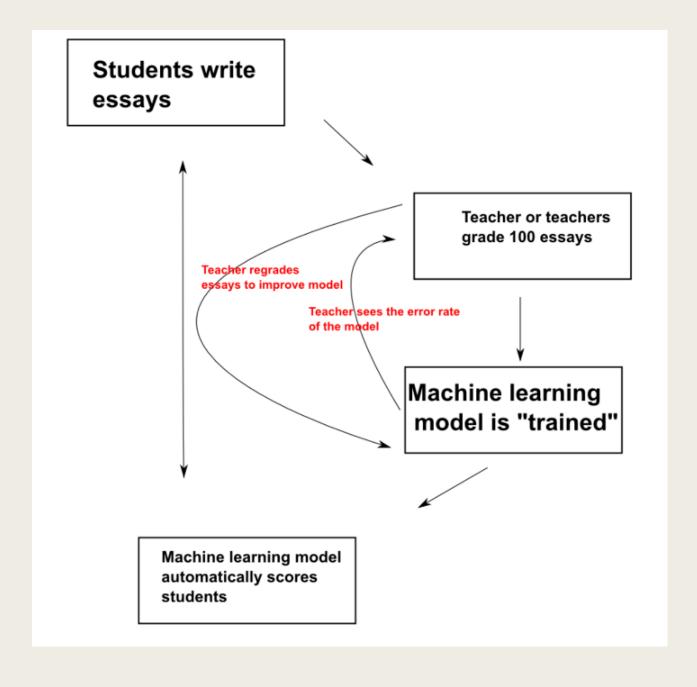
What is A/B Testing?

A/B testing (sometimes called split testing) is comparing two versions of a web page to see which one performs better. You compare two web pages by showing the two variants (let's call them A and B) to similar visitors at the same time. The one that gives a better conversion rate, wins!

50 % visitors
see variation A

Variation A

23%
conversion

50 % visitors
see variation B

Variation B

11%
conversion

All websites on the web have a goal - a reason for them to exist

AB testing

Machine Learning

slave or friend?

Hildebrandt's KNUT MEMORIAL LECTURE 2016

slave or friend?

© 2014 Ted Goff

"Go ahead and think that I'm not really thinking. I thought you would think that."

data-driven agency

From online to offline to onlife:

- **Software:** search engines, behavioural advertising, credit rating, hiring

- **IoT:** smart energy systems, remote healthcare, cloud robotics, self-driving cars

- Imagine your care robot or robot nanny doing **AB testing on your real life decisions**

- Imagine the same for the **distributed, polymorphous, mobile agents 'living' in the web**

data-driven agency

- **backend:**
1. *highly dynamic, interacting computational systems, supervised/reinforcement/unsupervised learning algorithms, or*
2. *highly sophisticated, blockchain-like systems that hardwire options and self-execute*

- **frontend:**
- *us, living with a novel* **choice architecture***, differently shaped affordances*
- *we think we use these systems, while they actually use our behavioural data, we must learn to interact with 'them*

- **Interface:**
- *that is designed to lure us, make us feel at home, that which rearticulates us*

threats

- **_the machine stops:_** increased dependence on artificial agency
  - _ML: systems learn by incorporating human expertise; humans de-skill_

- **_predictive craze:_** invisible visibilities
  - _if machines define something as real, it is real in its consequences_

- **_preemption of intent:_** increased manipulability of human agents
  - _ML: systems capable of measuring their impact on the environment, adaptive computing_

us elections:
data does NOT speak for itself

Reached by phone, Oczkowski, director of product for the president-elect's data team Cambridge Analytica, was exhilarated but not necessarily surprised. The polls, the pundits, and the data suggested otherwise, but Oczkowski says he and his crew knew weeks ago that Trump had a solid shot at the presidency. "This is not something that political intuition would tell you," he says, "but our models predicted most of these states correctly."

us elections:
data does NOT speak for itself

Ada is a complex computer algorithm that the campaign was prepared to publicly unveil after the election as its invisible guiding hand. Named for a female 19th-century mathematician — Ada, Countess of Lovelace — the algorithm was said to play a role in virtually every strategic decision Clinton aides made, including where and when to deploy the candidate and her battalion of surrogates and where to air television ads — as well as when it was safe to stay dark.

The campaign's deployment of other resources — including county-level campaign offices and the staging of high-profile concerts with stars like Jay Z and Beyoncé — was largely dependent on Ada's work, as well.
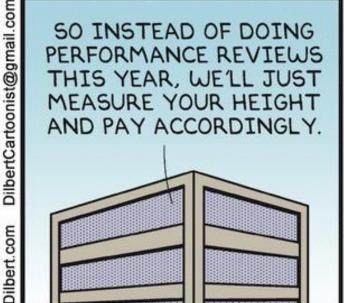
Sleep

Children with regular bedtimes less likely to misbehave, research shows
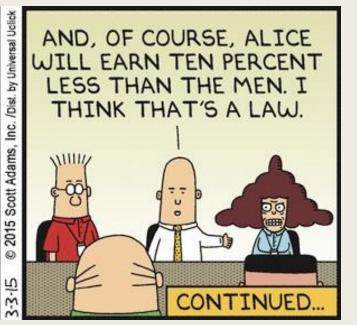
Youngsters with no set pattern more likely to have behavioural problems and emotional difficulties, suggests UCL study

- ■ *data obesitas, low hanging fruits, pattern obesitas, spurious correlation reigns*

Hume, Gadamer, Wolpert: no free lunch theorem

Where

d = training set;

f = 'target' input-output relationships;

h = hypothesis (the algorithm's guess for f made in response to d); and

C = off-training-set 'loss' associated with f and h ('generalization error')

How well you do

is determined by how 'aligned' your learning algorithm $P(h|d)$ is with the actual posterior, $P(f|d)$.

Check http://www.no-free-lunch.org

Since the *present futures* co-determine *the future present*, predictions basically *enlarge* the probability space we face; they do not reduce but expand both uncertainty and possibility. The question is about the distribution of the uncertainty and the possibility:

who gets how much of what?

Mireille Hildebrandt, 2016

THE PATH*S* OF LAW AND TECHNOLOGY

- **Law is built on the distinction between *matter as passive* and *mind as active***

  - **This distinction no longer holds – we are *surrounded by mindless agents***

- **Law is built on the distinction between** *agents and the rest of the world*
  - *Agents perform a unity of time-place-action (enaction: perception-action feedbackloops)*
  - *The rest of the world is distributed, no identifiable unity of enaction*

    - **Even this distinction no longer holds – we are** *surrounded by distributed agential systems*
      - *these systems are data-driven and algorithmic in the computational sense*
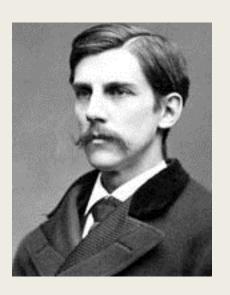
the grammar of law as-we-know-it

- ■ legal concepts are artefacts, law is an artificial architecture
- – *always under construction*

- ■ Dewey: legal fiction is not fictitious, an artificial lake is not an imaginary lake
- – *it has to be dug, fortified, cleaned, re-imagined and maybe re-directed*

the grammar of law as-we-know-it

- **jurisdiction**
- – *internal & external sovereignty: what about the boundary work and assumptions of territoriality?*

- **sources of law**
- – *role of text and sovereignty: what is the nature of binding force, interpretive authority?*

- **legal subjectivity**
- – *attribution: who is protected, who can be called to account for what?*

- **causality**
- – *attribution: what in case of distributed causation, network effects?*

- **liability**
- – *attribution: guilt, risk,*

- **privacy, non-discrimination, due process, presumption of innocence**
- – *autonomy: default assumption or to be 'made'?*

law *as* information

■ **law's modes of existence: how does law-as-we-know-it exist?**

– *law as text, based on human language*

– *law as the attribution of legal effect after specific legal conditions have been met*

– *these conditions are articulated in text (written, spoken, explicit, inferred, read-into)*

learning and the law

Holmes:

- 'The life of the law has not been logic; it has been **experience**'

- 'For the rational study of the law the blackletter man may be the man of the present, but the man of the future is the man of **statistics** and the master of economics'

- 'The **prophecies** of what the courts will do in fact, and nothing more pretentious is what I mean with the law.'

learning and the law
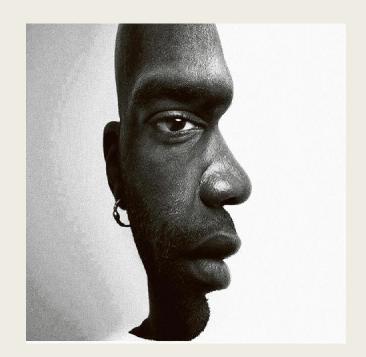

Surden (CodeX, Stanford Legal Informatics):

- 'Outside of law, various disciplines have developed *frameworks for handling errors*. For example, in medicine, if a diagnostic test incorrectly indicates that a healthy person has a disease, scientists formally classify such an error as a *"false positive."* These decision-error frameworks can be useful for understanding error patterns. Within law, similar error scenarios frequently arise; however, they are typically considered only informally. This talk [16th November 2016] will sketch *connections between formal decision-error concepts from the sciences, engineering, medicine, and statistics, and analogous situations within the legal context*.'

law *as* information

- law's modes of existence: what about the future of law?
- *law as code, based on computer language***s**
- *law as the attribution of legal effect after specific legal conditions have been met*
- *these conditions are articulated in*
1. text, inferred by means of legal intelligence (ML)
2. code, based on libraries, modulations, self-execution

LAW BY DESIGN?
LEGAL PROTECTION BY DESIGN?

Hildebrandt's KNUT MEMORIAL LECTURE 2016

DISRUPTION

'Law and Courts in an Online World' Conference 8-9 november 2016 Melbourne, AU

■ Robo Lawyers? The Limits of Artificial Intelligence

– *What will lawyers do in the future?*

– *What parts of the profession will be overtaken by digital services?*

– *What should practices do to preserve themselves in this new era?*

– *Exploring artificial intelligence, the use of precedents, 'citizen-lawyers' and the new era of smart documents.*

law by design I

■ ***Legal intelligence*** (designing the algorithms to mine legal text)

– *use of ML to describe, model, predict case law*

– *NLP, labelling the training set, mining the statistics of input & output, checking against a test set*

■ What about transparency & contestability?

the opacity argument in ML:

1. *intentional corporate or governmental self-protection and concealment*

– *trade secrets, IP rights, public security*

2. *current education invests in writing and reading natural language, not in code or ML*

– *monopoly of the new clerks, the end of democracy*

3. *mismatch between mathematical optimization in high-dimensionality of ML and human semantics*

– *when it comes to law and justice we cannot settle for 'computer says no'*

– *Jenna Burrell, How the machine 'thinks': Understanding opacity in machine learning algorithms', in **Big Data & Society**, January-June 2016, 1-12*

Predicting judicial decisions of the ECHR: a NLP perspective
by Nikolaos Aletras, Dimitrios Tsarapatsanis, Daniel Preotiuc-Pietro, and Vasileios Lampos

- assumption: text extracted from published judgments bears a sufficient number of similarities with, and can therefore stand as a (crude) proxy for, applications lodged with the Court as well as for briefs submitted by parties in pending cases.

- why? published judgments = low hanging fruit

- *problem: as authors state, facts may be articulated by court to fit the conclusion*

- cases held inadmissable or struck out beforehand are not reported, which entails that a text-based predictive analysis of these cases is not possible.

- why? admissable cases = low hanging fruit

- *problem: these cases would probably make a difference which now remains invisible*

- data: cases related to art. 3, 6, 8 ECHR

- why? provided the most data to be scraped, and sufficient cases for each

- *problem: impact of framing of the case remains invisible (think e.g. art. 5, 7, 9, 10, 14)*

automated prediction of judgment (OPoJ)

- APoJ used as a means to provide *feedback* to lawyers, clients, prosecutors, courts

- APoJ could involve a *sensitivity analysis*, modulating facts, legal precepts, claims

- APoJ as a domain for *experimentation*, developing new insights, argumentation patterns, testing alternative approaches

- APoJ could *detect missing information* (facts, legal arguments), helping to improve the outcome of cases

- APoJ can be used to *improve the acuity* of human judgment, *if not used to replace it*

- if APoJ is used to replace, it should not be confused with law; *then is becomes administration – the difference is crucial, critical and pertinent*

- cp http://www.vikparuchuri.com/blog/on-the-automated-scoring-of-essays/

law by design II

- smart contracts, smart regulation
- blockchain, self-executing code
- unclear what is so smart about this, typically non-learning deterministic algorithms
- nevertheless, from the compliance perspective there may be advantages
- *full transparency on the ledger*
- *self-execution of highly complex regulatory environments may generate trustworthiness*

- is this law, discipline or public administration?
- Hegel's dog had more freedom

legal protection by design

Law in a constitutional democracy:

1. **is based on a legislator's prerogative:**
– *NOT BEHIND OUR BACKS*
– *we must move beyond secretive nudging*

2. **is contestable in a court of law:**
– *the validity of the legal norm, its applicability and the facts of the case*
– *remember data does not speak for itself, neither do algorithms*