



THE ‘ROBOLEGAL’: PARALEGAL OR TOPLAWYER?

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JOB MARKET

A Robot May Be Training to Do Your Job. Don't Panic.

Preoccupations

By ALEXANDRA LEVIT SEPT. 10, 2016



Amy Su

As Artificial Intelligence Evolves, So Does Its Criminal Potential

By JOHN MARKOFF OCT. 23, 2016



Imagine receiving a phone call from your aging mother seeking your help because she has forgotten her banking password.

Except it's not your mother. The voice on the other end of the phone call just sounds deceptively like her.

It is actually a computer-synthesized voice, a tour-de-force of artificial intelligence technology that has been crafted to make it possible for someone to masquerade via the telephone.

Such a situation is still science fiction — but just barely. It is also the future of crime.

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what if simulation becomes the real thing?

Turing come true

what if this is about law?

Watson and financial regulation

It knows their methods

New banking rules baffle humans; can machines do better?

Oct 22nd 2016 | NEW YORK | From the print edition



JOINING “Hamilton”, a Broadway show, and concerts by Adele, a British soul diva, on the list of tickets-to-kill-for in New York is a screening in an ugly new office building that recently popped-up in the East Village, a place best known for offbeat culture. There is a ten-week-long queue to see simulations by Watson, IBM’s cognitive artificial-intelligence platform.

Initially known for stunts such as beating human contestants on “Jeopardy!”, a quiz show, Watson has been seeking a wider audience. It has found a vast potential one



- in September IBM purchased Promontory, a consultancy whose senior staff comes from the Federal Reserve, the World Bank, the Securities and Exchange Commission and other regulators.
- “The next area is to provide clarity about rules. They are sorted by jurisdictions, institutional divisions, products and so forth, and then further broken down between rules and guidance. Watson is getting better at categorising the various regulations and matching them with the appropriate enforcement mechanisms. Its conclusions are vetted, giving it an education that should improve its effectiveness in the future. *Promontory’s experts are expected to help Watson learn.*”

- “*Global financial institutions* provide an obvious market for these services, but so too do *small, local ones* that lack the scale to justify the cost of a team of legal experts. A third group is **the regulators themselves**, who often privately grouse about being bewildered by their own remit and distrust other regulators with overlapping briefs.”

- “*Global financial institutions* provide an obvious market for these services, but so too do *small, local ones* that lack the scale to justify the cost of a team of legal experts. A third group is **the regulators themselves, who often privately grouse about being bewildered by their own remit and distrust other regulators with overlapping briefs.**”

is that so?

“If successful, Watson could shift legal authority from individuals to laws.
That, of course, may be its greatest virtue.”

What's Next?

1. Legal intelligence
2. Regulation by code
3. Promises & Caveats

What's Next?

1. *Legal intelligence*
2. Regulation by code
3. Promises & Caveats

Machine learning (ML)

- ML is about
 - *choosing and pruning relevant, correct and sufficiently complete trainingsets*
 - *developing and training the right algorithm to detect the right mathematical function*
 - *ML is based on a productive bias, cp. Hume as well as Gadamer*
 - *optimization always depends on context, purpose, availability of training and test data*
 - *trade-offs!*
 - *reliability depends on the extent to which the future confirms the past*
 - *David Wolpert's no free lunch theorem should inform our assessment*

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, $P(f|d)$.

'Wolpert's result, in essence, formalizes Hume, extends him and calls the whole of science into question.'

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

POLICY & LAW SCIENCE US & WORLD

AI program able to predict human rights trials with 79 percent accuracy

by James Vincent · @jjvincent · Oct 24, 2016, 8:05a

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Predicting judicial decisions of the ECHR: a NLP perspective

by Nikolaos Aletras, Dimitrios Tsarpatzakis, Daniel Preotiu-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 inadmissible or struck out beforehand are not reported, which entails that a text-based predictive analysis of these cases is not possible.
- why? admissible 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)*

Predicting judicial decisions of the ECtHR: a NLP perspective

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■ dataset = publicly available!

- for each article: all cases [apart from non-English judgments]
- equal amount of violation/non-violation cases
- text extraction by using regular expressions, excluding operative provisions

■ textual features:

- *N-gram features (BOW model, not taking into account grammar, syntax, word order)*
- documents as m-dimensional variables over a set of m N-grams
- selection of top-2000 most frequent N-grams, where $N \in \{1, 2, 3, 4\}$
- each feature represents the normalized frequency of a particular N-gram in a case or section of a case
- *Topics: clustering of semantically similar N-grams (hypothesis that similar words appear in similar contexts)*
- computation of N-gram similarity, spectral clustering, obtaining 30 clusters of N-grams
- using topics instead of single N-grams reduces the dimensionality of the feature space, which limits overfitting to training data

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- **prediction is defined as a binary classification task: yes/no violation:**
 - *using each set of textual features to train SVM classifiers*
 - *linear kernel to check the weight learned for each feature*
 - *violation cases labelled +1, non-violation labelled -1*
 - *features with positive weights indicative of violation, with negative indicative of non-violation*
- *trained and tested by 10-fold cross validation, a held-out of 10% for testing*
- *performance computed as **mean accuracy** after 10-fold cross-validation*

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Table 2 Accuracy of the different feature types across articles. Accuracy of predicting violation/non-violation of cases across articles on 10-fold cross-validation using an SVM with linear kernel. Parentheses contain the standard deviation from the mean. Accuracy of random guess is .50. **Bold font** denotes best accuracy in a particular Article or on Average across Articles.

Feature Type		Article 3	Article 6	Article 8	Average
N-grams	Full	.70 (.10)	.82 (.11)	.72 (.05)	.75
	Procedure	.67 (.09)	.81 (.13)	.71 (.06)	.73
	Circumstances	.68 (.07)	.82 (.14)	.77 (.08)	.76
	Relevant law	.68 (.13)	.78 (.08)	.72 (.11)	.73
	Facts	.70 (.09)	.80 (.14)	.68 (.10)	.73
	Law	.56 (.09)	.68 (.15)	.62 (.05)	.62
	Topics	.78 (.09)	.81 (.12)	.76 (.09)	.78
Topics and circumstances		.75 (.10)	.84 (0.11)	.78 (0.06)	.79

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- circumstances and topics are best predictors, combined works best
- law has lowest performance
 - *in case of inadmissibility no law sections*
 - *discussion: facts more important than law*
 - *legal formalism and realism: evidence that legal realism is realistic*
- this is nonsense for 2 reasons:
 - *as indicated by the authors the facts, formulated by the court, may be tuned to the outcome*
 - *in many cases there is no law section due to an inadmissibility judgment*

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*

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/>

What's Next?

1. Legal intelligence
2. *Regulation by code*
3. Promises & Caveats

Regulation by computer code

1. Regulation:

- 'hardcoding' of regulation, such that legal conditions are automatically detected and legal effect automatically executed
- implies that conditions and effect are machine readable and machine executable

2. Contracts:

- 'hardcoding' of contractual clauses (determining what counts as performance) and the legal effect of neglect (compensation, nullification)
- implies that performance, neglect, compensation and nullification are machine readable and machine executable

Regulation by computer code

- *lex informatica* (Joel Reidenberg, 1997)
- *lex cryptographica* (Wright & De Filippi, 2016)

Regulation by computer code

Lex cryptographica [based on blockchain technologies]:

- smart contracts: “one of the first truly disruptive technological advancements to the practice of law *since the invention of the printing press.*”
- smart contracts: “could be used to enable employees to be paid on an hourly or daily basis with taxes remitted to a governmental body in real time.”

Regulation by computer code

Lex cryptographica [based on blockchain technologies]:

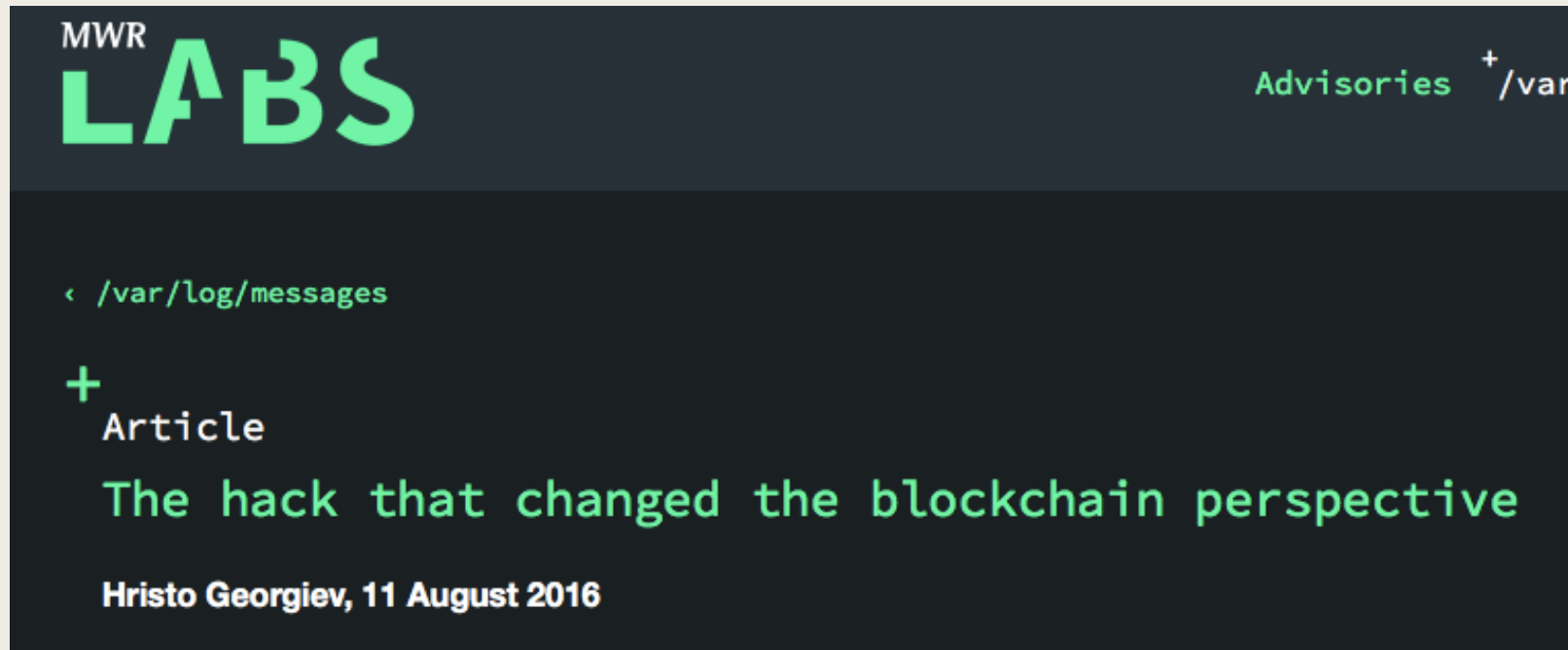
- “We could thus witness the emergence of decentralized autonomous organizations that enter into contractual relationships with individuals or other machines in order to create a **complex ecosystem of autonomous agents interacting with one another according to a set of pre-determined, hard-wired, and self-enforcing rules.**”
- “An ill-intentioned decentralized autonomous organization thus could be akin to a biological virus or an uncontrollable force of nature.”

Regulation by computer code

Lex cryptographica [based on blockchain technologies]:

- “(...) the way in which the rules have been defined—the code—is the same mechanism by which they are enforced.”
- “This raises the question over what is legally versus technically binding.”

Regulation by computer code



- <https://labs.mwrinfosecurity.com/blog/the-hack-that-changed-the-blockchain-perspective/>

“

To the DAO and the Ethereum community,

I have carefully examined the code of The DAO and decided to participate after finding the feature where splitting is rewarded with additional ether. I have made use of this feature and have rightfully claimed 3,641,694 ether, and would like to thank the DAO for this reward. It is my understanding that the DAO code contains this feature to promote decentralization and encourage the creation of “child DAOs”.

I am disappointed by those who are characterizing the use of this intentional feature as “theft”. I am making use of this explicitly coded feature as per the smart contract terms and my law firm has advised me that my action is fully compliant with United States criminal and tort law. For reference please review the terms of the DAO:

“The terms of The DAO Creation are set forth in the smart contract code existing on the Ethereum blockchain at 0xbb9bc244d798123fde783fcc1c72d3bb8c189413. Nothing in this explanation of terms or in any other document or communication may modify or add any additional obligations or guarantees beyond those set forth in The DAO’s code. Any and all explanatory terms or descriptions are merely offered for educational purposes and do not supercede or modify the express terms of The DAO’s code set forth on the blockchain; to the extent you believe there to be any conflict or discrepancy between the descriptions offered here and the functionality of The DAO’s code at 0xbb9bc244d798123fde783fcc1c72d3bb8c189413, The DAO’s code controls and sets forth all terms of The DAO Creation.”

A soft or hard fork would amount to seizure of my legitimate and rightful ether, claimed legally through the terms of a smart contract. Such fork would permanently and irrevocably ruin all confidence in not only Ethereum but also the in the field of smart contracts and blockchain technology. Many large Ethereum holders will dump their ether, and developers, researchers, and companies will leave Ethereum. Make no mistake: any fork, soft or hard, will further damage Ethereum and destroy its reputation and appeal.

I reserve all rights to take any and all legal action against any accomplices of illegitimate theft, freezing, or seizure of my legitimate ether, and am actively working with my law firm. Those accomplices will be receiving Cease and Desist notices in the mail shortly.

I hope this event becomes a valuable learning experience for the Ethereum community and wish you all the best of luck.

Yours truly,
"The Attacker"

- “The problem is that the entire principle of cryptocurrencies is to get around the corruption inherent in human nature, whereby the DAO’s code is the contract and cannot be reinterpreted by humans.”
- “By changing the code to prevent the theft, this causes a “fork” in the blockchain, so the miners who run the software as they have done in the past are on one blockchain, while the miners who update their software to make the hack impossible are essentially working on a completely different blockchain. And if at least 51% of all the miners do not agree to all update to the new software, the existing blockchain would have been broken.”

Regulation by computer code

- 'Legal by design'
- If you cannot violate the law it is not not but administration, execution or training
- Nothing wrong with that - in principle - as long as it is not confused with law
- Hegel's dog had more freedom
- Compare: techno-regulation and the combination of 'nudging' and ML

What's Next?

1. Legal intelligence
2. Regulation by code
3. *Promises & Caveats*

Promises

Scaling (automation), access to justice may be:

- more efficient
- more effective
- more equally distributed

Substantive challenges:

- new types of legal equality (labelling, low hanging fruit, bias)
- new types of legal certainty (descriptive, prescriptive)
- new insights into factors that co-determine the outcome of legal cases
- new insights in patterns of legal argumentation

pitfalls:

- trade secret and IP rights mean that the provider of legal intelligence can block access to the code, this has at least 2 consequences:
 - *the lawyer cannot verify how the system achieved its legal advice*
 - *the civil servant cannot verify how the system decides on automated enforcement*
 - *the providers of these applications have a dominant power position in relation to the publisher of legal text that are made accessible, searchable & mineable by the application.*

pitfalls:

1. **legal equality is reduced** to a machine readable product
2. **legal certainty may diminish** because of interacting systems of legal intelligence
3. **unequivalent access**, for instance:
 - access to expert systems trained by expensive top lawyers may be restricted to the lucky few
 - the less advantaged may have to settle for advice of less intelligent systems
4. **the balance of power of the rule of law may be corrupted by the dynamics of interacting systems of attorneys, public prosecutors and the courts**



relevant literature:

- M Hildebrandt, 'The Meaning and Mining of Legal Texts', in *Understanding Digital Humanities: The Computational Turn and New Technology*, ed. D.M. Berry (London: Palgrave Macmillan, 2011), https://works.bepress.com/mireille_hildebrandt/27/
- Mireille Hildebrandt, 'Law as Information in the Era of Data-Driven Agency', *The Modern Law Review* 79, no. 1 (1 January 2016): 1–30, <http://onlinelibrary.wiley.com/doi/10.1111/1468-2230.12165/abstract>
- Mireille Hildebrandt, *Smart Technologies and the End(s) of Law. Novel Entanglements of Law and Technology* (Cheltenham: Edward Elgar, 2015), <http://www.e-elgar.com/shop/smart-technologies-and-the-end-s-of-law>