How can AI help law?
How can law help AI?

Practical Insights for computer scientists

Prof. Gregory Lewkowicz, Director of the Smart Law Hub
Perelman Centre - ULB
SMART Law

<table>
<thead>
<tr>
<th><strong>SMART Law</strong></th>
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<tbody>
<tr>
<td><strong>SCIENTIFIC</strong></td>
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<td><strong>MATHEMATICAL</strong></td>
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<td><strong>ALGORITHMIC</strong></td>
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<td><strong>RISK</strong></td>
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<td><strong>TECHNOLOGY</strong></td>
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### 3 conversations: from law 1.0 to law 3.0

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Topic</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law 1.0</td>
<td>How to <strong>apply legal rules</strong> to a particular set of facts?</td>
<td>Attorneys and judges with the courtroom as the venue for decision</td>
</tr>
<tr>
<td>Law 2.0</td>
<td>Fitness for purposes: whether existing <strong>rules are fit for regulatory purposes</strong>?</td>
<td>Lawyers, lawmakers, policymakers, and regulators</td>
</tr>
<tr>
<td>Law 3.0</td>
<td>Fitness for purposes: whether <strong>rules or technological measures are better fit for regulatory purposes</strong>?</td>
<td>Lawyers, lawmakers, policymakers, regulators, technologists, ...</td>
</tr>
</tbody>
</table>
World stumbling zombie-like into a digital welfare dystopia, warns UN human rights expert
Dutch PM Mark Rutte said in January 2021 the decision to resign was "unavoidable."

The Dutch government has stepped down after thousands of families were wrongly accused of child welfare fraud and told to pay money back.

AI is the future of the NHS. It's also disadvantaging women and ethnic minorities

Experts warn that new research into AI in healthcare shows a failure to consider the full range of potential bias against particular groups of people will have life or death consequences.

How a Discriminatory Algorithm Wrongly Accused Thousands of Families of Fraud

Dutch tax authorities used algorithms to automate an austere and punitive war on low-level fraud—the results were catastrophic.
THE ENCOUNTER OF TWO WORLD-VIEWS: INFORMATICS V. LAW

INFORMATICS

Law is nothing but operations on data

- Data
- Operations on data (algorithms) / data processing

LAW

Digital technologies are things

- Legal Persons
- Things
- Rights, Duties and Transactions
HOW INFORMATION SYSTEMS CAME TO RULE THE WORLD

And Other Essays

Burt Swanson
Law = Data+Data Processing

« One day we may even have easily machine-readable rulebooks, which will foster compliance by regulated entities », SEC, 22 février 2021.

« And as we accelerate our goal of becoming a data and digital first regulator (...) », Financial Conduct Authority, 22 septembre 2021.
European and international approach: Rules on Data & Rules on algorithms

GDPR – Personal Data (Data Subject)
Rules regarding non-personal data
Intellectual Property

Ethical AI – Trustworthy AI
(Rules on algorithms & Liability)
Lawyers vs. Engineers
Collaboration is needed
1. How can AI help law?
Law-Making & Legislative Drafting
Agile Regulation for the Fourth Industrial Revolution
A Toolkit for Regulators

DECEMBER 2020

Recommendation of the Council for Agile Regulatory Governance to Harness Innovation
AGILE REGULATION - Toolkit

2. Anticipatory regulation
   2.1 Identifying innovations and their implications

3. Outcome-focused regulation
   3.1 Focusing regulation on the achievement of goals
   3.2 Including experimentation and sunset clauses in regulation
   3.3 Using soft law to provide certainty for business

4. Experimental regulation
   4.1 Providing regulatory advice to innovators
   4.2 Enabling testing under regulatory supervision
   4.3 Setting regulatory challenges for innovators

5. Data-driven regulation
   5.1 Introducing rules as machine-readable code
   5.2 Using technology to enable risk-based enforcement

6. Self- and co-regulation
   6.1 Fostering responsible industry-led governance

7. Joined-up regulation
   7.1 Promoting coordination across regulators
   7.2 Promoting coordination at the subnational level

8. International regulatory cooperation
   8.1 Collaborating across borders on regulation of innovation
Rac as a Policy Movement

Is the law as we know it still fit for purpose?
CSIRO Submission 19/691
Financial Technology and Regulatory Technology
Senate Select Committee on Financial Technology and Regulatory Technology
December 2019

Commonwealth Scientific and Industrial Research Organisation

The goal is that computer-assisted reasoning using these logics should give the same answers as judges and lawyers doing legal reasoning about the black-letter law. This vision is not just machine-readable web pages or PDF documents, but rather, machine-interpretable legislation, so computers can help to automate compliance - to reduce the cost of red tape and improve the quality of risk management in society.

This vision is sometimes called “Rules as Code”. When legal texts can be represented in this way, it enables the potential to build digital tools to help people to interact with the law. This could help to address the cost burdens and inefficiencies described above.
OECD – « RULES AS CODE »

OECD Working Papers on Public Governance No. 42

Cracking the code: Rulemaking for humans and machines

James Mohun, Alex Roberts

https://dx.doi.org/10.1787/3afe6ba5-en
OECD – « RULES AS CODE »

Rules as Code (RaC) aims to change government rulemaking. Fundamentally, RaC proposes to create a machine-consumable version of some types of government rules, to exist alongside the existing natural language counterpart. More than simply a technocratic solution, however, RaC represents a transformational shift in how governments create rules, and how third parties consume them.

By integrating technology into rulemaking from the outset, it brings the policy development and implementation components of the current process closer together to better align intent and outcomes. In allowing third parties to consume an official version of machine-consumable government rules, it also promises the potential for quicker service delivery, a more consistent application of the rules and greater efficiencies for rule takers.

“It could also drive a more consistent application of the rules, as third parties are enabled to consume an official version of machine-consumable rules directly from government.”
Rule-making and application life cycle

Rule-Making institution → Adpots legal texts in natural language (laws, regulations, etc) → Citizens, business and Legal operators
Rule-making and application life cycle in RaC

Rule-Making institution

Adpots legal texts in natural language (laws, regulations, etc)

Adpots legal texts in computer language (laws, regulations, etc)

Citizen, business and Legal operators

Machine “consumable”
Why RaC?

- Pragmatic: Law as a constraint in computational devices
- Operational: lowers costs and is more agile to implement
- Legisprudential: Co-drafting improves law’s clarity, consistecy and efficacy

"Automation" (WEF)
"Desintermediation" (OECD)
"Interoperability" (OECD)
"Law-ready for 4th industrial revolution" (WEF)

"Reduce complexity" (OECD)
"Better regulation" (EU)
"more fairness" (OECD)
Note: With only a natural language, human readable form of government rules, entities have to interpret and translate rules into coded forms (which can create inconsistencies or errors) multiple times. Figure 2.2 shows how creating an official, machine-consumable version of rules could enable their more consistent consumption and use by government (and its agencies), business and people by minimising the translation gap. This could have a range of impacts from necessitating an overhaul of the current rule creation process to making it easier for rules to be consumed (known and acted upon accordingly). Another major effect of making rules machine-consumable is that rules become easier to recognise and act upon for machines, but also for humans. This would likely be achieved indirectly, in that the coded version of the rules could inform tools (such as applications) that facilitate a better and more accessible understanding of government rules for individuals and businesses.

Formulating and recording rules in clear and precise language, which is unambiguous as possible, aids their effective and consistent implementation. It allows them to be known and shared, and supports standardisation in their application. The more explicitly rules are formulated, the less chance of rule-takers interpreting them differently and reaching diverging understandings and expectations of what is allowed or not. While this is true for all rules, clarity, precision and consistency in application are particularly important for government rulemaking. Of course, sometimes there is value in having less detailed and precise laws that act as high-level signals, that is, as indications of what is desired or valued (or what is to be avoided), e.g. a law against hate speech. Here, the manner in which the rule is applied needs to take into account the specifics of different cases and evolve over time as the intent and details of the rule are solidified in light of the working reality. This element of the law and rulemaking cannot and should not be discounted — but it should also be recognised that, especially in a digital context, all rules will be implemented in some form and thus ultimately translated into precise and specific rules anyway. As digital transformation unfolds, many rules become more and more embedded in digital systems and structures. For instance, rather than knowing the details of tax law, many will simply rely on digital systems when completing their tax return, accepting that it is likely in compliance with the rules because the system said so. In this way, humans will act in accordance with the rules embedded in digital infrastructure, even though the rules themselves may no longer be immediately apparent or visible (but with the knowledge that they are accessible and interrogable).
The world is changing at an unprecedented rate, often in unexpected directions. The global trends report of 2019 identified that ‘digitalisation is transforming economies, governments and societies in complex, interrelated and often unpredictable ways’ (OPSI, 2019: 13). Digitalisation has ‘sped up’ the world and made it increasingly connected. This has amplified the complexity of issues, as well as the complexity of responses needed to address them. As a result, governments have often struggled to prepare for, shape, adapt to and keep pace with this changed context. Likewise, the way governments create rules is under pressure and often falling behind what is now needed and expected. This is exacerbating old problems, while also creating new ones. Here, these problems can be understood as relating to three main areas:

1. **Interpretation and translation of intent**: In requiring repeated interpretation multiple times and in multiple stages throughout rule creation and implementation, the current process risks misunderstanding. This can create a gap between policy intent and implementation, as well as uncertainty and costs for consumers of the rules. This is magnified when happening at speed, as the ability to compare a rule’s intent with feedback about its in-practice implementation and its application to unanticipated contexts is hampered by ongoing, often irregular change.

2. **Complexity**: The current process is not well equipped to handle the twin challenge of growing complexity and fast-paced change, which characterises governments’ operating environments. This can reduce the quality and timeliness of government rulemaking. This is amplified by the transboundary interconnectedness that comes with globalisation and digitisation, and which requires that effective rulemaking addresses local and international contexts (OECD, 2019c).

3. **Efficiency**: Inefficiencies accrue in the current rule-creation process, especially in terms of the testing and revision of rule changes. By failing to provide an official set of government rules in Legislation drafter

The diagram shows the process and costs of translation gap with three main areas:

- **Legislation drafter**: Human readable documents & webpages, Inconsistent definitions, Hard to interpret & model, Hard to detect changes.
- **Lawyers/legal operators**: Legislation is interpreted according to organisation or personal priorities, Accountable only within organization.
- **Software developers**: Directions from “business” interpreted into programmatic terms for business systems.

The diagram indicates that changes (A, A1, A2) are translated into structured language, which is then translated into actionable rules, and finally, into code for IT/business systems. Examples include money laundering detection software and LEZ rules incorporated in cars or navigation applications.
RaC to improve inclusiveness and fairness?

Law is accessible to civil society in machine readable format
- Access via APIs & software library
- Structured language

NGO’s
- Consumer associations
- Public administration
- Researchers
- Etc.

Applications to make law human readable
- Develop tools for citizens

Chatbots
- Information services
- Legal design
- Multilingual access
- Simulators

Requesting a planning permit
Discussion:
What are the consequences?
What are the risks?
Programming Paradigms?

- Imperative
- Procedural
  - Object-Oriented
- Declarative
  - Functional
  - Logic

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**Doctorat en Droit**

**Story of a Legal Codex(t)**

*Writing Law in Code*

Megan Ma

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**Catala: A Programming Language for the Law**

DENIS MERIGOUX, Inria, France
NICOLAS CHATAING, Inria, ENS Paris, France
JONATHAN PROTZENKO, Microsoft Research, USA
New Drafting Methods? User-Centric Law
"I teach contract law at Harvard Law School and I can't understand my credit card contract. » (2009)
Plain Language Movement


« The Language of the Law, is a massive examination of the failure of law language by either criterion. »

R.L. Goldfarb
Plain Language Movement
Legal Design: front-end et back-end

Source: M. Hagan, Law by design
Personas & Journey
Legal Design & RaC

UML – Use Case Diagram
Prototype & Test
**RaC Step by Step**

**Existing Legislation**
- Mine and Compile legislation
  - Find legislation, mine, export, store in a central database
- Pre-process legislation
  - Clean data, explore, apply NLP
- Domain knowledge + computational methods
  - Ontologies, knowledge graphs, networks, etc.
- Evaluation tools & dashboards
  - Intrinsic complexity, technical complexity, referrals, readability, etc.
- Implement computer language
  - Choose a language, Interpret statues, write code
- Test RaC
  - Test beds, proto-typing, etc.

**New Legislation**
- Introduce co-drafting
  - Set up interdisciplinary teams: Programmers, subject matter experts, service delivery, etc.
- Evaluation tools & dashboards
  - Intrinsic complexity, technical complexity, referrals, readability, etc.
- Implement computer language
  - Choose a language, Interpret statues, write code
- Test RaC
  - Test beds, proto-typing, etc.
Legacy ?
Wanted
Legislative Data Pipeline
Methodology Overview

1. Scraping Moniteur/Justel
2. Justel Dump
3. Database construction
4. Standardization to Akoma Ntoso
5. Annotation - ANT, ULB
6. API
7. PDF consolidation
8. AI & Machine Learning
9. Web User Interface
Database Infrastructure

SimpLex Data Collection Architecture

Artificial Intelligence Applications

Admin Interface & API

Admin

PostgreSQL

access documents

configure scraping

Document Scraping Application

store text & pdf

download text & pdf

Documents from Moniteur Belge

Other Datasource

Other Datasource

Datasource

PK id

name: str
url: URL

Job

PK id

source: Datasource
scraper: str
started_on: datetime
status: str
publication_start: date
publication_end: date
type_monitor: str
monitor_source: str
type_law: str
language: str
scraped_docs: int
max_docs: int

Request

PK id

time_s: float
description: str
search: Search
method: str
url: URL
data: JSON
params: JSON
headers: JSON
failed: bool
error: str
created_on: datetime

Response

PK id

content: str
status: int
reason: str
request: Request
created_on: datetime
COMMON STRUCTURED FORMAT FOR EU LEGISLATIVE DOCUMENTS

FROM A WORD-BASED EXCHANGE TO AN XML-BASED EXCHANGE

Akoma Ntoso Technical Standard
Akoma Ntoso Implementation (Prototype)

```
def build_akoma_ntoso(document: Document) -> AkomaNtosoDocument:
    ... act = Act(""
    formatted_title = re.sub(r"\\(NOT[A-Za-z]\\)\", ",", document.title).strip()
    act.title = formatted_title
    act.publication_date = document.publication
    act.publication_number = document.numac
    act.language = document.language.lower()
    act.publication_name = formatted_title
    body_string = ET.tostring(build_document_xml_body(document), method='xml')
    body_element = objectify.fromstring(body_string)
    act.act.body = body_element
    return act
```
Legislator Dashboard (1)
### Information | Valeur | Description
--- | --- | ---
Nombre de chapitres | 73 | Indique le nombre de chapitres dans le texte de loi
Nombre de caractères | 466442 | Indique le nombre de caractères présent dans le texte
Nombre de paragraphes | 719 | Indique le nombre approximatif de paragraphes présent dans le texte
Nombre de phrases | 4855 | Indique le nombre approximatif de phrases présent dans le texte
Nombre de mots* | 86396 | Indique le nombre de mots à lire dans le texte
Nombre de mots différents* | 566631 | Indique le nombre de mots différents dans le texte
temps moyen de lecture* | 368 min | Temps de lecture moyen avec une vitesse normale et en voix off
Test de lisibilité Flesch | 56.4 | Niveau universitaire (Difficile à lire)
Test de lisibilité Flesch-Kincaid | 14.3 | Nombre d'années d'études nécessaire pour une compréhension du texte
Type Token Ratio(Variation lexicale) | 9.215% | Nombre total de mots différents/nombre total de mots

**Flesch**

\[
206.835 - 1.015 \left( \frac{\text{nombre total de mots}}{\text{nombre total de phrases}} \right) - \left( \frac{\text{nombre total de syllabes}}{\text{nombre total de mots}} \right)
\]

**Flesch-Kincaid**

\[
0.39 \left( \frac{\text{nombre total de mots}}{\text{nombre total de phrases}} \right) + 11.8 \left( \frac{\text{nombre total de syllabes}}{\text{nombre total de mots}} \right) - 15.59
\]
Method – Annotations (8427)

ANT software ULB

Le Gouvernement détermine :
1° les instances chargées de la transmission des documents aux autorités visées à l'alinéa précédent;
2° les modalités selon lesquelles les autorités compétentes de la Réunion ou de l'État susceptibles d'être affectées peuvent participer à la procédure d'évaluation de l'incidence sur l'environnement;
3° les modalités suivant lesquelles le plan, les avis amis visés à la phrase 4, quatrième état et au paragraphe 5, deuxième état et premier article, deuxième phrase, du présent article, et les modalités de suivi définies à l'article 27, § 2, quatrième état sont communiqués aux autorités visées à l'alinéa précédent.

Dans le cas qui suit, il motive sa décision sur chaque point à propos duquel il est écarté des avis ou des réclamations et observations émises lors de l'enquête.

Dans le cas qui suit, si les modifications sont mineures et ne sont pas susceptibles d'avoir des incidences notables sur l'environnement, le projet modifié, accompagné, le cas échéant, d'un complément au rapport sur les incidences environnementales, est à nouveau soumis aux actes d'action conformément à l'article 27, § 3, deuxième état.

En outre, si le projet de plan avait été dispensé de rapport sur les incidences environnementales conformément à l'article 27, § 3, deuxième état, le projet de plan doit être soumis à un rapport sur les incidences environnementales établi conformément à l'article 27, § 3, deuxième état.

Le projet d'atelier doit être adressé à la Commission régionale. Il doit comprendre les incidences environnementales et le projet modifié. Il doit être soumis à un rapport sur les incidences environnementales.

Le Gouvernement détermine si le projet modifié est conforme à l'article 27, § 3, deuxième état. Il peut ensuite adopter le projet de plan après conciliation.

La procédure de modification est soumise aux dispositions des articles 25 à 26, deuxième et troisième états.

Lorsque le projet de modification du plan régional d'affectation du sol est inscrit dans un plan régional de développement ou dans la modification de ce plan, le projet de modification du plan régional d'affectation du sol doit être envoyé dans les douze mois qui suivent l'adoption du plan régional de développement ou de la modification de ce plan.

Lorsqu'il est nécessaire de modifier le plan régional d'affectation du sol, il doit être pris au moins deux mois après l'adoption du plan régional de développement ou de la modification de ce plan.

Lorsque le plan régional d'affectation du sol est inscrit dans un plan régional de développement ou dans la modification de ce plan, le projet de modification du plan régional d'affectation du sol doit être envoyé dans les douze mois qui suivent l'adoption du plan régional de développement ou de la modification de ce plan.

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Legislator Dashboard (3) – Complexity test (cross-references)
Legislator Dashboard (3) – Complexity test (cross-references)
Test de neutralité technologique

Parties problématiques

🔗 Article 12/2
🔗 Article 36
🔗 Article 50

> Montrer tous les articles

Recalculer

Test du principe *Only Once*

Aucune partie problématique

OK

Recalculer
The Way Forward

Rules to Code with Large Language Models

Evaluating Large Language Models Trained on Code

Mark Chen 1 Jerry Tworek 1 Heewoo Jun 1 Qinming Yuan 1 Henrique Ponde de Oliveira Pinto 1 Jared Kaplan 1 Harri Edwards 1 Yuri Burda 1 Nicholas Joseph 2 Greg Brockman 1 Alex Ray 1 Raul Puri 1 Gretchen Krueger 1 Michael Petrov 1 Heidy Khlaif 1 Girish Sastry 1 Pamela Mishkin 1 Brooke Chan 1 Scott Gray 1 Nick Ryder 1 Mikhail Pavlov 1 Alethea Power 1 Lukasz Kaiser 1 Mohammad Bavarian 1 Clemens Winter 1 Philippe Tillet 1 Felipe Petroski Such 1 Dave Cummings 1 Matthias Plappert 1 Fotios Chantzis 1 Elizabeth Barnes 1 Ariel Herbert-Voss 1 William Helgen Guss 1 Alex Nichol 1 Alex Paino 1 Nikolas Tesak 1 Jie Tang 1 Igor Babuschkin 1 Suchir Balaji 1 Shantanu Jain 1 William Saunders 1 Christopher Hesse 1 Andrew N. Carr 1 Jan Leike 1 Josh Achiam 1 Vedant Misra 1 Evan Morikawa 1 Alec Radford 1 Matthew Knight 1 Miles Brundage 1 Mira Murati 1 Katie Mayer 1 Peter Welinder 1 Bob McGrew 1 Dario Amodei 1 Sam McCandlish 1 Ilya Sutskever 1 Wojciech Zaremba 1

LAW-GPT?

- Generate an executable python code of the text into bracket
  (When the code is the competent authority to issue the permit, the application is:
  - either deposited at the town hall, where a certificate of deposit is issued on the spot;
  - or sent to the college, by registered letter.)

Certainly! Here's an executable Python code based on the given text:

```python
# Define a function for permit application
def issue_permit(college):
    if college:
        print("Application can be sent to the college by registered letter.")
    else:
        print("Application can be deposited at the town hall. A certificate")

# Call the function with college as the competent authority
issue_permit(college=True)
```

This code defines a function `issue_permit` that takes a boolean argument `college` to indicate whether the college is the competent authority to issue the permit.
Discussion:
What are the limits?
The New Science of Ethical Algorithms

• « the emerging science of designing social constraints directly into algorithms, and the consequences and trade-offs that emerge »

• « new science underlying algorithms that internalize precise definition of things such as fairness and privacy – specified by humans – and make sure they are obeyed »
Function(s) of law?

Law is not a set of rules, it’s a social practice.
Adjudication
Wanted: Lawyers Who Understand AI

Law firms are preparing for more legal cases involving artificial intelligence as the technology grows ubiquitous.

By John Muraski

July 9, 2019 5:30 am ET | WSJ PRO
Jurimetrics & Modelization

• Compare the offer of an insurer vs. a model of court decision
• Useful in the context of negotiations (bargaining in the shadow of big data)
• Useful for the work of lawyers and judges (new ways of knowing the law)

Indemnisation du préjudice corporel
Source : A. Gayte-Papon de Lameigné et al. (s.d.)
Small claims landlord/tenants

(Laboratoire de Cyberjustice – U. Montréal)

<table>
<thead>
<tr>
<th>Tag</th>
<th>Total</th>
<th>Win</th>
<th>Loss</th>
<th>(tenant)</th>
<th>Rent reduction</th>
<th>Moral damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who was at fault for the infestation of bedbugs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landlord</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.0%</td>
<td>$0</td>
<td>$2,000</td>
</tr>
<tr>
<td>Not discussed</td>
<td>36</td>
<td>25</td>
<td>11</td>
<td>69.4%</td>
<td>$481</td>
<td>$270</td>
</tr>
<tr>
<td>Tenant</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100.0%</td>
<td>$460</td>
<td>$0</td>
</tr>
<tr>
<td>How intense was the infestation of bedbugs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>9</td>
<td>9</td>
<td>0</td>
<td>100.0%</td>
<td>$889</td>
<td>$300</td>
</tr>
<tr>
<td>Medium</td>
<td>23</td>
<td>14</td>
<td>9</td>
<td>60.9%</td>
<td>$379</td>
<td>$392</td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>57.1%</td>
<td>$216</td>
<td>$0</td>
</tr>
<tr>
<td>Was the landlord helpful in exterminating the bedbugs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpful</td>
<td>23</td>
<td>17</td>
<td>6</td>
<td>73.9%</td>
<td>$489</td>
<td>$183</td>
</tr>
<tr>
<td>Not discussed</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>66.7%</td>
<td>$442</td>
<td>$189</td>
</tr>
<tr>
<td>Not helpful</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>57.1%</td>
<td>$429</td>
<td>$830</td>
</tr>
<tr>
<td>Was the tenant cooperative with the exterminators?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpful</td>
<td>11</td>
<td>9</td>
<td>2</td>
<td>81.8%</td>
<td>$790</td>
<td>$437</td>
</tr>
<tr>
<td>Not discussed</td>
<td>17</td>
<td>9</td>
<td>8</td>
<td>52.9%</td>
<td>$383</td>
<td>$335</td>
</tr>
<tr>
<td>Not helpful</td>
<td>11</td>
<td>9</td>
<td>2</td>
<td>81.8%</td>
<td>$275</td>
<td>$109</td>
</tr>
</tbody>
</table>
Case Difficulty – From « what is a good lawyer? » to legal case management

• Compute a ‘‘Difficulty’’ value which enables to provide a more loyal information about the quality/performance of the services of a lawyer in court

• Discover some cases type/communities and compute the win/lose among these communities

• Use the article cited to group the case together
Case Graph

• Representing every cases in a graph where:

  • Case $c_1$ and case $c_2$ has an edge if they cite at least $k$ same articles

  • Formally, $G_c(N,E,k)$ is graph where the Node set $N$ and the edge set $E$ are defined as follow:
Graph Mining – Case similarity – New ways to explore the case law

- For the 3 last months of 2018 (5500 cases) Cour d’Appel de Paris
Graph Mining – Case similarity - New ways to explore the case law

- For the 3 last months of 2018 (1500 cases):

  \( k=2 \) (80K edges, 1000 nodes)

  \( k=3 \) (20K edges, 600 nodes)
Graph Mining – Case similarity - New ways to explore the case law

• For the 3 last months of 2018 (1500 cases):

  \[ k=2 \] (80K edges, 1000 nodes)

  \[ k=3 \] (20K edges, 600 nodes)

  \[ k=4 \] (5K edges, 400 nodes)
Example on Cour d’Appel de Paris

- **Green:** Claimant wins
- **Red:** Defendant wins
- **Blue:** unknown

$k=4$ (5K edges, 400 nodes)
Example on Cour d’Appel de Paris

Communities with high/medium winning rate

$k=4$ (5K edges, 400 nodes)
Example on Cour d’Appel de Paris

Communities with high losing rate

$k=4$ (5K edges, 400 nodes)
What can you infer from this information?
JAY WRIGHT FORRESTER (1918-2016)

• « The human mind is not adapted to interpreting how social systems behave. Social systems belong to the class called multi-loop nonlinear feedback systems. (...) Evolutionary processes have not given us the mental ability to interpret properly the dynamic behavior of those complex systems in which we are now imbedded. »

• « Social systems are far more complex and harder to understand than technological systems. Why then do we not use the same approach of making models of social systems and conducting laboratory experiments before adopting new laws and government programs? »

• « Substantial supporting evidence is accumulating that proper use of models of social systems can lead to far better systems, laws, and programs. »
The limits of modelling: J. Forrester in practice
Legal Case management
“Circuit” civil/commercial case at Cour de Cassation

Greffe des pourvois
- Enregistrement du pourvoi
  ✓ Réception du mémoire en demande (obligatoire)
  x Réception de mémoire en défense (facultatif)

SDER
- Orientation du pourvoi vers l’une des 6 chambres
- Signalement au premier président des affaires

Chambre
- Evaluation des dossiers par un membre de la chambre
- Désignation d’un conseiller rapporteur par le président de chambre
- Rédaction par le rapporteur:
  ✓ D’un rapport objectif
  ✓ D’un avis et d’un ou plusieurs projets d’arrêt
  ✓ Avis du parquet général
- Conférence du président et du doyen
- Audience publique
- Délibéré secret

Greffe des arrêts
- Mise à disposition des parties de l’arrêt
  • Archivage
Les données disponibles

**Decisions**
- 253 194 files XML
- 174 133 decisions Cour de Cassation
- 66 454 decisions with mémoire ampliatif
- File « Rapprochement » with groups of cases with similar previous questions

**Memos**
- 127 879 files HTML
- Commercial and civil chambers.
Annotating decisions

LA COUR DE CASATION, TROISIÈME CHAMBRE CIVILE, a rendu l'arrêt suivant :

Jugé les pourvois n°s H 10-14-351 et I M-10-15-000 ;

Sur l'arrêt prononcé :

Vu l'article 4 du code de procédure civile ;

Attendu, selon l'arrêt attaqué (Montpellier, 10 novembre 2009), que la société civile immobilière Cavok 2 (la SCI) a, par acte sous seing privé du 7 mars 2006, vendu aux époux X... un bien immobilier, sous conditions suspensives relatives à l'obtention d'un prêt ; que l'acte de vente n'ayant pas été notarié dans le délai prévu, la SCI a assigné les époux X... en paiement de la clause pénale et en dommages-intérêts ; que ceux-ci soutenant, à titre principal, que les conditions suspensives n'étant pas réalisées, la vente était caduc, se sont opposés à ces demandes et ont invoqué, à titre subsidiaire, la nullité de la vente pour erreur de substance ;

Attendu que pour prononcer la nullité du "compromis de vente", l'arrêt retient que bien que les époux X... ne soulièvent la nullité du contrat qu'à titre subsidiaire, la question de sa validité doit être nécessairement examinée en premier lieu ; qu'en effet, la nullité entraînant l'annulation renversante du contrat, il n'est pas possible d'examiner si les conditions suspensives contenues dans l'acte se sont réalisées alors que les époux X... prétendent par ailleurs que le contrat est nul et n'a donc jamais existé ;

Qu'en statuant ainsi, la cour d'appel qui a modifié l'objet du litige, a violé le texte susvisé ;

MOTIFS ENCORE QUE : la nullité étant renversante, le texte susvisé qui a ruiné l'ensemble des dispositions de l'arrêt ordonne à la SCI de vendre en justice la matière, et non de la nullifier au profit de celui qui a dû se voir refuser ce miroir, ou la suite de l'arrêt cassé.

MOYENS ANNEXES au présent arrêt

Moyens identiques n°s H 10-15-000 et H 10-14-351 produits par Me Fouassier, avocat aux Conseils, pour la société Cavok 2 ;

PREMIER MOYEN DE CASSATION

L'arrêt attaqué encouvre la censure ;

EN CE QUE : après avoir confirmé par substitution des motifs le jugement déféré en ce qui a débouché la SCI CAVOK 2 de ses demandes et ordonné à la SAS BOURSE DE L'IMMOBILIER DE restituer aux époux X... la somme de 20 000 € remise à titre de garantie, il a, infirmant le jugement, prononcé la nullité du compromis de vente du 7 mars 2006 et dit que la somme de 20 000 € portera intérêts à compter du 31 octobre 2007 (condition SCI CAVOK 2 au paiement de ces intérêts et débutoyé les parties du surplus de leurs demandes) ;

AUX MOTIFS D'ABORD QUE : bien que les époux X... ne soulièvent la nullité du contrat qu'à titre subsidiaire, la question de sa validité doit être nécessairement examinée en premier lieu ; qu'en effet, la nullité entraînant l'annulation renversante du contrat, il n'est pas possible d'examiner si les conditions suspensives contenues se sont réalisées alors qu'on prétend par ailleurs que le contrat est nul et n'a donc jamais existé ;

AUX MOTIFS ENCORE QUE : la nullité étant prononcée, la somme de 20 000 € devra être restituée avec intérêts au taux légal à compter du 31 octobre 2007 ;

ALORS QUE : prématurément, en vu du principe dispositif que rappelle l'article 4 du Code de procédure civile, les parties ont entière malice de leur demande ; que dans l'hypothèse où une partie formule deux demandes en indiquant que l'une est formée à titre principal et doit être examinée prioritairement cependant que l'autre est formée à titre subsidiaire pour le cas où la demande...
3 - Identification du ou des points de droit faisant difficulté à juger

I Responsabilité du notaire.
II Responsabilité du banquier et partage de responsabilité entre préteur et emprunteurs.
III Recevabilité des pièces qui ne sont pas communiquées simultanément aux conclusions (moyen préalable puisque la réponse conditionne l'examen des moyens relatifs à la responsabilité de l'organisme prêteur).

Extrait du rapport du conseiller

Attendu que la société Norfi fait grief à l'arrêt de la condamner à payer une certaine somme à M. et Mme Z..., alors, selon le moyen, que l'obligation faite à l'auteur des conclusions de communiquer ses pièces, simultanément au dépôt et à la notification de ses conclusions, est sanctionnée par l'obligation pour le juge, dès lors que la partie adverse le demande, d'écartar des débats les pièces non communiquées en même temps que les conclusions, qu'en refusant de faire droit à la demande de la société Norfi visant à faire écartier les pièces qui n'étaient pas été communiquées en même temps que les conclusions, ou motif que la preuve d'une atteinte aux droits de la défense n'a pas été rapportée, quand la sanction est automatique et qu'elle devait être appliquée avant que les juges du fond puissent examiner les demandes de M. et Mme Z... à l'encontre de la société Norfi, les juges du fond ont violé l’article 906 du code de procédure civile ;

Mais attendu qu'ayant relevé que la société intimée, à qui les appelsants avaient communiqué leurs pièces quelques jours après la notification des conclusions au soutien desquelles elles étaient produites et qui avait conclu à trois reprises et pour la dernière fois en décembre 2011, avait été en mesure, avant la clôture de l'instruction le 2 octobre 2012, de répondre à ces pièces et, souverainement retenu que les pièces avaient été communiquées en temps utile, la cour d'appel en a exactement déduit qu'il n'y avait pas lieu de les écarter ;

D'où il suit que le moyen n'est pas fondé ;

Mais sur le premier moyen du pourvoi principal :

Vu l'article 1382 du code civil ;

Attendu que pour débouter M. et Mme Z..., de leur demande indemnitatoire à l'encontre de la SCP Jean-Michel CI..., notaire, l'arrêt rejetait qu'à l'acte de vente en l'état futur d'achèvement conclu entre la SCI et M. et Mme Z..., reçu par la SCP Jean-Michel CI..., le 5 octobre 2007, le vendeur, qui a indiqué qu'une déclaration d'ouverture du chantier avait été faite par lui le 1er juin 2007, disposait d'un délai de quatre mois et demi et que ce délai était suffisant pour commencer la construction de manière significative afin d'éviter la péremption, le notaire n'avait pas à procéder à d'autres vérifications ou à exiger la justificatiation d'une demande de prorogation du permis de construire qui n'était pas nécessaire en cas de commencement des travaux ;

Qu'en statuant ainsi, alors que ni la formalité d'une déclaration d'ouverture de chantier ni l'existence d'une garantie d'achèvement ne dispensaient le notaire, tenu d'assurer l'eficacité de l'acte de vente en l'état futur d'achèvement qu'il dressait le 5 octobre 2007, de vérifier le commencement effectif des travaux, seule circonstance de nature à prolonger le délai de validité du permis de construire délivré le 12 octobre 2005, en l'absence de demande de prorogation, et d'informer les acquéreurs des risques qu'ils couraient, la cour d'appel a violé le texte susvisé ;

Et sur le deuxième moyen du pourvoi principal et le troisième moyen du pourvoi incident, réunis :

Vu l'article 1147 du code civil ;

Attendu que pour limiter la condamnation prononcée contre la société Norfi au profit de M. et Mme Z..., après partage de responsabilité, l'arrêt retient qu'il y a lieu de tenir compte de la propre négligence des acquéreurs qui n'ont pas respecté les clauses de l'acte ;
Alors que 1°) l’un des voisins ne peut, sans le consentement de l’autre, pratiquer dans le mur mitoyen aucune fenêtre ou ouverture en quelque manière que ce soit, même à verre dormant ; que tout jour de souffrance constitue une ouverture ; que la cour d’appel qui a admis que les châssis installés par M. et Mme J. constituaient des ouvertures mais qui a retenu qu’ils ne créaient pas de vue, n’a pas tiré les conséquences légales de ses constatations, violant l’article 675 du code civil ;

Alors que 2°) le juge doit donner ou restituer leur exacte qualification aux faits et actes litigieux sans s’arrêter à la dénomination que les parties en auraient proposée ; qu’en ayant refusé de requalifier en demande de suppression d’ouverture la demande de suppression de vue fondée par M. L. sur l’article 675 du code civil, la cour d’appel a violé l’article 12 du code de procédure civile.

Décision

Sur le moyen unique du pourvoi principal :

Vu l'article 675 du code civil ;

Attendu que l'un des voisins ne peut, sans le consentement de l'autre, pratiquer dans le mur mitoyen aucune fenêtre ou ouverture, en quelque manière que ce soit, même à verre dormant ;

Attendu, selon l'arrêt attaqué (Riom, 11 mars 2013), que M. et Mme C. ont fait édifier à la bordure de leur fonds et de celui de leur voisin, M. R., un mur dans lequel ils ont intégré un dispositif d'ouverture consistant en deux châssis basculants et comportant une ventilation ; que M. R., se fondant sur le caractère mitoyen de ce mur les a assignés en suppression de ce dispositif ;

Attendu que pour rejeter cette demande, l'arrêt retient que le mur est mitoyen mais que l'installation de M. et Mme C. garantit une discrétion suffisante ;

Qu’en statuant ainsi, tout en constatant que l’installation constituée de châssis basculants réalisait une ouverture prohibée par l’article 675 du code civil, la cour d’appel a violé ce texte ;
"ALORS QU'engage sa responsabilité le séquestre conventionnel qui se dessaisit des fonds séquestrés sans s'assurer que la contestation ayant motivé la mesure de séquestre est terminée ; qu'aux termes du contrat de prêt conclu entre la société BNP PARIBAS et Madame P., « l'objet du présent crédit est destiné à constituer un compte séquestre d'un montant de 795.000 F (…). La mise en place de ce crédit ne pourra être effective qu'après ouverture d’un compte séquestre » ; qu'il résultait des termes clairs et précis de ce contrat que Madame P. avait conventionnellement constitué séquestre des fonds lui appartenant entre les mains de la société BNP PARIBAS, à raison du litige qui l'opposait au fisc quant au montant de sa dette fiscale, litige dont la Cour d'appel a constaté l'existence, en sorte que la société BNP PARIBAS ne pouvait dès lors se dessaisir desdits fonds sans s'assurer au préalable que la contestation de la dette fiscale avait trouvé son terme ; qu'en écartant la responsabilité in solidum de la société BNP PARIBAS résultant de la remise par la première au second des fonds appartenant à Madame P. aux motifs que c'est à tort que les parties au contrat de prêt avaient employé le terme de séquestre, la Cour d'appel a dénaturé les termes de ce contrat et violé en conséquence l'article 1134 du Code civil."
AI for “Attribution Task”

Dataset: 132, 237 Memoires, divided into 64% training, 16% validation and 20% test.
Word Embeddings - W2V

- Transform text into vectors of representation
- They are learnt automatically to preserve their “semantic properties”
- Two words with the same “meaning” should have similar representations
- Consequence: Better performance
- Models used: word2vec CBOW
- Used 6.8 GB (5.3 Cour de cassation and 1.3GB Dalloz)
Results of the Attribution task: from 1 to 3 months to 8 sec.

<table>
<thead>
<tr>
<th>Model</th>
<th>Validation Accuracy</th>
<th>Test Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>RandomEmb+BiLSTM</td>
<td>77.5%</td>
<td>77%</td>
</tr>
<tr>
<td>LegalEmb+BiLSTM</td>
<td>81.2%</td>
<td>80.75%</td>
</tr>
<tr>
<td>DAP+BiLSTM</td>
<td>80.3%</td>
<td>80.3%</td>
</tr>
<tr>
<td>CamemBERT</td>
<td>83.4%</td>
<td><strong>83.26%</strong></td>
</tr>
<tr>
<td>FlauBERT</td>
<td>83.7%</td>
<td><strong>83.3%</strong></td>
</tr>
</tbody>
</table>
2. How can law help AI?
Regulation as a safeguard: Trustworthy

Data Acquisition  Data Quality  Model improvement  Life-cycle management
(a) Data
Geopolitics of Digital Technologies: Extraterritorial Laws on Data

EU General Data Protection Regulation (Art. 3)

1. This Regulation applies to the processing of personal data in the context of the activities of an establishment of a controller or a processor in the Union, regardless of whether the processing takes place in the Union or not.

2. This Regulation applies to the processing of personal data of data subjects who are in the Union by a controller or processor not established in the Union, where the processing activities are related to:
   a) the offering of goods or services, irrespective of whether a payment of the data subject is required, to such data subjects in the Union; or b) the monitoring of their behaviour as far as their behaviour takes place within the Union.

Claryfying Lawful Overseas Use of Data Act (CLOUD Act) - H.R. 4943 - 2018

“A provider of electronic communication service or remote computing service shall comply with the obligations of this chapter to preserve, backup, or disclose the contents of a wire or electronic communication and any record or other information pertaining to a customer or subscriber within such provider’s possession, custody, or control, regardless of whether such communication, record, or other information is located within or outside of the United States.”
Geopolitics of Digital Technologies : Extraterritorial Laws on Data

• Personal Information Protection Law of the People’s Republic of China (August 2021, in force Nov. 2021) – Article 3

“This Law applies to the activities of handling the personal information of natural persons within the borders of the People’s Republic of China.” (…)

Where one of the following circumstances is present in handling activities outside the borders of the People’s Republic of China of personal information of natural persons within the borders of the People’s Republic of China, this Law applies as well:

1. Where the purpose is to provide products or services to natural persons inside the borders;
2. Where analyzing or assessing activities of natural persons inside the borders;
3. Other circumstances provided in laws or administrative regulations.”
The Act defines “interstate commerce” as “trade, commerce, transportation, or communication among the several States, or between any foreign country and any State or between any State and any place or ship outside thereof ....”. The term also includes the intrastate use of any interstate means of communication, or any other interstate instrumentality. **Thus, placing a telephone call or sending an e-mail, text message, or fax from, to, or through the United States involves interstate commerce—as does sending a wire transfer from or to a U.S. bank or otherwise using the U.S. banking system, or traveling across state borders or internationally to or from the United States.**
GLOBAL DATA PROTECTION AND PRIVACY REGULATION

Canada: Digital Privacy Act reforming PIPEDA (Personal Information and Protection and Electronic Documents Act)

California: CCPA (California Consumer Privacy Act)

Brazil: LGPD (General Data Protection Law)

EU: ePrivacy Regulation and GDPR

South Africa: POPIA (Protection of Personal Information Act)

Thailand: PDPA (Personal Data Protection Act)

China: PIS Standard (Personal Information Security Specification)

India: PDPB (Personal Data Protection Bill)

New Zealand: Privacy Bill 34-2

Australia: Privacy Act and Amendments

Source: Based on February data from © 2020 DLA Piper, dlapiperdataprotection.com
Tsunami of European regulations on data and data processing (including Artificial Intelligence)

- Regulation (EU) 2016/679 on the **protection of natural persons** with regard to the processing of personal data and on the **free movement of such data** (GDPR)
- Regulation (EU) 2017/745 on medical devices
- Regulation (EU) 2017/746 on in vitro diagnostic medical devices
- Regulation (EU) 2018/1807 on a framework for the **free flow of non-personal data** in the European Union
- Directive (EU) 2019/1024 on open data and the re-use of public sector information
- Regulation (EU) 2022/868 on European data governance (Data Governance Act / DGA)
- Regulation on harmonised rules on fair access to and use of data (Data Act)
- Regulation laying down harmonised rules on artificial intelligence (Artificial Intelligence Act)
- Regulation on the European Health Data Space
Interplay of the horizontal framework and the sectoral European data spaces

- Mechanisms for enhanced use of certain public sector data
- Certification/labelling framework for data intermediaries
- Measures facilitating data altruism
- Coordination of horizontal aspects of governance (European Data innovation Board)

Building blocks for individual data spaces to establish faster:
- Easy access & secure data processing environments
- Trusted data intermediaries
- Safety for data shared on altruistic grounds
- Coordination of national practices, stakeholder & MS representation, guidance on prioritisation of standards

Governance of the individual data spaces defined by the stakeholders:
- Health
- Industrial & Manufacturing
- Agriculture
- Finance
- Mobility
- Green Deal
- Energy
- Public Administration
- Skills

Voluntary adoption of standards
Room for sector-specific rules

Common European data spaces
(b) Data Processing / Algorithms
AI Act (as of Nov. 11, 2022)
Risk-based approach
Unacceptable Risk

• Subliminal techniques beyond a person’s consciousness

• AI system that exploits any of the vulnerabilities of a specific group of persons due to their age, disability or a specific social or economic situation

• AI systems for social scoring leading to detrimental or unfavourable treatment (i) in social contexts which are unrelated to the contexts in which the data was originally generated or collected / or that is unjustified or disproportionate;

• use of ‘real-time’ remote biometric identification systems in publicly accessible spaces by law enforcement authorities (with exception)
High-Risk AI Systems (Annex III)

Biometrics

Critical infrastructure

Education and vocational training

Employment, workers management and access to self-employment

Access to and enjoyment of essential private services and essential public services and benefits:

Law enforcement

Migration, asylum and border control management

Administration of justice and democratic processes
AI Act
("Fundamental Rights" - 60 occurrences)

- « caused harm to the health and safety or adverse impact on the fundamental rights » (Art. 7 (2) c)
- « significant risks to fundamental rights, health or safety » (Art. 7 (3) a)
- « identification and analysis of the known and foreseeable risks most likely to occur to health, safety and fundamental rights in view of the intended purpose of the high-risk AI system » (Art. 9 2 (a))
1. The Commission is empowered (...) to amend the list in Annex III by adding high-risk AI systems where both of the following conditions are fulfilled:

(a) the AI systems are intended to be used in any of the areas listed in points 1 to 8 of Annex III;

(b) the AI systems pose a risk of harm to the health and safety, or a risk of adverse impact on fundamental rights, that is, in respect of its severity and probability of occurrence, equivalent to or greater than the risk of harm or of adverse impact posed by the high-risk AI systems already referred to in Annex III.
Chapter 2 – Requirements for High-Risk AI Systems (Compliance)

• Risk management system (art. 9) : « identification and analysis of the known and foreseeable risks most likely to occur to health, safety and fundamental rights in view of the intended purpose of the high-risk AI system » (9 §2 a)

• Data and data governance (art. 10) : « Training, validation and testing data sets shall be subject to appropriate data governance and management practices (…) in particular (…) (f) examination in view of possible biases that are likely to affect health and safety of natural persons or lead to discrimination prohibited by Union law »
Chapter 2 – Requirements for High-Risk AI Systems (Compliance)

• Technical documentation (art. 11) : « It shall contain, at a minimum, the elements set out in Annex IV » (art. 11 §1)
• Record-keeping (art. 12)
• Transparency and provision of information to users (art. 13)
• Human oversight (art. 14) : « Human oversight shall aim at preventing or minimising the risks to health, safety or fundamental rights that may emerge when a high-risk AI system is used in accordance with its intended purpose or under conditions of reasonably foreseeable misuse » (art. 14 §2)
• Accuracy, robustness and cybersecurity (art. 15)
3. Detailed information about the monitoring, functioning and control of the AI system, in particular with regard to: (...) the degrees of accuracy for specific persons or groups of persons on which the system is intended to be used and the overall expected level of accuracy in relation to its intended purpose; the foreseeable unintended outcomes and sources of risks to health and safety, fundamental rights and discrimination in view of the intended purpose of the AI system; the human oversight measures needed in accordance with Article 14 (...)
6. A list of the harmonised standards applied in full or in part the references of which have been published in the Official Journal of the European Union; where no such harmonised standards have been applied, a detailed description of the solutions adopted to meet the requirements set out in Title III, Chapter 2, including a list of other relevant standards and technical specifications applied;
The European “New approach” (1985)
Harmonised Standards

A harmonised standard is a European standard developed by a recognised European Standards Organisation: CEN, CENELEC, or ETSI. It is created following a request from the European Commission to one of these organisations. Manufacturers, other economic operators, or conformity assessment bodies can use harmonised standards to demonstrate that products, services, or processes comply with relevant EU legislation.

The references of harmonised standards must be published in the Official Journal of the European Union (OJEU). The purpose of this website is to provide access to the latest lists of references of harmonised standards and other European standards published in the OJEU.
« The reports referred to in paragraphs 1 to 3 shall include evidence of how CEN and CENELEC have planned for and ensured the appropriate involvement of EU small and medium enterprises, civil society organisations, and the gathering of relevant expertise in the area of fundamental rights, as well as a description of ETSI’s contribution. »
A more general European trend
Recital 9: « This Regulation fully harmonises the rules applicable to intermediary services in the internal market with the objective of ensuring a safe, predictable and trusted online environment (...) within which fundamental rights enshrined in the Charter are effectively protected »
Art. 34 – Risk Assessment

1. Providers of very large online platforms and of very large online search engines shall **diligently identify, analyse and assess** any systemic risks in the Union stemming from the design or functioning of their service and its related systems.

This risk assessment shall be specific to their services and proportionate to the systemic risks, taking into consideration their severity and probability, and shall include the following systemic risks:
Art. 34 – Risk Assessment

1. (b) any actual or foreseeable negative effects for the exercise of fundamental rights, in particular the fundamental rights to human dignity enshrined in Article 1 of the Charter, to respect for private and family life enshrined in Article 7 of the Charter, to the protection of personal data enshrined in Article 8 of the Charter, to freedom of expression and information, including the freedom and pluralism of the media, enshrined in Article 11 of the Charter, to non-discrimination enshrined in Article 21 of the Charter, to respect for the rights of the child enshrined in Article 24 of the Charter and to a high-level of consumer protection enshrined in Article 38 of the Charter;

Art. 35 – Mitigation of Risks
Art. 44 – Standards

1. The Commission shall consult the Board, and shall support and promote the development and implementation of voluntary standards set by relevant European and international standardisation bodies, at least in respect of the following:

(j) standards for targeted measures to protect minors online.
Article 10 §2
Each digital health authority shall be entrusted with the following tasks:

(...)

h) contribute, at Union level, to the development of the European electronic health record exchange format and to the **elaboration of common specifications addressing interoperability, security, safety or fundamental right concerns** in accordance with Article 23 and of the specifications of the EU database for EHR systems and wellness applications referred to in Article 32;
A more general global trend
Rights, Opportunities, or Access

Civil rights, civil liberties, and privacy, including freedom of speech, voting, and protections from discrimination, excessive punishment, unlawful surveillance, and violations of privacy and other freedoms in both public and private sector contexts;

Equal opportunities, including equitable access to education, housing, credit, employment, and other programs; or,

Access to critical resources or services, such as healthcare, financial services, safety, social services, non-deceptive information about goods and services, and government benefits.


3 AI Risks and Trustworthiness
3.1 Valid and Reliable
3.2 Safe
3.3 Secure and Resilient
3.4 Accountable and Transparent
3.5 Explainable and Interpretable
3.6 Privacy-Enhanced
3.7 Fair – with Harmful Bias Managed

1. Framing Risk

AI risk management offers a path to minimize potential negative impacts of AI systems, such as threats to civil liberties and rights, while also providing opportunities to maximize positive impacts. Addressing, documenting, and managing AI risks and potential negative impacts effectively can lead to more trustworthy AI systems.
September 25 2021, the Ministry of Science and Technology eventually published its Ethical Norms for New Generation Artificial Intelligence based on Chinese ethical principles.

These Norms applies “to the formulation and implementation of policies, regulations, and technical standards ».

Geopolitics of AI Standardization

Are standardization agencies ready to settle values disputes?
3.2 EU-U.S. Leadership and cooperation on international technical standards and tools for trustworthy AI and risk management

The EU and United States affirm that AI technologies should be shaped by our shared democratic values and commitment to protecting and respecting human rights. Leadership in standards for AI and emerging technologies should promote safety, security, fairness, non-discrimination, interoperability, innovation, transparency, diverse markets, compatibility, and inclusiveness. Both sides are committed to supporting multi-stakeholder approaches to standards development, and recognize the importance of procedures that advance transparency, openness, fair processes, impartiality, and inclusiveness.
(e) Human Rights in Technical Standards?
AI Standardization and Fundamental Rights: The Rise of Socio‐Technical Standards

IEEE P7003™, Standard for Algorithmic Bias Considerations Working Group
IEEE Computer Society/Software & Systems Engineering Standards Committee (C/S2ESC)

Human Rights in the Era of Artificial Intelligence
Europe as International Standard Setters for Artificial Intelligence

NIST AI Workshop Series
Bias in AI Workshop
August 18, 2020
9 AM – 5 PM
DIGNITY, INCLUSION, IDENTITY, TRUST, AND AGENCY

ICS 35.020

ISO/IEC TR 24027:2021
Information technology — Artificial intelligence (AI) — Bias in AI systems and AI aided decision making

IEEE 7002-2022
IEEE Approved Draft Standard for Data Privacy Process

ISO/IEC 30146:2019
Information technology — Smart city ICT indicators
IEEE Standards Help Enable Smart City Technologies for Humanity

**Smart Grid**
- IEEE 1547™ Series DER
- IEEE 1815™ Distributed Network Protocol
- IEEE 2030™ Series Interoperability
- IEEE C37™ Series Grid Critical Infrastructure

**Intelligent Transportation**
- IEEE 1609™ Series Wireless Access Vehicle Environment
- IEEE 1901™ Series Power Line Communications (PLC)
- IEEE 802.15.4p™ WPAN Rail Communications and Control
- IEEE 1512™ Emergency Management System

**eHealth**
- IEEE 11073™ Series Medical Devices
- IEEE 1399™ RF Emission from ISM Equipment
- IEEE 602™ Healthcare Facilities
- IEEE 1363™ Series Encryption

**Energy Efficiency**
- IEEE 1801™ Low Power, Energy Aware Electronic Systems
- IEEE P1889™ Electrical Performance of Energy Saving Devices
- IEEE P1823™ Universal Power Adapter for Mobile Devices
- IEEE P1922.1™-IEEE P1929.1™ Series for Energy Efficient Systems

**Internet of Things (IoT)**
- IEEE P2415™ IoT Architecture
- IEEE 1588™ Precision Time Stamp
- IEEE 1451™ Series Sensor Networks
- IEEE P1451-99™ Harmonization of IoT Devices and Systems

**Learning Technologies**
- IEEE 1484™ Series eLearning Technologies
- IEEE 1278™ Series Distributed Interactive Simulation
- IEEE 1516™ Series Modeling and Simulation
- IEEE 1730™ Series Distributed Simulation Engineering and Execution Process

**Smart Home**
- IEEE 802.1™ LAN/MAN
- IEEE 1901™ Series PLC
- IEEE 1905.1™ Home Network for Heterogeneous Technologies
- IEEE 2030.5™ Smart Energy Profile

**eGovernance**
- IEEE P7002™ Data Privacy Process
- IEEE P7004™ Child and Student Data Governance
- IEEE P7005™ Transparent Employer Data Governance
- IEEE P7006™ Personal Data Artificial Intelligence (AI) Agent

**Cyber Security**
- IEEE P802E™ ePrivacy
- IEEE 1363™ Series Encryption
- IEEE 1402™ Physical Security
- IEEE 1686™ Intelligent Electronic Devices (IEDs)

**5G**
- IEEE P1914.1™ Fronthaul
- IEEE P1918.1™ Tactile Internet
- IEEE 802.1™ LAN/MAN
- IEEE P1915™-IEEE P1921.1™ Series Software Defined Networks

Smart City
GEOPOLITICS OF SMART CITIES

Une évolution plus probable est l’émergence de deux modèles de smart city s’appuyant chacun sur un type d’infrastructure, de réseau, de normes, mais aussi sur une conception propre de la gouvernance urbaine et des droits des résidents urbains. Ces deux écosystèmes technologiques pourraient à terme constituer deux sphères d’influence distinctes. L’absence d’interopérabilité entre les deux écosystèmes pourrait creuser un peu plus le fossé technologique entre pays, mais aussi entre villes.

A patent application authored by Huawei and the PRC government includes Uyghur-detection analytics, in the latest proof that the China tech giant uses this explicitly racist technology.
Legitimacy: Democracy vs. Stakeholderism


An EU Strategy on Standardisation
Setting global standards in support of a resilient, green and digital EU single market

The Commission encourages EU Member States to support the participation of civil society, SME experts, trade unions and consumer representatives in international standardisation activities. As standards do not only regulate the technical aspect of a product, but can have an impact on people, workers and the environment, an inclusive and multi-stakeholder approach can bring important check and balances to standards-making.
### TABLE 3. Comparison of deep learning for hate speech detection.

<table>
<thead>
<tr>
<th>Author</th>
<th>Aim of the Study</th>
<th>Futures Extraction method</th>
<th>Deep Learning Algorithm</th>
<th>Evaluation metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>[73]</td>
<td>To solve discriminatory problem</td>
<td>word embedding</td>
<td>CNN</td>
<td>std deviations = 0.84</td>
</tr>
<tr>
<td>[17]</td>
<td>To identify hate speech in Arabic Tweets</td>
<td>character n-gram and CBOW</td>
<td>CNN and RNN</td>
<td>Pr = 0.81, Rc = 0.78, A = 83, F1 = 0.79, AUC = 0.89, F1 = 93.35</td>
</tr>
<tr>
<td>[74]</td>
<td>To improve the performance</td>
<td>CBOW and Continuous Skip-gram</td>
<td>CNN, LSTM, CNN+GRU</td>
<td></td>
</tr>
<tr>
<td>[71]</td>
<td>To classify a tweet as racist, sexist or neither</td>
<td>Char n-grams, TFIDF, BoW</td>
<td>CNN and LSTM</td>
<td>Pr = 0.93, Rc = 0.93, F1 = 0.93</td>
</tr>
<tr>
<td>[43]</td>
<td>Detection and explanation of hate speech on SM</td>
<td>Deep</td>
<td>LSTM</td>
<td>A = 90.82, Pr = 83.82, Rc = 84.23</td>
</tr>
</tbody>
</table>

### TABLE 1. Comparison of related techniques for hate speech detection.

<table>
<thead>
<tr>
<th>Author</th>
<th>Classifier</th>
<th>Novelty</th>
<th>Feature Extraction</th>
<th>Evaluation Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>[52]</td>
<td>NB, RF, LG, DT, SVM, DL</td>
<td>Improvement on islamophobia detection</td>
<td>Word embedding</td>
<td>Accuracy, precision, recall and F1</td>
</tr>
<tr>
<td>[53]</td>
<td>DL</td>
<td>HS in Context</td>
<td>embedding</td>
<td>Accuracy, Recall, Precision, F1-score</td>
</tr>
<tr>
<td>[54]</td>
<td>Ensemble method</td>
<td>Multi-tier meta-learning model</td>
<td>character n-gram and word n-gram</td>
<td>Precision, Recall and F1-score</td>
</tr>
<tr>
<td>[45]</td>
<td>GRU</td>
<td>A new study on the Amharic language</td>
<td>Word2Vec</td>
<td>Accuracy, ROC, AUC</td>
</tr>
<tr>
<td>[55]</td>
<td>SVM, NB, DT, RF</td>
<td>To detect Arabic context-based HS</td>
<td>BoW and TF-IDF</td>
<td>Accuracy, precision, recall, G-mean</td>
</tr>
<tr>
<td>[56]</td>
<td>NB, LR, SVM, KNN, DT, RF</td>
<td>Addresses Code-switch</td>
<td>TF-IDF</td>
<td>Confusion matrix</td>
</tr>
<tr>
<td>[51]</td>
<td>LR and LSTM</td>
<td>Multi-lingual aspect analysis of HS</td>
<td>BoW</td>
<td>F1-score</td>
</tr>
<tr>
<td>[52]</td>
<td>RF</td>
<td>Improved RF for HS detection</td>
<td>Count vectors</td>
<td>F1-score, precision, recall</td>
</tr>
<tr>
<td>[58]</td>
<td>Lexicon, RNN</td>
<td>The building of Arabic dataset</td>
<td>N-gam, embedding</td>
<td>F1-score, precision, recall, AUROC</td>
</tr>
<tr>
<td>[59]</td>
<td>SVM, NB &amp; RF</td>
<td>Emotional Analysis</td>
<td>N-gram</td>
<td>Precision and Recall</td>
</tr>
<tr>
<td>[3]</td>
<td>RF, SVM, J48graft</td>
<td>Combination 3 different dataset which gives a wider coverage</td>
<td>Unigrams</td>
<td>Precision, Recall, F1</td>
</tr>
<tr>
<td>[60]</td>
<td>n-Gram word</td>
<td>Identifying cyber hate</td>
<td>BoW</td>
<td>Precision, Recall, F1</td>
</tr>
<tr>
<td>Fairness metrics</td>
<td>Formula</td>
<td>Bias preserving?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Group fairness, Statistical (demographic) parity</td>
<td>( P(\hat{y} = 1</td>
<td>A = a) = P(\hat{y} = 1</td>
<td>A = a') \forall a, a' )</td>
<td>X</td>
</tr>
<tr>
<td>2. Conditional statistical (demographic) parity, Conditional independence</td>
<td>( P(\hat{y} = 1</td>
<td>C = c, A = a) = P(\hat{y} = 1</td>
<td>C = c, A = a') \forall c, a, a' )</td>
<td>X</td>
</tr>
<tr>
<td>3. Predictive parity, outcome test</td>
<td>( P(\hat{y} = 1</td>
<td>y = 1, A = a) = P(\hat{y} = 1</td>
<td>y = 1, A = a') \forall a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>4. False positive error rate balance</td>
<td>( P(y = 0</td>
<td>\hat{y} = 1, A = a) = P(y = 0</td>
<td>\hat{y} = 1, A = a') \forall a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>5. False negative error rate balance, Equal opportunity</td>
<td>Or the equivalent formula ( P(y = 0</td>
<td>\hat{y} = 1, A = a) = P(y = 1</td>
<td>\hat{y} = 1, A = a') \forall a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>6. Equalized odds</td>
<td>( P(\hat{y} = 1</td>
<td>y = i, A = a) = P(\hat{y} = 1</td>
<td>y = i, A = a') \forall i \in {0,1}, a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>7. Conditional use accuracy equality</td>
<td>( P(\hat{y} = i</td>
<td>y = i, A = a) = P(\hat{y} = i</td>
<td>y = i, A = a') \forall i \in {0,1}, a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>8. Overall accuracy equality</td>
<td>( P(\hat{y} = y</td>
<td>A = a) = P(\hat{y} = y</td>
<td>A = a') \forall i \in {0,1}, a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>9. Treatment equality</td>
<td>( \frac{P(\hat{y} = 0 \land y = 1</td>
<td>A = a)}{P(\hat{y} = 1 \land 0 = 1</td>
<td>A = a)} = \frac{P(\hat{y} = 0 \land y = 1</td>
<td>A = a)}{P(\hat{y} = 1 \land 0 = 1</td>
</tr>
<tr>
<td>10. Test-fairness or calibration</td>
<td>( P(y = 1</td>
<td>\hat{y} = t, A = a) = P(y = 1</td>
<td>\hat{y} = t, A = a') \forall t \in \mathbb{R}, a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>11. Well-calibration</td>
<td>( P(y = i</td>
<td>\hat{y} = t, A = a) = P(y = i</td>
<td>\hat{y} = t, A = a') \forall i \in {0,1}, t \in \mathbb{R}, a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>12. Balance for positive class</td>
<td>( E(\hat{y}</td>
<td>y = 1, A = a) = E(\hat{y}</td>
<td>y = 1, A = a') \forall a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>13. Balance for negative class</td>
<td>( E(\hat{y}</td>
<td>y = 0, A = a) = E(\hat{y}</td>
<td>y = 0, A = a') \forall a, a' )</td>
<td>√</td>
</tr>
<tr>
<td>14. Causal discrimination (direct discrimination)</td>
<td>( \hat{y}(x_1, x_2, ..., x_n, a) = \hat{y}(x_1, x_2, ..., x_n, a') \forall a, a' )</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Fairness through unawareness</td>
<td>( \hat{y} ) if a function of x only and not protected attribute a</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Fairness through awareness</td>
<td>The distribution of randomized outcomes is k-Lipschitz with respect to a metric defined over the inputs</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Counterfactual fairness</td>
<td>( \hat{y}<em>{A=a}(x_1, x_2, ..., x_n, a) = \hat{y}</em>{A=a}(x_1, x_2, ..., x_n, a) )</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. No unresolved discrimination (causal variant of 2)</td>
<td>( \hat{y}<em>{A-a, A'=a}(x_1, x_2, ..., x_n, a) = \hat{y}</em>{A-a, A'=a'}(x_1, x_2, ..., x_n, a) )</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. No proxy discrimination</td>
<td>No simple formula</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Path based causal reasoning</td>
<td>No simple formula</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 1a – Bias preserving fairness metrics (full table)*

*Indicates that a perfect classifier satisfying \( \hat{Y} = \hat{Y} \) would always satisfy this definition if perfect predictions can be made without explicitly using the protected attribute such as race or sex.*
<table>
<thead>
<tr>
<th>Freedom of expression and information</th>
<th>Right of collective bargaining and action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-discrimination</td>
<td>Right to the integrity of the person</td>
</tr>
<tr>
<td>Human dignity</td>
<td>Right to liberty and security</td>
</tr>
<tr>
<td>Right to marry and right to founded a family</td>
<td>Protection of personal data</td>
</tr>
<tr>
<td>Prohibition of slavery and forced labour</td>
<td>Prohibition of slavery and forced labour</td>
</tr>
<tr>
<td>Freedom of thought, conscience and religion</td>
<td>Right to life</td>
</tr>
<tr>
<td>Protection of personal data</td>
<td>Respect for private and family life</td>
</tr>
</tbody>
</table>

Prohibition of torture and inhuman or degrading treatment or punishment

**Balancing / Proportionality Test ?**