Contributions to AI research in Parliaments

Prof. Monica Palmirani – University of Bologna, CIRSFID-ALMA AI – Italy

3rd July 2023

ChatGPT is now writing legislation. Is this the future?

Analysis by Cristiano Lima
with research by Aaron Schaffer

January 23, 2023 at 8:55 a.m. EST

But in what may be a first, a Massachusetts state senator has used a surging new tool to help write a bill aimed at restricting it: ChatGPT, the artificial intelligence chatbot.

Speach with ChatGPT in the Senate of Italy

Parla il senatore che si è fatto scrivere un intervento in aula da ChatGPT

La provocazione dell'esponente di Azione-IV Marco Lombardo, che rilancia: "È adesso che bisogna parlarne"

Artificial Intelligence (AI) in parliaments – preliminary analysis of the Eduskunta experiment

Fotios Fitsilis ✉ iD

Check for updates

GPT Takes the Bar Exam

December 29, 2022

Michael Bommarito II [1,2,3], Daniel Martin Katz[1,2,3,*]

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2 Bucerius Law School (Hamburg, Germany)
3 CodeX - The Stanford Center for Legal Informatics (Stanford, CA USA)

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Abstract

Nearly all jurisdictions in the United States require a professional license exam, commonly referred to as "the Bar Exam," as a precondition for law practice. To even sit for the exam, most jurisdictions require that an applicant completes at least seven years of post-secondary education, including three years at an accredited law school. In addition, most test-takers also undergo weeks to months of further, exam-specific preparation. Despite this significant investment of time and capital, approximately one in five test-takers still score under the rate required to pass the exam on their first try. In the face of a complex task that requires such depth of knowledge, what, then, should we expect of the state of the art in "AI?" In this research, we document our experimental evaluation of the performance of OpenAI's TEXT-DAVINCI-003 model, often-referred to as GPT-3.5, on the multistate multiple choice (MBE) section of the exam. While we find no benefit in fine-tuning over GPT-3.5's zero-shot performance at the scale of our training data, we do find that hyperparameter optimization and prompt engineering positively impacted GPT-3.5's zero-shot performance. For best prompt and parameters, GPT-3.5 achieves a headline correct rate of 50.3% on a complete NCBE MBE practice exam, significantly in excess of the 25% baseline guessing rate, and performs at a passing rate for both Evidence and Torts. GPT-3.5's ranking of responses is also highly-correlated with correctness; its top two and top three choices are correct 71% and 88% of the time, respectively, indicating very strong non-entailment performance. While our ability to interpret these results is limited by nascent scientific understanding of LLMs and the proprietary nature of GPT, we believe that these results strongly suggest that an LLM will pass the MBE component of the Bar Exam in the near future.

Fig 1. Summary of performance by question category for GPT-3.5 and NCBE-Reported Students

	GPT	GPT Top 2	GPT Top 3	NCBE
Evidence	63%	84%	98%	65%
Torts	62%	72%	93%	71%
Civil Procedure	52%	63%	79%	59%
Constitutional Law	49%	67%	87%	72%
Real Property	45%	72%	85%	65%
Contracts	45%	77%	86%	70%
Criminal Law & Procedure	35%	62%	86%	71%
AVERAGE	50%	71%	88%	68%

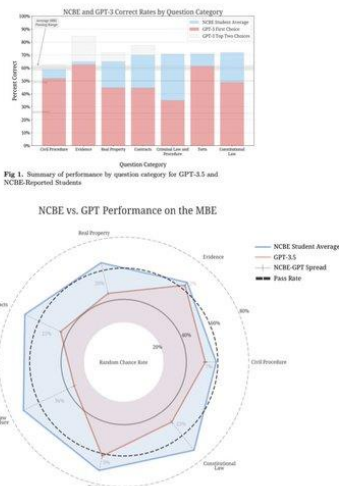Table 2. Summary of performance by question category for GPT-3.5 and NCBE-Reported Students

Fig 2. Accuracy by Question Category for GPT and Average Test-Takers

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PDF View PDF   Download full issue

Computer Law & Security Review
Volume 48, April 2023, 105772

ELSEVIER

Comment

Representing legislative Rules as Code: Reducing the problems of 'scaling up'

Andrew Mowbray [a] ✉ , Philip Chung [b] ✉ , Graham Greenleaf [c] 👤 ✉

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| Tweet | Tweet e risposte | Contenuti multimediali | Mi piace |

📌 Tweet fissato

Matthew Waddington @mattwadd · 5 feb · · ·

I finally cracked- with encouragement from 1 of my daughters I signed up for #ChatGPT.

Asked it to draft some UK-style legislation - Act regulating bakeries, with 3 typical elements.

Plenty errors, but 1st go good & 2nd go improved- but just look at the sensible elements it added

commercial bakery without a licence from the statutory body; and enables people to appeal against a refusal of a licence, or against an unreasonable condition imposed on a licence.

The Commercial Baking Regulation Act 2023

Preamble:

WHEREAS it is desirable to regulate the commercial baking industry to ensure the protection of public health and safety and the promotion of fair competition;

BE IT ENACTED by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

Section 1: Establishment of Statutory Body

(1) There shall be established a statutory body to be known as the Commercial Baking Regulation Authority (CBRA).

(2) The CBRA shall have the power to regulate the commercial baking industry, including the licensing of commercial bakeries.

Section 2: Licensing of Commercial Bakeries

(1) No person shall operate a commercial bakery without first obtaining a licence from the CBRA.

(2) An application for a licence shall be made in the prescribed form and shall be accompanied by the prescribed fee.

(3) The CBRA may refuse to grant a licence if it is satisfied that the applicant does not meet the prescribed standards of public health and safety or if it is in the public interest to do so.

Section 3: Offence and Penalty

(1) Any person who operates a commercial bakery without a licence from the CBRA shall be guilty of an offence and shall be liable on conviction to a fine not exceeding £50,000 or to imprisonment for a term not exceeding seven years, or to both.

"licence" means a licence granted under this Act;

"prescribed" means prescribed by regulations made under this Act.

ENACTED by the authority of the Parliament of the United Kingdom.

Thanks, that is a very good start. Please can you add a provision enabling the CBRA to add conditions to a licence, and requiring it to consider whether the applicant is a fit and proper person to hold a licence. Please also change section 5 so that it is the Secretary of State who makes the Regulations, instead of the CBRA.

The Commercial Baking Regulation Act 2023

Preamble:

WHEREAS it is desirable to regulate the commercial baking industry to ensure the protection of public health and safety and the promotion of fair competition;

BE IT ENACTED by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

(1) Any person who is aggrieved by a decision of the CBRA to refuse a licence, impose unreasonable conditions [Load failed] [Regenerate response] on a licence, or revoke a licence, may appeal to the Secretary of State within 28 days of the decision being made.

(2) The Secretary of State may affirm, vary or set aside the decision of the CBRA, and make such order as he thinks fit.

Section 5: Regulations

(1) The Secretary of State shall make regulations to give effect to the provisions of this Act and to provide for the licensing and regulation of commercial bakeries.

(2) Without prejudice to the generality of subsection (1), the regulations may provide for—

(a) the form of the application for a licence;

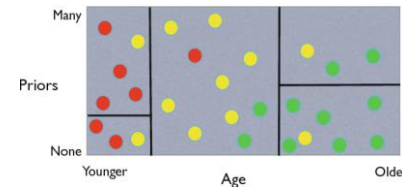(b) the fee to be paid on making an application for a licence;

eLegal evolution

Publishing — Open Data — Workflow — Legal Analytics — AI and Smart Contract

1990s   2000s   2010s   2020s   2030s

AI and Law

Logic programming – AI simbolica

Semantic Web e Knowledge representation

ML, Classification, clustering, NLP, predict

Legal data analytics

Blockchain & Smart Contract

«Rule As Code»

CRACKING THE CODE
RULEMAKING FOR HUMANS AND MACHINES

@OPSIGOV   OPSI   Observatory of Public Sector Innovation   OECD

digital.nsw
NSW GOVERNMENT

Digital Transformation   Policy   Design System   Get Involved   Blog

Rules as Code – NSW Joins the Worldwide Movement to Make Better Rules

From code to text
Several critical issues
- *Computational legalism*
- Democratic risks
- Ethical concerns

Integration of Legal Theory and ICT for a Legal Smart Legal Order

Hybrid AI Framework for Legal Analysis of the EU Legislation Corrigenda

Monica PALMIRANI[a1], Francesco SOVRANO[b], Davide LIGA[a], Salvatore SAPIENZA[a] and Fabio VITALI[b]

[a]CIRSFID-ALMA-AI, University of Bologna
[b]DISI, University of Bologna

IS LAW COMPUTABLE?
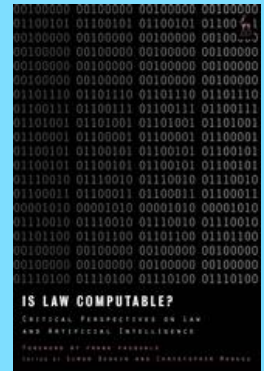
Legal Theoretical Framework
- Normativity and legitimacy in smart legal order
- Interpretation and legal theory using computational linguistics approach
- Explicability & Transparency using HCI

AI and Legislation Domain: critical analsysis

- Law is **not only rules** (e.g., principles and values).

- Norms have been adapted according to the **evolution of the society – dynamic model**

- '**artificial languages**' (e.g., programming language) is a subset of natural language (Chomsky 2006)

- Norms sometime are intentionally **vague** for implementing flexibility and interpretations (hermeneutic)

- **Prediction** based on the past should be mitigated to the new events (computational legalism)

- Predictions influence decision-makers and future human behaviour (Hildebrandt 2021)

- **Autonomy** and transparency are pillars of normativity (Günther 2021)

- The **right of disobey** as moment of creativity of new norms

Hallucination AI

Lawyer apologizes for fake court citations from ChatGPT

By Ramishah Maruf, CNN

Updated 3:28 PM EDT, Sun May 28, 2023

US judge orders lawyers to sign AI pledge, warning 'they make stuff up'

By Jacqueline Thomsen ⌄

May 31, 2023 8:56 PM GMT+2 · Updated 10 hours ago

Home / News / Technology / Artificial Intelligence / EU Commission issues internal guidelines on ChatGPT, generative AI

EU Commission issues internal guidelines on ChatGPT, generative AI

By Luca Bertuzzi | EURACTIV.com 🕐 Est. 4min   📅 31 mag 2023

Different goals of AI in Parliaments

1. **Generation** of the legislation/amendment/debates/summary– *ex-ante*

2. **Modelling**/representing/classifying/extracting the source of the law– *ex-post*

3. **Prediction** of some output– *pro-futuro*

4. **Executing**/reasoning rules– *real-time*

Different applications

Summarization of debates	Transcript	Dossier	Preamble	Amendment
Consolidation	Definitions	Smart Legislative Drafting	Semantic annotation	Classification
Clustering	Analysis of impact	Analysis of effectiveness	Policy Checking	Simplification
Similarity in comparative law	Transposition	Check compliance	Detection of the needs	Prediction of the success of bill
	Prediction of the correlation	Smart Search Engine	Conversional Query	
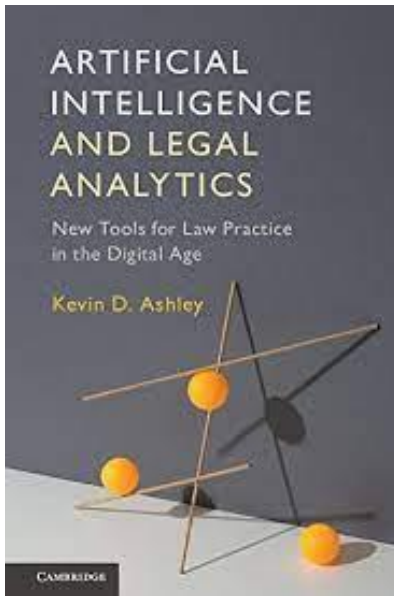
Klaus Günther

From Normative to Smart Orders?

Abstract: The increasing penetration of new digital technologies, especially artificial intelligence, into almost all areas of society's life has led to the emergence of smart orders. These are orders that are designed to minimize or eliminate deviations from their norms through intelligent design and algorithmic operations. The article explains some examples of smart orders and shows that, at least in principle, a distinction can be made between algorithmically optimized, norm addressee-oriented prevention and addressee-substituting pre-emption of deviant behavior by digital technologies. The focus of the article is then on the question of whether and, if so, in what sense smart orders are still normative orders at all. In the course of the analysis, it becomes apparent that while legal orders and other normative orders pursue the goal of effective enforcement of their norms, they do not pursue the ideal of complete non-deviance. It becomes clear that one of the essential aspects of normative orders is that they are addressed to persons who must embrace them as autonomous and, at the

HyperModeLex Research Questions

What is the Law in digital era?

Go beyond post-reductionism textualism / normativism of philosophy of law for a new theory of eLegislation

01

02

How to model interpretation?

Analyse Legal Hermeneutic in eLegislation

How to defend democracy?

03

Define Constitutional legitimacy of eLegislation and its e-enforceability

How to preserve legal language ?

Integrate Legal language role in normativism with computational linguistics models

04

05

How to keep autonomy ?

Implement *Better Regulation* with Legal Design and HCI

110100010101010100
11010111010010011
01010110010010001
100110111101010i
34ffd1001ad902ff3
01010110101010101
10011011101010100
10010110101

HyperModeLex: three sub-projects

1. Hybrid AI: Human and Machine

Pre-requirements
- Legitimacy
- Authoritativeness

Theoretical grounding
- Institutional Theory
- Interpretation Theory

Principles
- Constitutional Law principles
- Democratic powers

2. Hybrid AI: Ecosystem

Symbolic

Non-Symbolic

Sub-Symbolic

Algorithm-driven

Data-driven

Document-Drive

Semantic Web-driven

Similarity World Constitutions
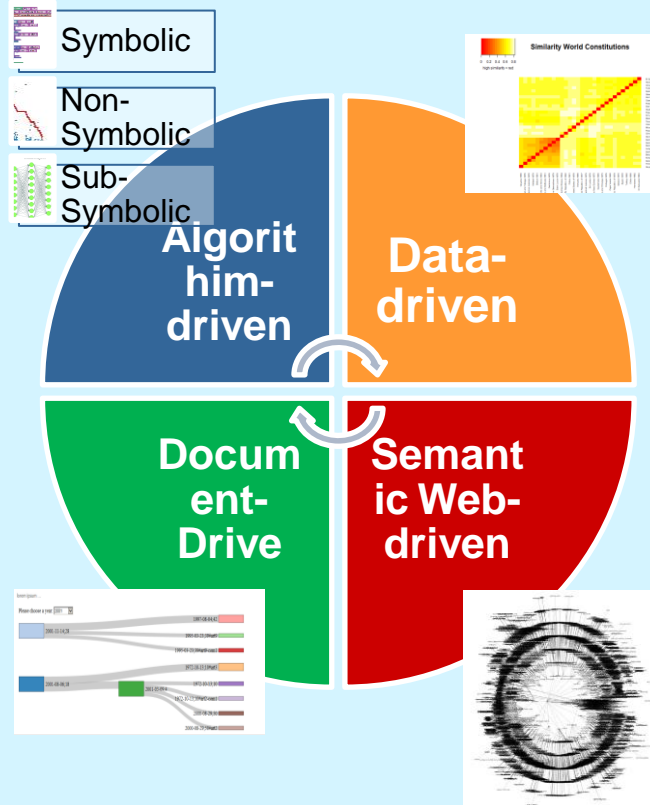
3. Hybrid AI: Explanation & Human-Computer Interaction
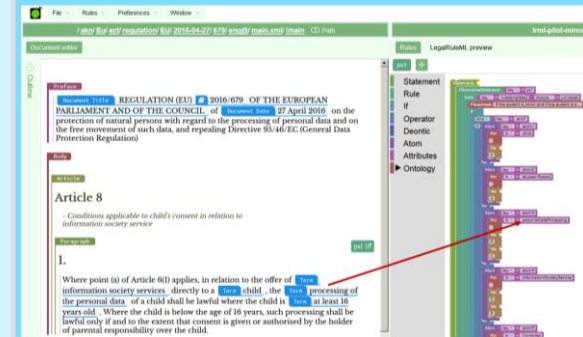
- Legal Design
- Explicability
- Autonomy
- Transparency

The European Commission's
HIGH-LEVEL EXPERT GROUP ON
ARTIFICIAL INTELLIGENCE

"White box" approach in AI

Lawyer-readable

Machine-readable

Human-readable

Human-in-the-loop
Human-on-the-loop
Human-in-Command

Next Gen Data Science Experience
We are envisioning the future of how data scientists interact with AI tools and technologies covering topics such as data science automation, machine teaching, usable programming models, and visual debugging.

Human-Agent Interaction
We are exploring and studying the design of human interactions with AI assistants to support business objectives because human interactions with AI systems will be increasingly conversational in the future.

HCI⁴AI

Experiencing AI
We are creating mindshare and awareness of AI by designing public-facing AI experiments and demonstrations allowing users to gain hands-on experience, as well as studying societal & ethical aspects of AI.

Visual AI & Explainability
We are investigating how to make decision-making in AI systems more transparent in order to increase trust and acceptance through AI model visualizations and underlying research on interpretability.

MANNING
Human-in-the-Loop Machine Learning
Active learning and annotation for human-centered AI
ROBERT (MUNRO) MONARCH
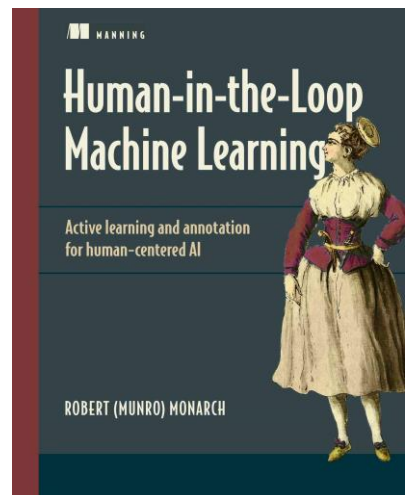
https://researcher.watson.ibm.com/researcher/view_group.php?id=9529

Framework

Visualization/ Portals/LEOS (other editors)

Services of AI (support during drafting, classification, clustering, aggregation, correlation) - LLM

Workflow management

Advanced Ontology and Rule-base system

Extraction of the Legal Knowledge using AI

ELI/ECLI

 AKOMA NTOSO – XML

AI for Legislative drafting

Study on 'Drafting legislation in the era of AI and digitisation' with EU Commission – Directorate General Informatics Unit B2 – Solutions for Legislation, Policy & HR

Legal Drafting in the Era of Artificial Intelligence and Digitisation

■ 4 use-cases
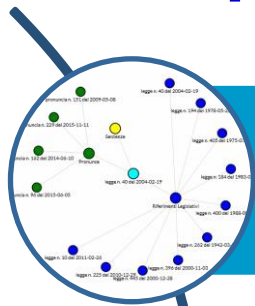
Legal Drafting supported by AI system for improving quality, effectiveness, efficacy, semantic annotation (e.g., Law as Platform)
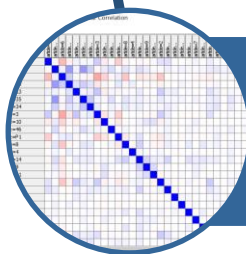
Decision support System/AI for making better the legislative process and anticipating needs of the society (e.g., same-sex marriage, end of live, etc.)
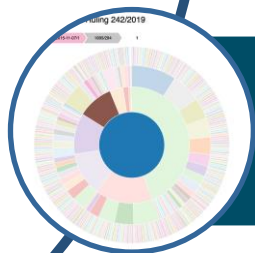
Legal System data analytics for understanding the legislative hidden knowledge (e.g., patterns, frequent errors)

DEROGATION

Anatomy of a derogation

R1$_{t1}$ derogated to R2$_{t2}$

<action>

<normDerogated>

<jurisdiction>

<temporalParameter>

<scope>

By way of derogation from paragraphs 1 and 2, in Cyprus, Croatia, Malta and Slovenia, the amount referred to in those paragraphs may be set at a value lower than EUR 500, but not less than EUR 200 or, in the case of Malta, not less than EUR 50.

Dataset

- The dataset is composed by legislative act in the span of time 2010-2020 for a total of 15.328 documents.

- Regulation, Directive, Implementation instruments

- The documents are converted in Akoma Ntoso in order to have the structure of the document and the context annotated

- We have extracted 13.587 partitions involved in the derogation using a preliminary taxonomy of "RegEx"

Manage the derogations: classification

Pie Chart

- ● derogation_pattern_1
- ● derogation_pattern_1b
- ● derogation_pattern_1c
- ● derogation_pattern_1d
- ● derogation_pattern_2
- ● derogation_pattern_3
- ● derogation_pattern_potential
- ● exception_pattern_1
- ● exception_pattern_potential
- ● notapply_pattern_1
- ● notapply_pattern_potential
- ● pattern_delegatedsActs
- ● pattern_memberState
- ● pattern_memberStateReq
- ● pattern_temporaryDer

pattern_memberState   867.00

26%

6%

10%

20%

6%

11%

14%
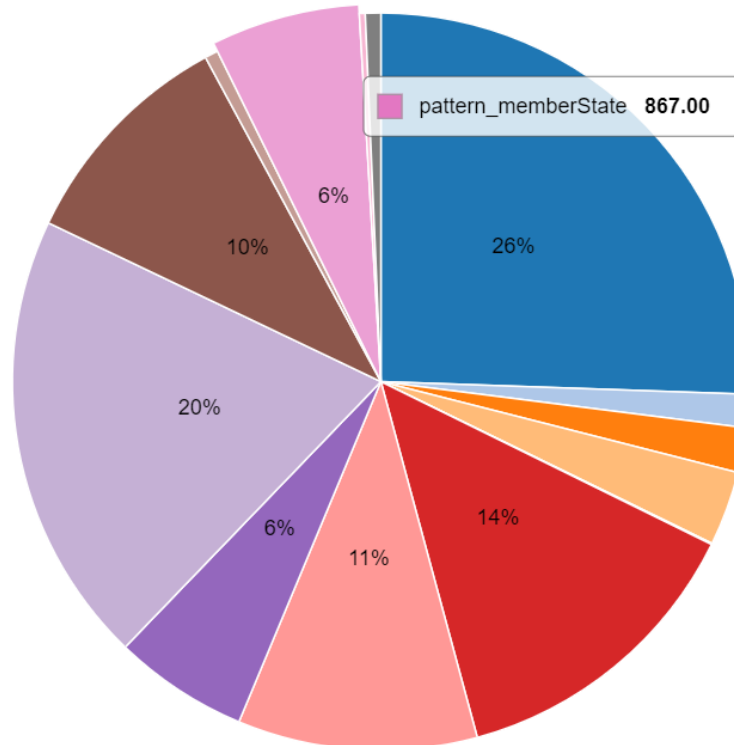
Akoma Ntoso: detection of knowledge

```xml
<alinea eId="body__art_2__al_3">
        <content eId="body__art_2__al_3__content">
          <mod eId="body__art_2__al_3__content__mod_1">
              <p>By way of derogation from the second paragraph, Member States may
                    choose not to apply the provisions of point ORO.FTL.205(e) of
                    <ref eId="ref_1" href="href="/akn/eu/act/regulation/2012-02-17/965-2012/!main/>annex_III">Annex
                    III to Regulation (EU) No 965/2012 </ref> and continue to apply the
                    existing national provisions concerning in-flight rest until<date
                        date="2017-02-17" refersTo="#derogationTime">17 February 2017</date>.</p>
              </mod>
          </content>
  </alinea>
```

Distribution of the derogations classification for thematic topic using Eurovoc

https://cirsfid.gitlab.io/derograph/
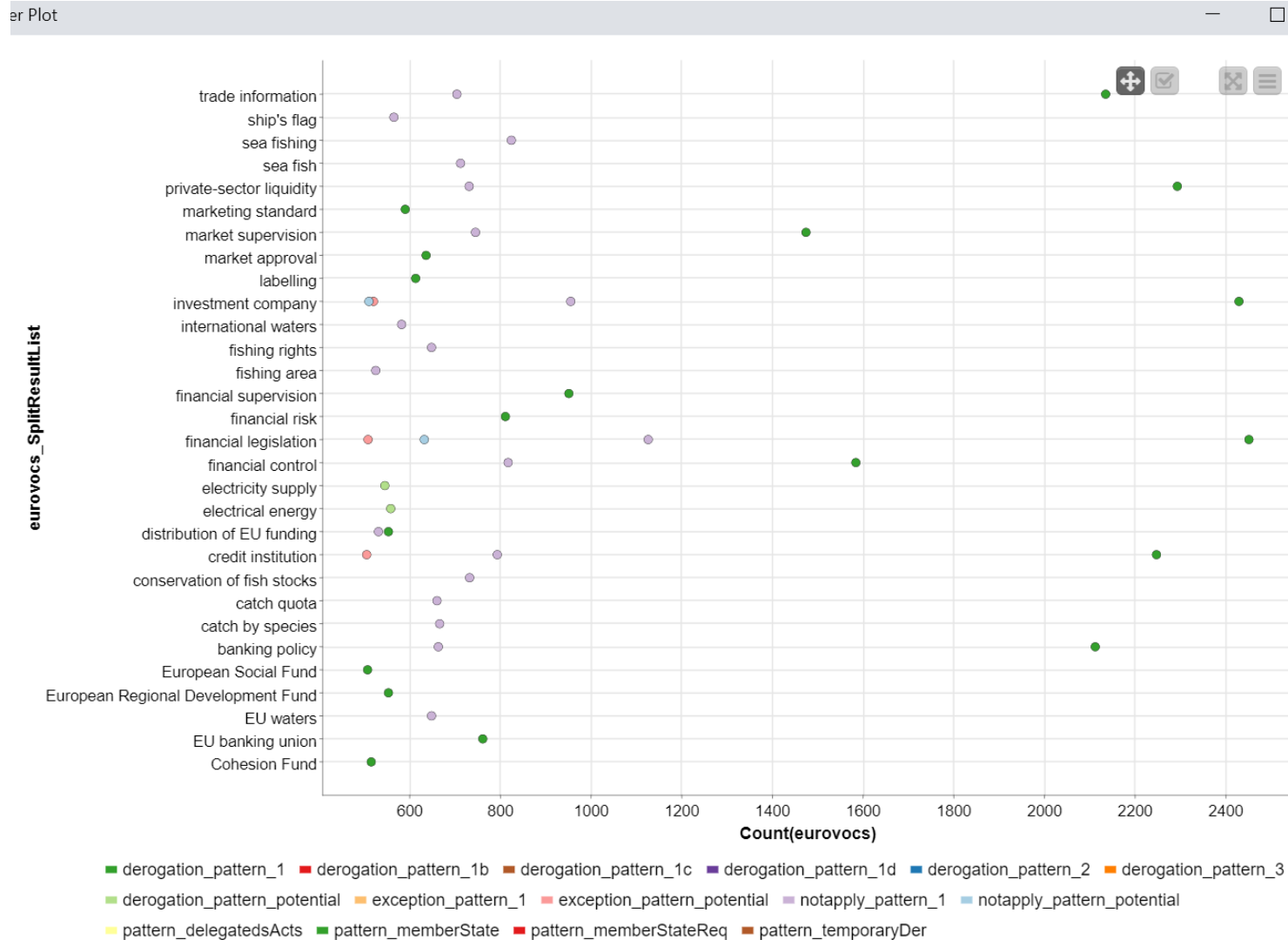
Analysis of the Derogations in EU Legislation using Network Analysis

This is a visualization map for AKN derogations of the EU legislation from 2010 to 2020
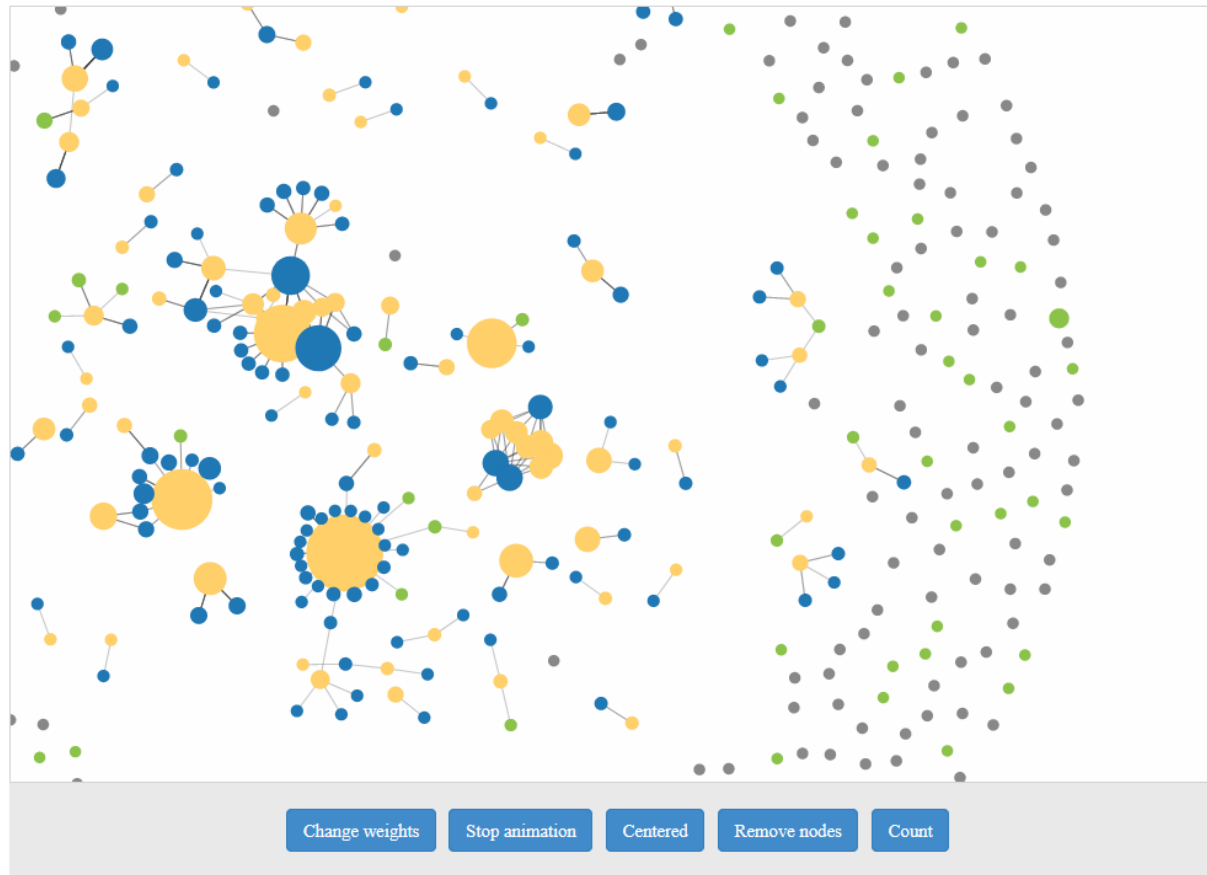
$$w = k * (\#ActiveDerogations + \#ReflexiveDerogations + \#PassiveDerogations)$$

DIGITAL READY

Positive list of word

Article 21

General requirements for the pharmacovigilance system master file

- 1. The information in the pharmacovigilance system master **file** required under Article 77(2) of Regulation (EU) 2019/6 shall be accurate and reflect the pharmacovigilance **system** in place.

- 2. The contractual arrangements between marketing authorisation holders and third parties concerning pharmacovigilance activities shall be clearly documented, detailed and up-to-date.

- 3.Marketing authorisation holders may, where appropriate, use separate pharmacovigilance systems for different categories of veterinary medicinal products. Each such system shall be described in a separate pharmacovigilance **system master file**.

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0128

electronic identification

electronic signature

electronic seal

electronic signature

web
electronic tickets
e-book
e-reader
non-cash payment

electronic payment

digital means of exchange

file

database
wifi
digital service
digital certification
digital content

Negative list of word

«Article 4
Requirements for certificates for terrestrial animals and germinal products
1. The official veterinarian shall complete certificates for consignments of terrestrial animals and germinal products in accordance with the following requirements:

(omissis)

*(c) the **certificate** must consist of one of the following:*
*(i) a single **sheet** of **paper**;*
*(ii) several sheets of **paper** where all sheets are indivisible and constitute an integrated whole;*
*(iii) a sequence of pages with each page numbered so as to indicate that it is a particular **page** in a finite sequence; »*

http://publications.europa.eu/resource/cellar/267982c7-9218-11eb-b85c-01aa75ed71a1.0006.03/DOC_1

Certified copy
Cheque
Courier
Stamp
Facsimile
Fax
Hard copy
In writing
Ink
Mail
Microfiche
Newspaper
Original copy
Paper
Pen
Pencil
Post
Print
Printout
Scan
Seal
Telex
Written
Person identification
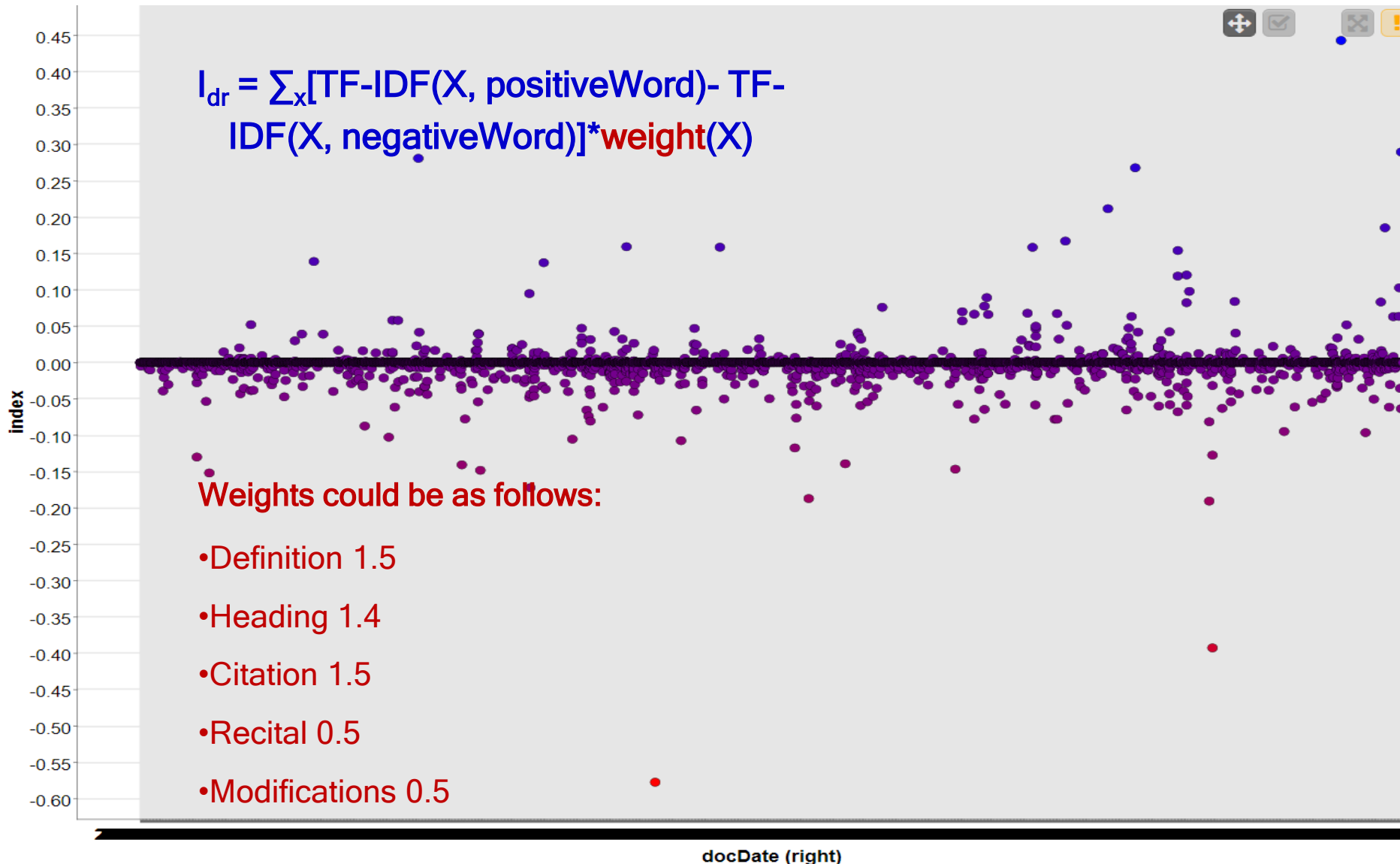Signature
Paper documentation
Paper tickets
cash payment
Digital service
Durable medium

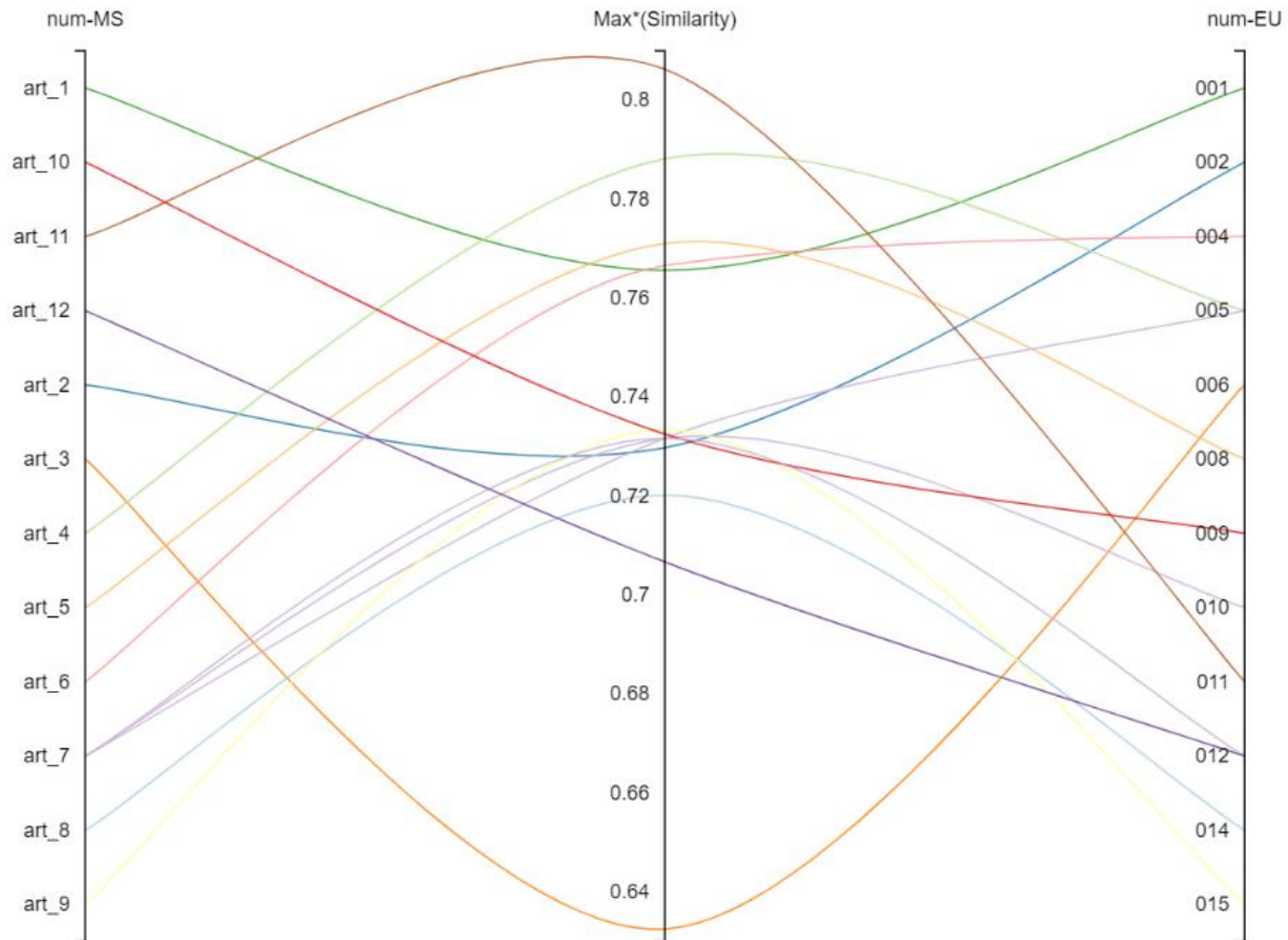# Digital-ready index in the EU legislation – TF-IDF at article level

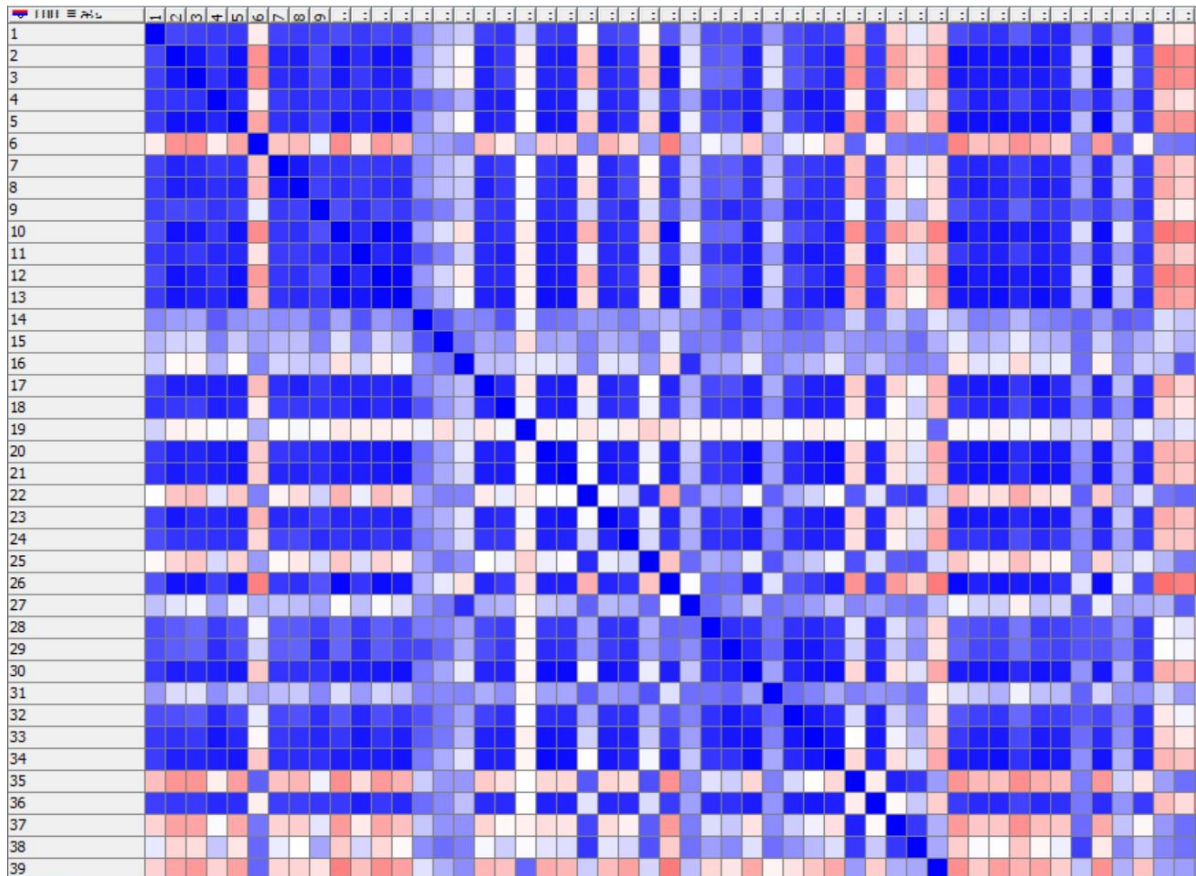$$I_{dr} = \sum_x[\text{TF-IDF}(X, \text{positiveWord}) - \text{TF-IDF}(X, \text{negativeWord})]*\text{weight}(X)$$

Weights could be as follows:

- Definition 1.5
- Heading 1.4
- Citation 1.5
- Recital 0.5
- Modifications 0.5

IMPLEMENTATION DIRECTIVE

Similarity between Italian implementation of Directive and the EU Directive

2-gram distance

Similarity index and correlation with EU directive articles

Conclusions

- Standard like AKN provides a good annotated corpora for AI application

- AI without semantic and structure is problematic (e.g., hallucination)

- Transparency, explicability and accountability are crucial for Parliaments (e.g., democratic principles)

- Legitimacy and Rule of Law should be included *by-design* in the AI projects

thank you
for your attention

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