# 3. Main findings of the study

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#### AI and Legislation Domain: critical analysis

- Law is not just made up of rules but also includes elements that can hardly be reflected in static formulas (e.g., principles and values).
- Fixing norms in a monolithic code is a form of translation of the legislative text that does not allow norms to adapt to the evolution of the society.
- To use 'artificial languages' is to use a subset of natural language (Chomsky 2006), which comes with limitations.
- Norms could be intentionally kept vague, e.g., in order to implement a balancing between different institutions.
- Any prediction based only on the past is inherently limited.
- Predictions influence decision-makers and future human behaviour (Hildebrandt 2021).

# Weakness of ML in legal domain

- Granularity vs. Structure: ML works at sentence level and this approach is not capable to link different parts of the speech semantically connected (e.g., obligation-exception, duty-penalty)
- Content vs. Context: ML looses the context (e.g., jurisdiction, temporal parameters)
- Past vs. Future: ML depends to the past data series (e.g., new brilliant solution has no historical series)
- Internal vs. External info: ML does not consider the normative and juridical citations.
- Static vs. Dynamic: The normative references evolve over time (e.g., art. 3 is not the same forever)



### Hybrid AI for Legal Domain



### "White box" approach in AI

AKOMA NTOSO



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	Human-readable

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#### Machine-readable





### 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

#### 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)

### 1. AI for legislative drafting

- Do not use *may not* for a prohibition in nonenacting terms, as it could be taken to mean a negative possibility. Use an alternative such as must not instead.'
- 'The principal amount of the instruments may not be reduced or repaid, except in either of the following cases:'
- Refusal to redeem the instruments, or the limitation of the redemption of the instruments where applicable, *may not* constitute an event of default of the institution.'

Detect the parts of legislation that do not support the digital transformation:

'5. The group of organisers shall be responsible for the collection of the statements of support from signatories in *paper form*.' Detect the parts of legislation that state derogations depending on temporal conditions:

'By way of derogation from the date of application referred to in the second paragraph of Article 61, Article 46 shall apply from 17 June 2018 insofar as necessary in order to allow a timely recognition of control authorities and control bodies.'

### **Benefits: a. Information retreival**

- Retrieve all the derogations applied to a given Member State like Cyprus concerning transportation:
- '5. The provisions relating to railways, and in particular any requirement to connect airports and ports to railways, shall not apply to Cyprus and Malta for as long as no railway system is established within their territory.'

### **Benefits: b. Legal reasoning**

Article 5 Obligation of traceability

Traders shall, throughout the supply chain, be able to identify: ...

### Article 19 Penalties

1. The Member States shall lay down the rules on penalties applicable to infringements of the provisions of this Regulation and shall take all measures necessary to ensure that they are implemented.

### **Benefits: c. Visualization**



pattern\_delegatedsActs = pattern\_memberState = pattern\_memberStateReq = pattern\_temporaryDer

### **Benefits: d. Interoperablity**

Discover that in the national transposition the legal concept 'document' is changed with the concept 'data'

Artikel 11 **Nichtdiskriminierung** (2) Werden Dokumente von öffentlichen Stellen als Ausgangsmaterial für eigene Geschäftstätigkeiten weiterverwendet, die nicht unter ihren öffentlichen Auftrag fallen, so gelten für die Bereitstellung der Dokumente für diese Tätigkeiten dieselben Gebühren und Entgelte und sonstigen Bedingungen wie für andere Nutzer.

#### § 5

**Nichtdiskriminierung** (2) Werden Daten von einer öffentlichen Stelle als Ausgangsmaterial für die eigene Geschäftstätigkeit genutzt, die nicht unter den öffentlichen Auftrag der öffentlichen Stelle fällt, so gelten für die Bereitstellung der Daten für die Geschäftstätigkeit dieselben Entgelte und sonstigen Bedingungen wie für andere Nutzer

### Client-side: integration with LEOS

LEOS

Server-side: RESTful web services

### **State of the art**



### **Integration in LEOS**



**Visualization/ Portals/LEOS** 

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

**Workflow management** 

Advanced Ontology and Rule-base system

**Extraction of the Legal Knowledge using AI** 

**ELI/ECLI** 



# 5. Demonstrating the potential of the use of advanced IT in drafting law

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





# CORRIGENDA

### **Technical issues**

*Classification of the Corrigenda*: using NLP signatures using a light-taxonomy and the metadata of Akoma Ntoso

**Clustering of the Corrigenda**: we have created clusters of the corrigenda using different neural network algorithm techniques

*Distance of the text calculation*: we have calculated the distance between the old text and the new text using the Levenshtein distance

**Data Analytics**: this step combines the results of the previous ones with AKN information to explain by user interfaces some interpretations, statistics, analyses using KNIME

### **Type of modifications**



### Levenshtein distance



### Levenshtein distance =1 means identical



### **Distribution over time**



# **Topics of the corrigenda: standard regulations**



### **Conclusions and future work**

- 1. unnecessary text is involved in each corrigendum that could produce new errors and confusion in the end-user
- the clustering operates on the basis of the type of provision involved in the modification and the type of modifications (e.g., C4 is mostly modifications at article level and with modification of the meaning)
- 3. the last decade shows an incrementation of the corrigenda due probably to the intensive number of regulations and the extension of the EU Community (multiliguism)
- 4. the statistics detected an intense period of modifications in the "standard regulations" domain
- we need to elaborate these findings in the direction of explain in better way the figures and to provide robust interpretation
- we want to measure better the results with different techniques and compare them (recall, precision, etc.)

# DEROGATION

### 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"

### Study on "Drafting legislation in the era of AI and digitisation" Manage the derogations to the Acquis



### **Anatomy of a derogation**

- <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.

# Akoma Ntoso second advanced serialization

<scopeMod type="exceptionOfScope"> <source href="body\_art\_2\_al\_3\_content\_mod\_1"/> < destination href="/akn/eu/act/regulation/2012-02-17/965-2012/!main/annex\_III"/> <force> <date date="2014-02-20"/> </force> <duration> <date date="2017-02-17" refersTo="#endDate"/> </duration> <condition/> <domain/> </scopeMod>

### Distribution of the derogations classification for thematic topic using Eurovoc



pattern\_delegatedsActs = pattern\_memberState = pattern\_memberStateReq = pattern\_temporaryDer

### **Benefits of this use case**

- Classification of the derogations in the provisions
- Extraction of legal knowledge composing the derogation (e.g., jurisdiction, times, amount, etc.)
- Connection of the derogation with the main norms and the other parameters
- Searchability
- Network Analysis

#### **AKN Derogation Maps**

This is a visualization map for AKN derogations



## **DIGITAL READY**

### **Positive list of word**

Article 21

General requirements for the pharmacovigilance system master file

- 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.

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 <u>certificate</u> must consist of one of the following:
(i) a single <u>sheet</u> 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 <u>page</u> in a finite sequence; »

http://publications.europa.eu/resource/cellar/267982c7-9218-11ebb85c-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**



### **Digital-ready index in the EU** legislation



aoc i ype (rigni)

### Relationship between the index of «digital-ready» and the normative references in the same portion



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# **IMPLEMENTATION DIRECTIVE**

# **Support the transposition and implementation of the Acquis**

- Akoma Ntoso LegalXML creates interoperability methodology
- AI +Semantic Web + AKN support the implementation of the directive in the Member States
  - Harmonize the definitions with the Acquis
  - Manage the derogations to the Acquis
  - Measure the deflections and similitudes
  - Synchronize the domestic law for the future modifications of the directives
  - Comparative law approach

### Study on "Drafting legislation in the era of AI and digitisation" Similarity between Italian implementation of Directive and the EU Directive



# **Similarity index and correlation with EU directive articles**



### thank you for your attention

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