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An introduction to Artificial Intelligence (and) Law

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MAP (?)

AI/tech as the **object** of *legal regulation*: how *positive law* regulates technology

- Data protection
- Insurance
- Health
- Labour law
- Civil liability
- Copyright law
- Smart contracts
- Criminal law
- Legal practice, justice
- etc., etc. ...

AI/tech as an **instrument** of *regulation*:
Technology regulates?

legal regulation

AI/tech «*regulates*»

- Legally relevant acts and facts
- legal practice
- the legal phenomenon

non-legal regulation

No legal effect, but still AI/tech has normative effects

illegal regulation

N.B.: it is just a map/taxonomy, do not take it too seriously

What are we going to do:

- What it is that is going on here
- How did we get here- a historical-conceptual map
 1. Conceptual roots
 2. The early days: Law and Computational Machines
 3. AI and the AI and Law Community
 4. Connectionism and Big Data
 5. Today's opportunities and challenges
- AI, technology and the *forma mentis* of the jurist

- Hope, enthusiasm and...myth
- Techno-optimism v. Techno-pessimism
- Normative optimism and anthropological pessimism
- What machines can do and what humans can do -> what machines do and what humans do

AIhype

- Data is the new oil
- The end of theory: The Data Deluge Makes the Scientific Method Obsolete
- Can AI Be a Fair Judge in Court? Estonia Thinks So
- How AI Will Affect the Practice of Law
- Can Robots be Lawyers?
- Quantitative Legal Prediction—or—How I Learned to Stop Worrying and Start Preparing for the Data-Driven Future of the Legal Services Industry
- Self-Driving Laws
- The Path of the Law: Toward Legal Singularity
- And, finally, The end of lawyers

AI Act

(3) Artificial intelligence [...] can contribute to a wide array of economic and societal benefits across the entire spectrum of industries and social activities. By improving prediction, optimising operations and resource allocation, and personalising digital solutions available for individuals and organisations, the use of artificial intelligence can provide key competitive advantages to companies and support socially and environmentally beneficial outcomes, for example in healthcare, farming, education and training, infrastructure management, energy, transport and logistics, public services, security, justice, resource and energy efficiency, and climate change mitigation and adaptation.

(Parenthesis: Robots lawyers, robo-judges...?)

What it looks like



What it is

The screenshot displays the Northpointe Suite software interface. At the top, there is a navigation bar with options like Home, Search, Operations, Reports, Scheduling, Administration, and Help. The user is identified as Donald Demore. The main content area is divided into several sections:

- Person Summary:** A table of personal information for Donald Demore, including Name, SID (389483), Status (Open), DOC # (2883892), Race / Ethnicity (Caucasian / European), Date of Birth (10/23/1969), and Gender (Male).
- Assessment and Alternative Screening Scores:** A table listing various assessments and their scores. For example, a Case Supervision Review on 05/27/2013 has a score of 'Consider Raising Current Supervision Level'.
- Case Manager Dashboard:** A table listing case information for several individuals, including Olaf Frison, LaToya Hanceal, Helena Hernandez, and Poobie Jones. Each row shows the person's name, SID, DOC #, DOB, and various assessment scores and recommendations.

Name	Assessment/Screening	Date	Score
Case Supervision Review	Case Supervision Review	05/27/2013	Consider Raising Current Supervision Level
Substance Abuse	Core All Scales 3-11: Incarcerated Language	09/09/2013	Highly Probable
Violent Recidivism Risk	Pretrial Matrix	09/16/2013	Low
General Recidivism Risk	Pre All Scales 3-11: Incarcerated Language	09/09/2013	Medium

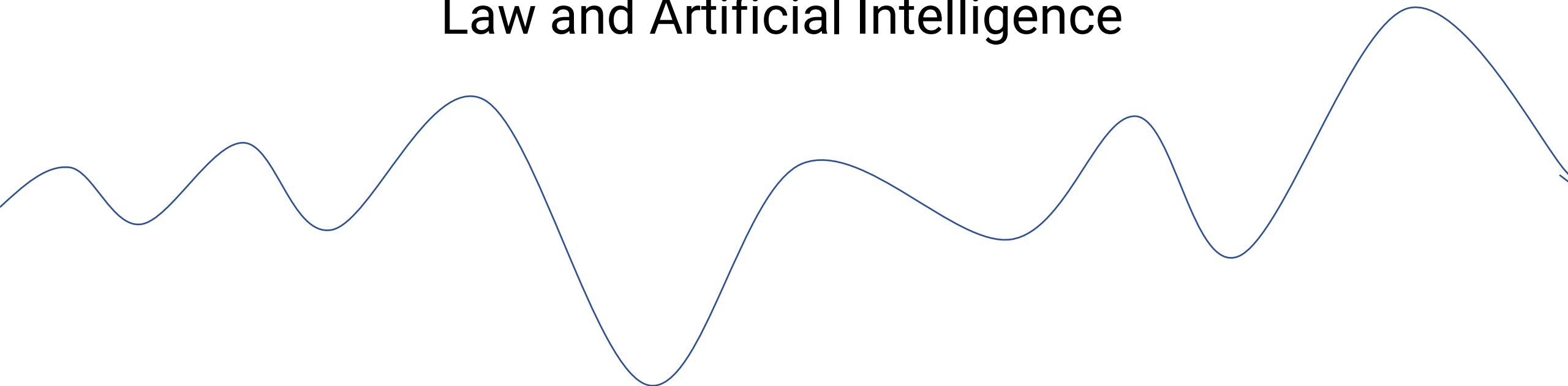
Date	Case	Person Information	Supervisor Information	Contact Dates	Case Links
09/20/2013	389483	Olaf Frison SID: 456464 DOC #: N/A DOB: 1/14/1986	Actual Supervision Recommendation: High General Risk Score: Low (4) Violent Risk Score: High (10) Status: Create a Case Plan Points: N/A Status: Case Supervision Review Points: N/A Status: Max Points: 5.5	Alternative Screening Alternative Screenings - Due: 07/17/2017 Case Plan Started Create Case Plan - Due: 01/16/2017 Supervision Contact Home Visit Every 30 Days - Due: 02/16/2017	Case Plan: 1/23/2017 Case: 456464-1 Last Assessment: 1/2/2017 Case Notes: View Print Packet: View
09/16/2013	389483	LaToya Hanceal SID: 52335219 DOC #: N/A DOB: 2/9/1990	Actual Supervision Recommendation: N/A General Risk Score: N/A Violent Risk Score: N/A		Case: 52335219-1 Case Notes: View Print Packet: View
05/05/2013	389483	Helena Hernandez SID: 87984 DOC #: N/A DOB: 1/1/1995	Actual Supervision Recommendation: N/A General Risk Score: N/A Violent Risk Score: N/A Status: Intake Points: 7.5	Case Plan Started Create Case Plan - Due: 02/23/2017 Intake Paperwork - Due: 02/23/2017 Supervision Contact Face To Face Every 30 Days - Due: 02/23/2017 Supervision Contact Home Visit Every 30 Days - Due: 02/23/2017	Case: 87984-1 Last Assessment: 1/23/2017 Case Notes: View Print Packet: View
04/29/2013	389483	Poobie Jones SID: 3448559 DOC #: N/A DOB: 8/13/1977	Actual Supervision Recommendation: N/A General Risk Score: N/A Violent Risk Score: N/A		Case Plan: 1/17/2017 Case: 3448559-2 Case Notes: View Print Packet: View

AI Spring?

As we will see later, we can intelligibly talk of an AI spring because there was (and probably there will be) an **AI autumn** and an **AI winter**

Is winter coming?

Law, Artificial Intelligence, Law and Artificial Intelligence



Cyclical trends of problems and solutions

- Law: crisis of legal information
- AI and AI and Law seasons: AI winter, spring, summer, autumn...
- As we will see, discussing the fortunes of AI and law will help shedding light on AI more in general

Techno-optimism v. techno-pessimism? No thanks!

- Debunk the hype and myths
- Identify fundamental questions and avoid to reinvent the wheel
- Try to assess what is it out there, real problems and real solutions
- Most importantly, remind ourselves that we are jurists, that, as such, we have a toolbox to frame and solve problems

How did we get here

1.

Conceptual roots: Law and computation

Recurrent Cris(es) of legal information... and the cyclical attempts to solve them

Corpus Iuris Civilis (Justinian, a.d. 529-534)

We do not allow them to recklessly propose other kinds of interpretation, or rather, of subversion of law, so to avoid that, for their confusion, their prolixity brings some discredit to our laws, as it happened also in the case of the ancient commentators of the Edictus Perpetuus who, by providing in one sense or another contradictory opinions on that work drafted with wise measure, detracted it without any limit, to the point that almost all roman legislation was confused. [...] Whoever will dare [to draft a commentary dissimilar to the dictate of our command] he will be subject to the accusation of falsity and his draft will be seized and destroyed in any way. Whether, some part may possibly appear ambiguous, the judges will refer it to the Emperor, the only who is granted the power to draft and interpret the law. (*Constitutio Tanta*, 21, my translation)

VI° century AD



- Birth of modern State: Bodin and Hobbes
- Consolidation; *droit* -> *lois*
 - Ordonnances 1660s (Louis XIV)
 - Prussian *Allgemeines Landrecht für di Preussischen Staaten* (ALR), 1794
Frederick the Great: “body of perfect laws” in which “everything would be foreseen, everything would be combined, and nothing would be subject to absurdities” -> more than 19.000 sections.

16th–18th century



The Enlightenment and the Age of Code (1.0)

- Cesare Beccaria, On Crimes and Punishments (*Dei delitti e delle pene*, 1764)
 - **Problem:** *every person has his own point of view, and at different times, every person has different ones. The spirit of the law, therefore, would be the upshoot of good or bad logic on the part of the judge and of the state of his digestion [...]*
 - **Solution:** *[w]hen a fixed code of law, which must be followed to the letter, leaves the judge no role other than that of enquiring into citizens' actions and judging whether they conform or not to the written law, [...] are not matter of debate but of fact, then the subject are not exposed to the petty tyrannies of the many individuals enforcing the law [...]*
- Codification: Code Civil (1804): dogma of completeness

18th-19th century



“It is one of the greatest anomalies of modern times that the law, which exists as a public guide to conduct, has become such a recondite mystery that it is incomprehensible to the public and scarcely intelligible to its own votaries. The rules which are supposed to be the guides to action of men living in society have become the secret cult of a group of priestly professionals. The mystic ritual of this cult is announced to the public, if at all, only in a bewildering jargon. Daily the law becomes more complex, citizens become more confused, and society becomes less cohesive”

Lee Loevinger, Jurimetrics. The Next Step Forward, in Minnesota Law Review, 1949, 33, 5, p. 40

- But this time there is a game changer: Loevinger calls for a new approach to law, *Jurimetrics*, based on a science and on the use of computers.
- Kelso Louis O., *Does the Law Need a Technological Revolution*, in *Rocky Mountain Law Review*, 1946, 18, 4, p. 378.
- The powerful metaphor of the computational machine, and the actual availability of computational tools, make it possible to imagine new “solutions” to the troubles of law

Let's rewind the tape

- The discourse on computation, and on law and computation, has deep roots in modern legal thinking
- The «granparents» of modern legal thinking:
 - Hobbes: macroanthropos, macromachine
 - Leibniz: *calculemus!*
- Enlightenment:
 - Beccaria: «breakfast jurisprudence» v. «perfect syllogism»
- Legal «formalism(s)»
- German Legal Science
- Langdell

Assumptions: Two forms of formalism (legal and non)

Central role played by the concept of **rule**:

- Rules – *system of norms -> code*
- Rules – *patterns of regularity -> data*

2.

**The early days: Law and Computational
Machines**

Post war period, two main research paradigms:

- Prevalently in North America, Anglo-Saxon world -> **Jurimetrics**
- Prevalently in Continental Europe -> **Juscybernetics**

Jurimetrics

- Loevinger, 1949: “[w]hy should not a machine be constructed to decide lawsuits?”.

the reason why legal machines have not been realized yet is that legal reasoning is an illogical and intuitive, if not arbitrary, process that takes place at a “*sub-verbal (and usually subconscious) level*”

Therefore, the answer is that, under the current state of law, what would lack is the very material to be “*put into the machines*” .

Machines are conceived as,

- a useful instrument to explain the laws that govern the current behaviour of legal subjects
- the tool that makes it possible to design an alternative system of behavioural regulation capable of replacing law.

Jurimetrics

1963 Baade, *Jurimetrics*

- A. electronic data storage and retrieval of legal information: the computer as a storehouse of information
- B. use of symbolic logic to represent law and legal reasoning: normalizing law
- C. predictive approach: behavioral analysis of decisions

Predictive approach: behavioral analysis of decisions

- Sydney S. Ulmer (1963): law is a field of investigation distinguished by a great quantity and availability of relevant data systematically recorded

[...] it is well known that some forms of data, when collected in sufficient quantities, will reveal certain patterns or regularities. These regularities have analytical value. Once observed, they may be projected into the future in a predictive fashion. The lawyer, like everyone else, proceeds in this fashion. [...]. It is possible that a focus on regularized patterns of data or behavior provides a safer predictive route

- Fred Kort (1957): aims at identifying and expressing in mathematical terms the set of factual elements which influence decision making.

Such empirical analysis, as Kort underlines, is totally indifferent to "what the Court said by way of reasoning".

What is the **rule** here?

What is the **rule** here?

- Wiener Frederick Bernays, 1962:
Decision Prediction by Computers: Nonsense Cubed-and Worse
- Losano, 1969:
“What is the point of talking of a measuring of the law? [...] Is it permissible to call generically ‘law’ that which is measured and quantified?”

Juscybernetics: Law as a cybernetic system

Losano, 1969

Cybernetic models, in general, should be thought with a view to their implementation through cybernetic machines. Such transition to the machine (the computer), however, presupposes a formalization of legal language: the application of formal logic to law, the analysis of legal language and the general theory of law are investigated at this third level of Juscybernetic inquiry.

Documentary paradigm: Legal Informatics

3.

AI and the AI and Law community

A new research agenda: Artificial Intelligence

- Alan Turing: «*can machines think?*» (1950)
 - Yes, if it is possible to give a *mechanical explanation of thought* (1937)
In a way, when we calculate, or think, we are machines
 - Formalize “*complete laws of behaviour*”

A new research agenda: Artificial Intelligence

John McCarthy, Marvin L. Minsky, Nathaniel Rochester, Claude E. Shannon (1955)
A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence

- **Assumptions**

“every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it”

- **Aim**

“find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves”

Haugeland: **GOFAI** - “**Good Old-Fashioned AI**” – paradigm:
intelligent human being = general-purpose symbol-manipulating device.

Dreyfus, “the black knight of AI” identified the 4 assumptions of GOFAI:

Biological

“on some level of operation - usually supposed to be that of the neurons - the brain processes information in discrete operations by way of some biological equivalent of on/off switches”

Psychological

“the mind can be viewed as a device operating on bits of information according to formal rules”

Epistemological

“all knowledge can be formalized”

Ontological

“since all information fed into digital computers must be in bits, the computer model of the mind presupposes that all relevant information about the world, everything essential to the production of intelligent behavior, must in principle be analysable as a set of situation-free determinate elements. [...] what there is, is a set of facts each logically independent of all the others”

- The first decade of AI research -> paradigm of **knowledge-engineering**: intelligent behaviour is a function of
 - the heuristics, rules of thumb, employed by an information-processing program
 - the quality and structure of the knowledge offered to such program in the form of data.
- Knowledge, experience, understanding and action can be explained, formalized and processed by framing them as a set of meaningless rules, according to the account provided by Turing.
- Attempts to formalize domain expert knowledge, common sense knowledge
- How many rules do I need to do something really trivial?

GOFAIL and the AI and Law community

Buchanan and Headrix (1970) [Some Speculation on Artificial Intelligence and Legal Reasoning](#):

The computer can be much more than a mere “*storehouse of legal information*”!

The aim becomes that of:

- developing machines capable of operating “*on the legal data base the way a lawyer does*”
- “*codifying the decision-making processes of lawyers*” to
 - design a “computational model of **legal reasoning**” and
 - build “a system that would produce **legal arguments**”

- Rissland (1990): the **goals of AI and Law research**:
 1. Reason with cases (both real and hypothetical) and analogies;
 2. Reason with rules;
 3. Combine several modes of reasoning;
 4. Handle ill-defined and open-textured concepts;
 5. Formulate arguments and explanations;
 6. Handle exceptions to and conflicts among items of knowledge, like rules;
 7. Accommodate changes in the base of legal knowledge, particularly legal concepts, and handle non-monotonicity, that is, changes in which previous truths no longer hold as more becomes known;
 8. Model common sense knowledge;
 9. Model knowledge of intent and belief;
 10. Perform some aspects of natural language understanding

McCarty ([1990](#)): the AI and Law agenda:

- **practical motivation**: building "intelligent legal information systems that can assist both lawyers and nonlawyers in their interactions with both legal and nonlegal rules";
- **theoretical motivation**: "trying to gain a better understanding of the process of legal reasoning and legal argumentation, using computational models and techniques".

- Rule and case-based systems,
 - prediction of judgements,
 - argumentation logics,
 - Information Retrieval
-
- '90s: the paradigm of **Legal Expert Systems**

- **Limitations:**

knowledge representation bottleneck, i.e., the need to code, with a top-down approach, all the rules that are required to formalize legal reasoning

In the meantime...

4.

Connectionism and Big Data

A change of paradigm

- From the work of Turing, the question of machine intelligence has been tied with the questions of learning: the goal was to develop “*a machine that can learn from experience*”, and the “*mechanism*” for achieving such goal was “*the possibility of letting the machine alter its own instructions*”. (1947)
- Mid-Eighties: the interest in machine learning started to shift from the rule-based approach (à la GOFAI) to inductive methods.
- “virtuous circle”: increasing availability of data, growth of computational power and development of learning algorithms
- Automation of tasks which required manual formalization

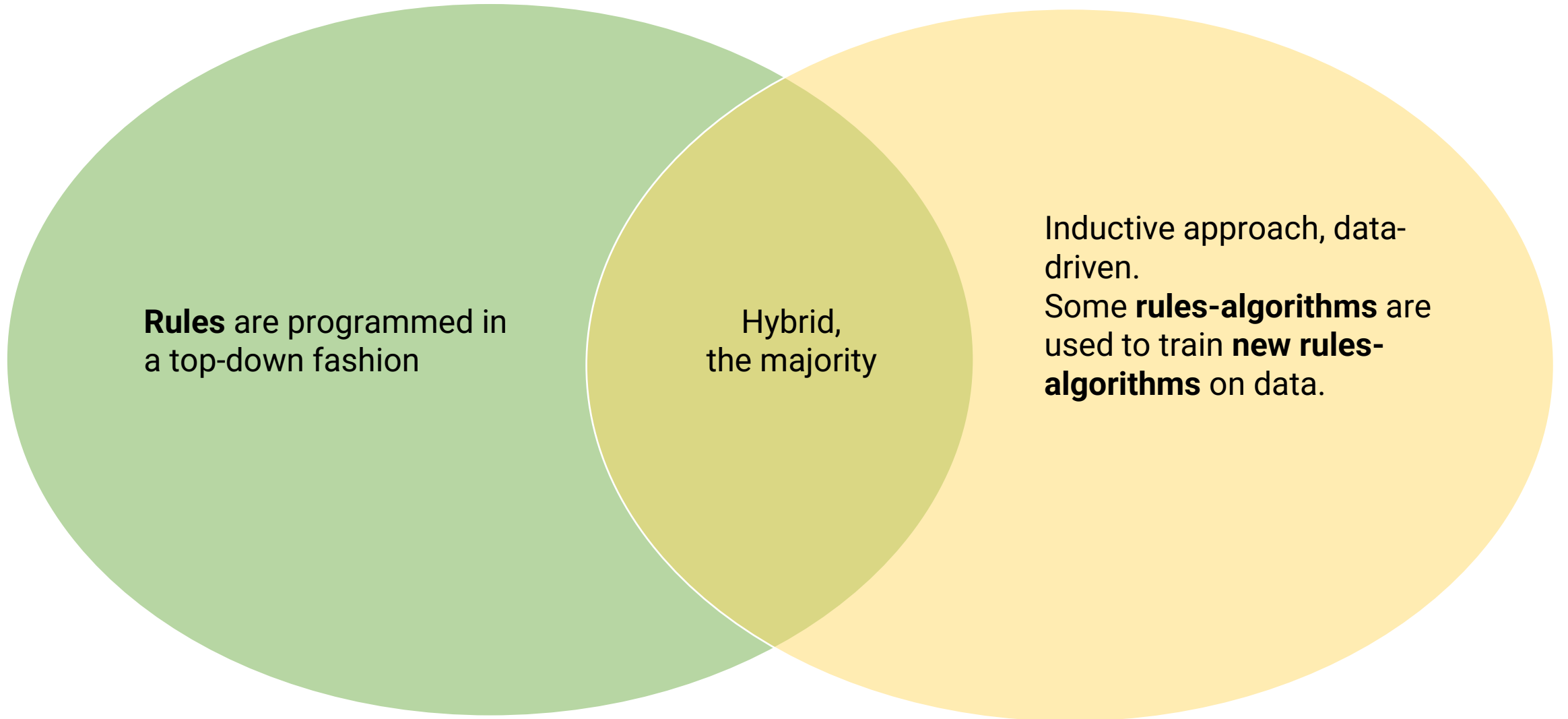
GOFAI

ML, DL

Rules are programmed in a top-down fashion

Hybrid,
the majority

Inductive approach, data-driven.
Some **rules-algorithms** are used to train **new rules-algorithms** on data.

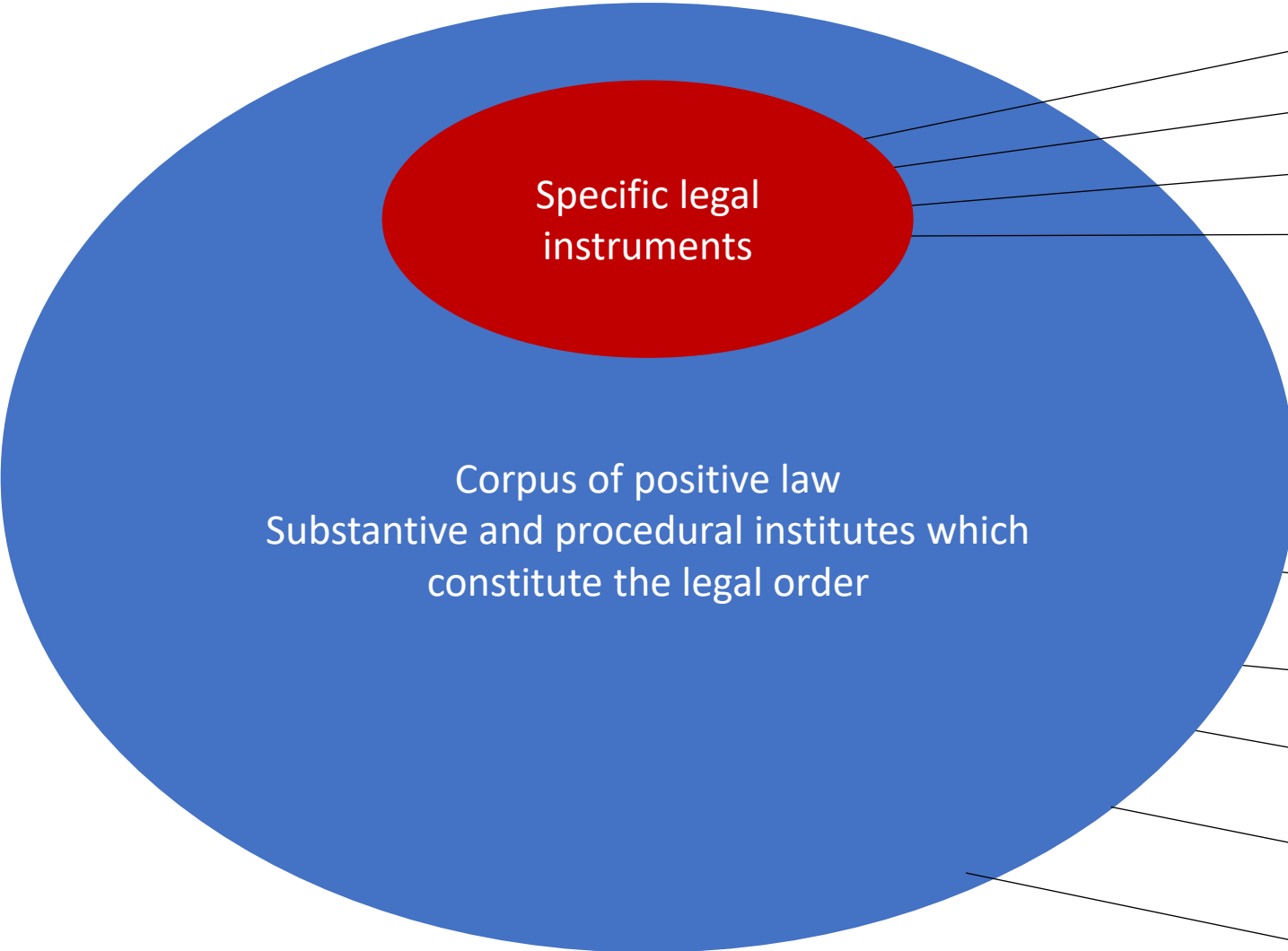


- Network analysis
- Risk assessment
- Predictive analytics
- Clustering
- Translation
- Legal Research tools
- Argumentation mining
- Compliance automation
- Drafting of legal documents

A lot of interesting tools

- JURISays : *I'm predicting judgments of the European Court of Human Rights with an overall accuracy of 69.1%. JURI reads published documents from previous years and decisions of the cases judged by the European Court of Human Rights and predicts decisions the Court will make. Every month it learns from its mistakes.*
- CLAUDETTE *"Machine Learning Powered Analysis of Consumer Contracts and Privacy Policies"*
- DoNotPay *"The DoNotPay app is the home of the world's first robot lawyer. Fight corporations, beat bureaucracy and sue anyone at the press of a button"*

- Back to Jurimetrics and its behaviourist assumptions?
- What is the rule here?
- ML/NLP approach



- GDPR
- AI Act
- CEPEJ Charter
- Etc.

- Human rights
- Prohibition of discrimination
- Right to a fair trial
- Duty to state reasons
- Principle of legality
- Etc.

Thank you!

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