

Mining and Reasoning with Legal Texts (MIREL)

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Legal texts are stored in *legal document management systems* to help legal professionals to retrieve the information they are interested in. Legal mining and legal reasoning are examples of AI techniques used to automate repetitive operations such as classifying, indexing, and discovering relations among legal texts.

Legal mining is the application of natural language processing methods to legal texts, in order to extract legal data and classify legal texts to facilitate navigation and search. Examples of tools used in legal mining are parsers, statistical algorithms and semantic knowledge bases.

Legal reasoning is the application of knowledge representation and reasoning techniques to infer new knowledge and actions from legal data, for example to support and monitor compliance assessment, or risk analysis.

To *bridge the communities studying legal mining and legal reasoning*, which previously worked mostly in isolation, the H2020 project “MIREL - Mining and Reasoning with Legal texts” focused on *semantic aspects of law*. Legal mining is often done by transforming the source legal documents into XML standards, where relevant information is tagged. The XML files are archived and queried in subsequent phases. Although these techniques provide valid solutions to help navigate legislation and retrieve information, the overall usefulness and effectiveness of the systems are limited due to their focus on terminological issues and information retrieval. The semantic aspects of law studied in the MIREL project focus on its logical structure in terms of constitutive and regulative rules, thus allowing legal reasoning.

The major *challenge to bridge mining and reasoning* in the MIREL project is *legal ambiguity* and the related handling of *multiple legal interpretations* of the provisions.

Legal interpretations are the context-specific pragmatic interpretations of the terms and sentences occurring in legal texts.

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Legal ambiguity is not a bug, but a feature of legal reasoning. Since it is impossible to predict every possible context where the provisions will be used, legislators use terms accounting for the multitude of situations that should be covered by the legislation. Legal interpretation often depends on the precedent cases, and on reflections of legal doctrine. It is eventually up to judges and other appointed authorities to decide the legal interpretation of provisions in a specific context. In borderline cases, judges may adopt distinct legal interpretations, incompatible among themselves. Moreover, in legal interpretations in disputes may reflect different interests of the legal stakeholders. Handling multiple interpretations introduces an additional layer of complexity for legal reasoning.

Legal ontologies are the main instrument to address legal interpretations, and thus to bridge mining and reasoning from legal texts. They define a set of legal concepts and categories of the domain of legal discourse.

Legal ontologies are a representation, formal naming and definition of the categories, properties and relations between the legal concepts, data and entities.

Legal ontologies help legal practitioners and scholars to keep up to date with continuous changes in the law and understand legal sub-languages outside their own areas of expertise or jurisdiction, and legislators to draft legislation with clarity and consistency. Moreover, they help identify the inter-relationship between general jurisdictions and specific related ones, e.g., between the jurisdiction of the European Union and the ones of the Member States, in order to foster harmonisation.

The increasing use of AI techniques such as mining and reasoning in legal expert systems is studied in the field of AI and law. For example, Robaldo and van der Torre [1] define the emerging field of Legal AI as follows:

Legal AI is the research area concerned with the AI-driven processing of norms occurring in legislation and related documents like jurisprudence, international standards, and doctrine in order to achieve compliance of the systems with the regulations in force.

Moreover, they define compliance as follows:

Compliance checking in computer systems is the process of ensuring that the specification requirements of such systems are in accordance with prescribed and/or agreed compliance requirements. These norms may stem from legislation and regulatory bodies (e.g., Sarbanes-Oxley, Basel II, HIPAA), standards and codes of practice (e.g., SCOR, ISO9000), and business partner contracts.

A further increase of research in legal AI may be expected in the near future. The European Union (EU) chose as one of its primary objectives to establish an integrated and standardised system of laws that applies in all member states. Legal AI has recently received a lot of investments from industry and institutions, due to the 2008 global financial crisis and the connected rise of RegTech and

FinTech. As the law gets more complex, conflicting, and ever changing, more advanced methodologies are required for analysing, representing and reasoning on legal knowledge.

References

1. Livio Robaldo and Leendert W. N. van der Torre. Introduction to legal AI. *Journal of Applied Logics*, 6(5):711–714, 2019.