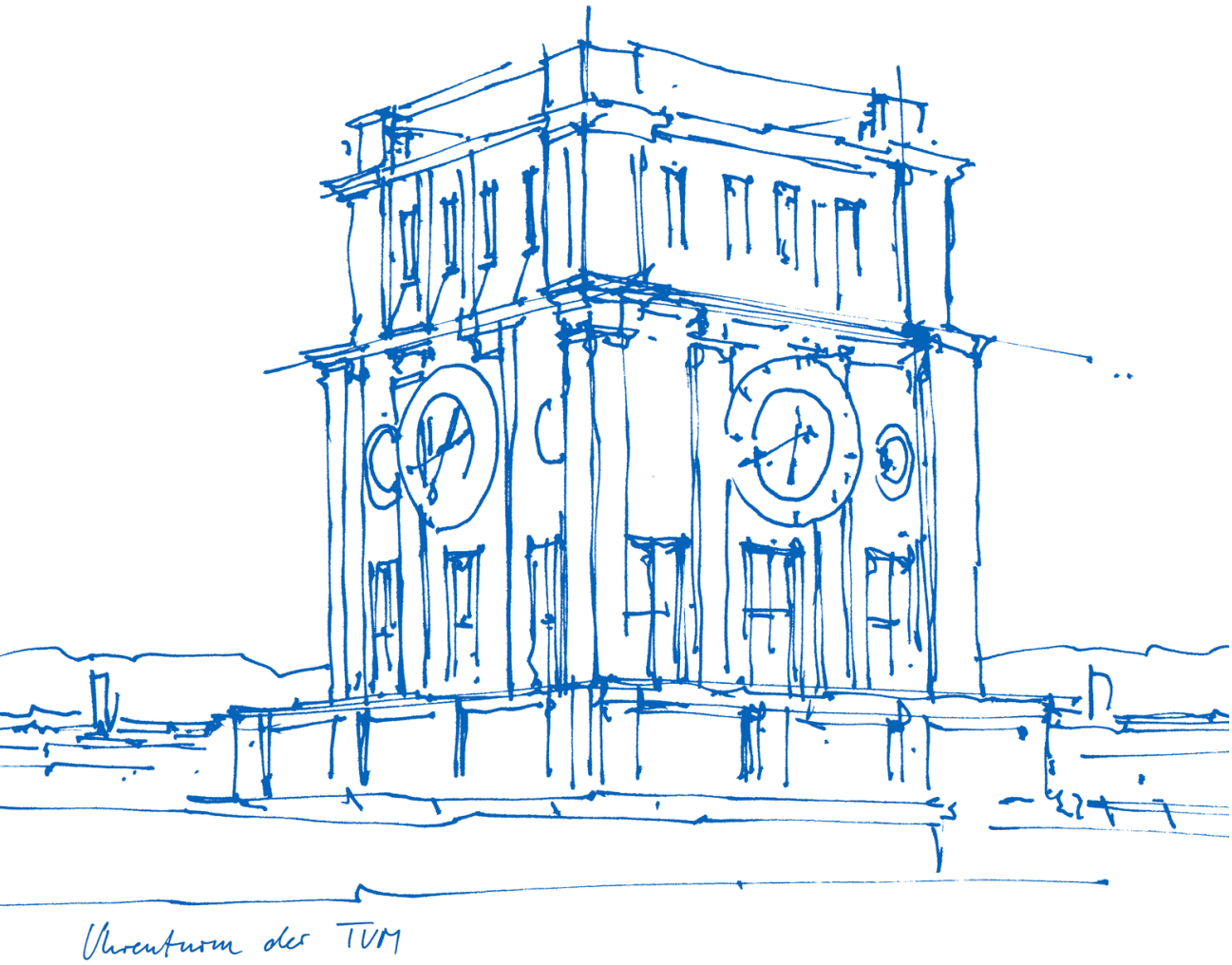

Legal AI Use Case Radar 2024 Report

Presented by:

Chair of Software Engineering for Business Information Systems
Technical University of Munich

This report is dedicated to all the legal practitioners who made this work possible. Herzlichen Dank!

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PREFACE

Recent years have brought an incredible array of advancements in the field of Artificial Intelligence (AI), bringing new opportunities to a variety of domains and promising increased efficiency and higher automation. One particular field raises an interesting point of investigation: the legal domain. In a field that typically entails large amounts of text data in the form of documents, one may imagine the benefits of AI may be attractive to legal practitioners to automate traditionally manual work.

Building on this promise, we have seen an increasing interest in the field of *Legal Tech*, which can be broadly defined as innovative technologies aimed at improving legal processes. From both the academic and practical sides, one can observe an upward swing in attention paid to Legal Tech, particularly on the development of novel technological solutions. This has resulted in a plethora of Legal Tech startups around the globe, including here in Germany.

With the recent hype in AI powered by modern Large Language Models, the question becomes how these innovative general-purpose models can be leveraged in Legal Tech. While academic literature and popular media may agree on general directions where AI *should* be integrated, little work has been done to make concrete potential use cases of Legal AI.

Our study, spanning over the past year and half, has sought to tackle this gap, namely to identify and investigate the various use cases for Legal AI. The results of our study, spanning a literature review, multiple interview rounds with legal professionals, and two surveys, are now presented in the following report. Here, you will find a catalogue of Legal AI use cases, evaluated on their legal relevance, academic riskiness, and potential riskiness. In addition, you will be provided with helpful resources stemming from academic literature. Finally, we give concise and objective experience reports (ERs) stemming from our interview findings.

We hope that this report will shed some light on the current state of Legal AI, particularly from the perspective of the use cases for which it will be put into action. This report is meant to serve in companion with our Legal AI Use Case Radar, available at legal-ai-radar.de.

Thank you for taking the time to read our report, and we welcome any feedback!

Meet the Team

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Who are we?

The team behind the Legal AI Use Case Radar consists of an interdisciplinary research team under the direction of Prof. Dr. Florian Matthes, who heads the Chair of Software Engineering for Business Information Systems (sebis) at the Technical University of Munich in Germany. Working under Prof. Matthes are Stephen Meisenbacher, Nektarios Machner, and Juraj Vladika, full-time Research Associates focusing their research in various aspects of Natural Language Processing (NLP). Together, their combined expertise in NLP and common interest in Legal Technologies have fueled the work behind the Legal AI Use Case Radar.

Acknowledgements

The authors would like to thank Martina Preis, Yanjie Li, and Benedikt Thiess for their incredibly valuable contributions to this project. Your hard work made the website and report possible!

Methodology

Motivation
Our goal is to investigate the use cases of Legal AI in a systematic way, most importantly by talking to legal practitioners in the German-speaking area.

Literature Review
The first step in our study was to conduct a systematic literature review, focusing on Natural Language Processing (NLP) technologies for the legal domain. From this review, we were able to compile a list of eight NLP technology categories, as well as extract an initial collection of 22 Legal AI use cases.

Semi-Structured Interviews (Round 1)
Following the literature review, we conducted a round of 18 semi-structured interviews with legal professionals in the German-speaking region. The goal of these interviews was to validate our initial use cases, as well as expand the list with use cases not considered in the literature. The result of the interview analysis was an extended list of 34 total Legal AI use cases.

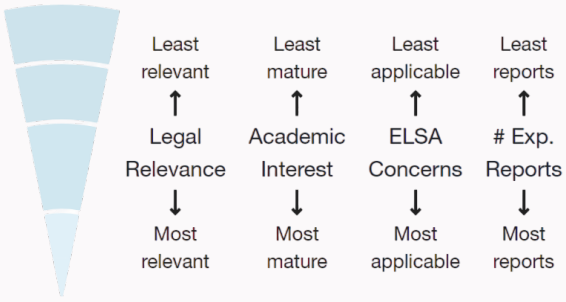
Online Survey
The next step entailed validating the identified use cases by way of an online survey. In this survey, legal professionals were asked to evaluate all use cases for their relevance and perceived riskiness (with respect to ELSA). These formed the basis for our use case evaluation metrics.

Semi-Structured Interviews (Round 2)
The final part of our study involved semi-structured interviews with Legal AI solution providers and appliers (users of Legal AI tools). These interview findings gave deeper insights into the true current usage of Legal AI, setting the foundation for the 23 Experience Reports we present in this report. Additionally, the discussions led in these interviews shed light on which identified Legal AI use cases are more prominent in the current legal sphere.

Going Forward
With this four-step methodology, we set the stage for future iterations of our study, where we plan to keep an up-to-date and objective survey of the developing Legal AI landscape by tracking existing use cases and discovering new ones!

Radar Quick Guide

Rings



Sectors

Each sector represents a use case category. Please refer to the table of contents for an overview of all categories and use cases.

Use Cases

New Moved in/out No change

Use cases and their outer rings indicate the trends over the years, although this is the first year!

Colors of the use cases represent their related NLP technologies. See the next page for the technology list.

Evaluation Metrics

Legal Relevance
Legal relevance aims to capture the perceived need of a given use case in the legal domain.

Academic Interest
Academic interest represents the current state of the reviewed literature, namely to the relative frequency of technical solutions appearing in the literature.

ELSA Concerns
Introducing Legal AI technologies may carry ethical, legal, and societal implications, and we capture the perceived riskiness of a given use case in the lens of the aspects (ELSA).

Number of Experience Reports
By talking to legal professionals in our interview study, we gained insights into the relative frequency by which use cases are being realized amongst our interviewees.

NLP Technologies

- Syntactic Analysis
- Text Extraction
- Document Analysis
- Text Representation
- Text Generation
- Conversational NLP
- Text Classification
- Other

Table of Contents

LEGAL AI USE CASES

In the following, a collection of 34 identified Legal AI Use Cases is presented, broken down into eight use case categories. Each use case is introduced with a brief description, followed by supporting literature and curated summaries of these sources. Finally, each use is scored based on our four evaluation metrics.

At the conclusion of some chapters, Experience Reports outlining key findings from our interview study are given. These reports aim to provide information of real uses of Legal AI in the industry today, presented in an objective fashion. With this, one may gain insights into real-world uses of Legal AI, as well as open challenges and concerns.

While our presented set of Legal AI use cases is not meant to be exhaustive, we strove to survey the latest and most innovative use cases, based on the currently available literature and the experiences of the legal professionals we interviewed. We hope that this list continues to grow and evolve as our study continues!

1 Use Case Category

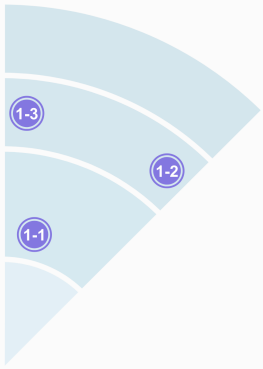
Compliance and Risk Management

Use Cases

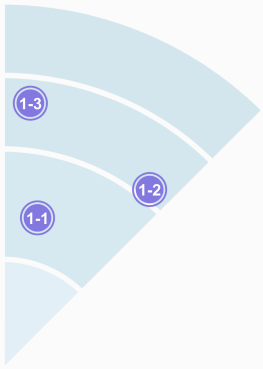
1-1 Automation of Auditing
1-2 GDPR Compliance
1-3 Risk Assessment

Compliance and risk management play a large role in today's legal sphere, especially considering important key regulations such as GDPR. In processes such as auditing or conducting risk assessments, NLP technologies can help to reduce cumbersome tasks, while still maintaining the rigor required to carry out such processes.

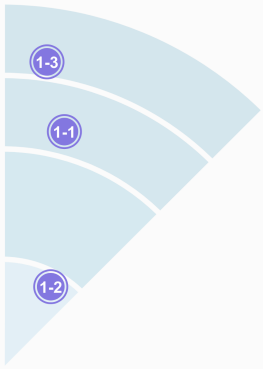
Legal Relevance



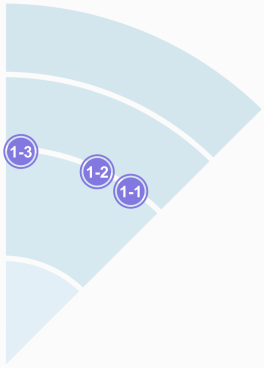
Academic Interest



ELSA Concerns



Number of Reports



1-1 Automation of Auditing

Auditing is the process by which providers of legal services undergo a review process. In this process, an auditor primarily examines the work output of a legal service, in the form of billable hours, fees, expenses, etc. The goal of such a review is to verify that the number of hours billed equals the services rendered, ensuring fair and transparent legal representation.

The automation of auditing processes could help to speed up what is normally an arduous manual process. Training models that can interpret text descriptions of notes and compare them to financial statements would help to provide an initial assessment of equivalence. Text mining, language modeling, and unsupervised and supervised methods could all be leveraged in unison to make auditing more efficient and streamlined.

Literature

- Towards Automated Auditing with Machine Learning, Sifa, Rafet, et al.

Literature TL;DR

- **Towards Automated Auditing with Machine Learning**: The architecture of the ALI recommender tool is presented which includes text mining, language modeling, unsupervised and supervised methods that range from binary classification models to deep recurrent neural networks.

Evaluation

Relevance	Interest	Concerns	# Reports
4.49	2.30	2.80	1.00

1-2 GDPR Compliance

In the modern age of big data, the processing of such data has been regulated by comprehensive and far-reaching legislation. The foremost example comes with the General Data Protection Regulation (GDPR), which mandates the use of proper technical and organizational measures to ensure data protection. The process of complying with such regulations, therefore, represents an important point for many organizations, particularly those involved in data processing.

The implementation of technical measures for data privacy compliance, however, is quite challenging, particularly in the question of which measures exactly should be taken. As a potential solution, the use of NLP technologies can help to aid the compliance process, particularly in the mapping of data processing activities to legal requirements. Furthermore, technology can be leveraged to facilitate the process of (pseudo-)anonymization, which may be strictly required in certain settings.

Literature

- A Combined Rule-Based and Machine Learning Approach for Automated GDPR Compliance Checking, Rajaa EL HAMDANI
- Frequent use cases extraction from legal texts in the data protection domain, Leone, V., Di Caro, L.

Literature TL;DR

- **A Combined Rule-Based and Machine Learning Approach for Automated GDPR Compliance Checking**: This paper conceptualizes a framework to implement a document-centric approach to compliance checking in the data supply chain, and develops specific methods to automate compliance checking of privacy policies.
- **Frequent use cases extraction from legal texts in the data protection domain**: This paper discusses a method to extract common use cases from GDPR-related legal documents using Ontology Design Patterns (ODPs) and Natural Language Processing techniques.

Evaluation

Relevance	Interest	Concerns	# Reports
4.11	4.66	2.78	1.00

Evaluation

Relevance	Interest	Concerns	# Reports
3.73	1.20	3.30	1.00

1-3 Risk Assessment

An important part of legal services is assessing the riskiness of legal representation or other related activities. Such an assessment is vital to the long-term success of a law firm or legal team, as the ability to assess the risks associated with a legal activity often may translate to the success of the business in question.

Using Legal Tech solutions can help to ensure that risk assessments are performed objectively and intelligently. By automatically analyzing historical data, identifying risk factors, and generating risk profiles, trained models can assist legal professionals in carrying out risk assessments in an informed manner, thus leading to a higher probability of an accurate risk assessment.

Literature

- Design of Contract Review System in Enterprise Legal Department Based on Natural Language Processing, L. Yaqin, C. Gang, Z. Runkai and S. Mengting

Literature TL;DR

- **Design of Contract Review System in Enterprise Legal Department Based on Natural Language Processing**: The proposed contract review system for enterprise legal department based on natural language processing technology makes intelligent draft according to the contract signing scenario and artificial intelligence and liberates the productivity of legal specialists and enables them to devote more energy to solving professional legal problems.

2 Use Case Category

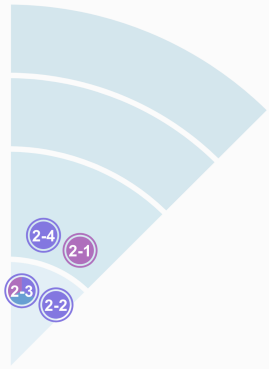
Document Analysis and Management

Use Cases

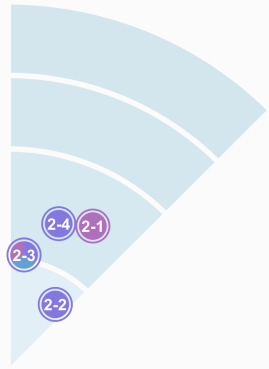
2-1 File Difference Tracking
2-2 Document Classification
2-3 Content Lifecycle Management
2-4 Error Detection

Legal professionals must handle many collections of documents in order to conduct their daily work. In addition, they must be able to analyze and understand the contents of this material. Dealing with masses of documents may be overwhelming, but leveraging Legal Tech solutions, this process may become more manageable. Use cases including file version tracking or document classification encompass this category, amongst others.

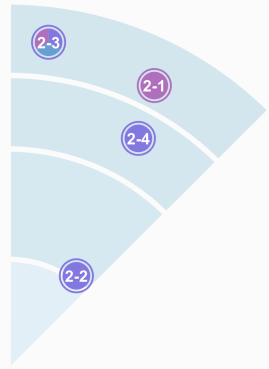
Legal Relevance



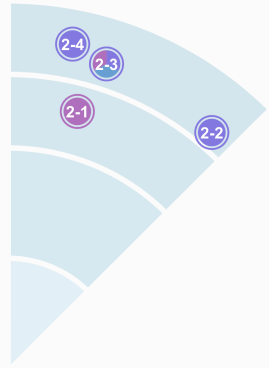
Academic Interest



ELSA Concerns



Number of Reports



2-1 File Difference Tracking

Tracking the difference between versions of the same file is a subtask of Document Management which aims to provide a versioning history and allow for attribution of changes to single employees. While this is a problem not exclusively faced by legal professionals, it is particularly important in the legal field. When editing legal documents collaboratively, overlooking changes can lead to miscommunication, void clauses in contracts or errors in the legal procedure, potentially resulting in massive problems for legal professionals and their clients.

Modern Document Management tools automate this task entirely, providing immense time savings and security increases. While Machine Learning techniques are not needed for the core task of finding differences and attributing them to their respective editors, it is now making its way into this field by automatically generating comments and explanations for made changes, further increasing the time savings for legal professionals.

Literature

- Modificatory Provisions Detection: a Hybrid NLP Approach, Davide Gianfelice, Leonardo Lesmo, Monica Palmirani, Daniele Perlo, and Daniele P. Radicioni

Literature TL;DR

- **Modificatory Provisions Detection: a Hybrid NLP Approach**: A combination between parsing and regular expressions is explored to tackle the problem at hand of detecting modificatory provisions in normative texts, and results are discussed in order to improve both system's accuracy and annotation practice.

Evaluation

Relevance	Interest	Concerns	# Reports
4.59	1.20	2.10	1.00

2-2 Document Classification

Document Classification is a common preprocessing step to categorize new, incoming documents into distinct classes (e.g., ‘Contract’, ‘State Law’, ‘Court Decision’ or ‘Statement of Claim’). With further refinement it can also classify into finer categories, like different types of contracts. This preprocessing step aims to enable easier document search and retrieval afterwards.

Automating this process and applying it at document exchange points in the workflow pipeline of legal professionals can help to save time and effort. Machine Learning can come into play here by training models on existing documents that have already been categorized by hand.

Literature

- Understanding Legal Documents: Classification of Rhetorical Role of Sentences Using Deep Learning and Natural Language Processing, S. R. Ahmad, D. Harris and I. Sahibzada
- Legal Area Classification: A Comparative Study of Text Classifiers on Singapore Supreme Court Judgments, Soh et al.
- Multi-granular Legal Topic Classification on Greek Legislation, Papaloukas et al.
- Semi-automatic Triage of Requests for Free Legal Assistance, Mistica et al.
- On What it Means to Pay Your Fair Share: Towards Automatically Mapping Different Conceptions of Tax Justice in Legal Research Literature, Gubelmann et al.
- Processing Long Legal Documents with Pre-trained Transformers: Modding LegalBERT and Longformer, Dimitris Mamakas, Petros Tsotsi, Ion Androutsopoulos, and Ilias Chalkidis

Literature TL;DR

- **Understanding Legal Documents: Classification of Rhetorical Role of Sentences Using Deep Learning and Natural Language Processing**: A deep learning model is proposed

- that breaks down legal documents and classifies the rhetorical types of sentences and will automate the processing of legal documents hence decreasing, and ultimately eliminating the backlog that currently exists throughout various legal systems.
- **Legal Area Classification: A Comparative Study of Text Classifiers on Singapore Supreme Court Judgments**: All approaches tested, including topic model, word embedding, and language model-based classifiers, performed well with as little as a few hundred judgments, but more work needs to be done to optimize state-of-the-art methods for the legal domain.
- **Multi-granular Legal Topic Classification on Greek Legislation**: It is shown that recurrent architectures with domain-specific word embeddings offer improved overall performance while being competitive even to transformer-based models, and the necessity of training monolingual transfer learning models as a rule of thumb is questioned.
- **Semi-automatic Triage of Requests for Free Legal Assistance**: This paper describes a collaboration with a major provider of free legal assistance, and the deployment of natural language processing models to assign area-of-law categories to real-world requests for legal assistance.
- **On What it Means to Pay Your Fair Share: Towards Automatically Mapping Different Conceptions of Tax Justice in Legal Research Literature**: This article proposes the first steps towards a method that automatically labels normative statements in tax law research, and that suggests the normative background of these statements.
- **Processing Long Legal Documents with Pre-trained Transformers: Modding LegalBERT and Longformer**: Two directions to cope with long legal texts are explored: modifying a Longformer warm-started from LegalBERT to handle even longer texts, and modifying LegalberT to use TF-IDF representations, which are the best in terms of performance.

Evaluation

Relevance	Interest	Concerns	# Reports
4.90	4.80	1.50	2.67

2-3 Content Lifecycle Management

Managing documents and their respective versions in between various steps of editing and auditing by numerous legal practitioners is a key task in complex cases that involve multiple parties and the exchange of all kinds of documents, drafts, and auditing comments.

Document Management tools can help lawyers to keep track of changes in individual documents and collections of documents that belong to the same legal case. They usually allow for the management of legal cases as projects, including the management of participants, documents, open tasks etc.

Evaluation

Relevance	Interest	Concerns	# Reports
4.99	1.30	1.00	2.33

2-4 Error Detection

Besides classical detection of spelling and grammar errors (language errors), Error Detection for legal documents can also involve compliance checks regarding state law and company policies. It is one of the key tasks of legal professionals and can require significant amounts of time and legal expertise.

Automating or assisting with this task can lead to performance boosts for legal practitioners and therefore cost and time savings. While this task remains challenging for computers, Machine Learning advancements have allowed for some degree of automation on highly standardized contracts, such as FIDIC construction contracts or Terms of Service of online shops.

Literature

- Hybrid AI Framework for Legal Analysis of the EU Legislation Corrigenda, Palmirani, M., Sovrano, F., Liga, D., Sapienza, S., Vitali, F.

Literature TL;DR

- **Hybrid AI Framework for Legal Analysis of the EU Legislation Corrigenda**: A pipeline of different techniques combining AI, NLP, Data Analytics, Semantic annotation and LegalXML instruments for enriching the non-symbolic AI tools with legal knowledge interpretation to offer to the legal experts.

Evaluation

Relevance	Interest	Concerns	# Reports
4.69	2.30	1.60	1.00

ER1 LLM Usage at a German Law Firm

Who is using it?

The legal tech department of a German law firm with over 350 employees is exploring the usage of AI-based solutions to support the daily legal work of the lawyers. The department consists of 6 employees and is responsible for the digital transformation and legal tech strategy.

What problem(s) are they solving?

The most important problem to solve is how to schematically process large collections of documents. Therefore, extraction of relevant information from documents is the main use case the department is using AI-based solutions for. Other related use cases are the classification of documents and being able to ask the AI questions about the contents of a document.

Which NLP technologies are they using?

The law firm has been using tools based on machine learning for multiple years and is currently looking at solutions like Legisway Analyzer (https://www.wolterskluwer.com/en-gb/solutions/legisway/legisway-analyzer) and Harvey (https://www.harvey.ai/). The output is perceived to be really good but still requires manual checking to make sure the information is not hallucinated.

Stage

Production - users are using the tool in their daily workflow

Challenges

- Most processes can not be fully automated yet and still require a human in the loop
- OCR does not always work as intended, especially for old documents that only exist on paper and need to be scanned
- Form-based data is more difficult to process with NLP than unstructured textual data (full sentences)
- Ensuring GDPR compliance

Source

Two interviews conducted in May 2024, led by sebis researchers, one interviewee is a lawyer and the head of the legal tech department at the company, the other is an associate of the same law firm and part of the legal tech team.

ER2 AI Solution Provider: Mioto Labs

Who is using it?

The solution is targeted at small- to medium-sized law firms.

What problem(s) are they solving?

Mioto Labs (https://mioto.app/) offers custom-tailored solutions for customers in the legal domain. Typical use cases include but are not limited to contract generation based on pre-defined templates, document review and analysis, and information extraction.

Which NLP technologies are they using?

The solution currently consists of a workflow builder for process automation. Commercial LLMs like ChatGPT through an Azure instance are used to assist in specific steps of the workflow, e.g., to extract information from documents. Depending on the needs of the customers, the team decided where and when in the workflow chain it makes sense to utilize LLMs to achieve a specific subtask.

Challenges

- SaaS is difficult to market to customers in the legal domain
- Building custom solutions for customers requires a lot of flexibility from the development team as requirements are not often clear at the beginning

Source

Interview conducted in May 2024, led by sebis researchers. The interviewee is a co-founder and the CTO of the company.

3

Use Case Category

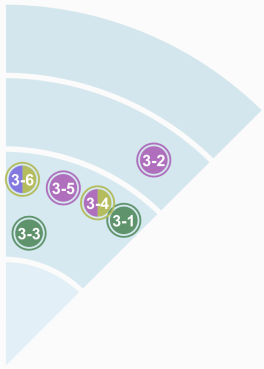
Document Generation and Assistance

Use Cases

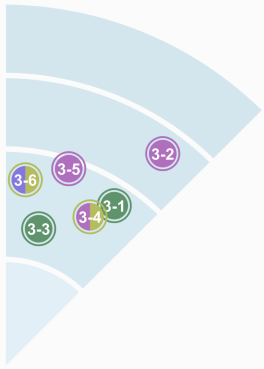
3-1 Contract Generation
3-2 Legal Document Enrichment
3-3 Summarization
3-4 Deadline Management
3-5 E-Mail
3-6 Class Action Lawsuits

Document generation encompasses all use cases referring to creating new documents from scratch, summarizing long documents, or enriching existing documents by inserting valuable information. This includes contract generation, e-mail drafting, creating mass trial requests, deadline management, etc.

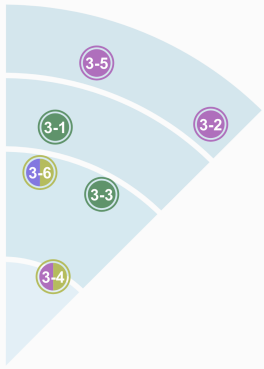
Legal Relevance



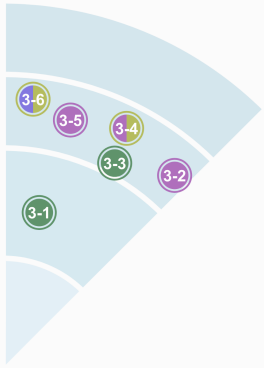
Academic Interest



ELSA Concerns



Number of Reports



3-1 Contract Generation

Writing contracts according to the needs of the parties involved is one of the core tasks of legal professionals. Making sure that all specified obligations and agreements are valid under state law and potential company policies requires extensive legal knowledge and understanding. For many standard contracts, such as employment contracts or Terms of Service this is a minor issue, but it remains a big concern when drafting large, specialized contracts (e.g., company acquisitions).

Well-established and mature assistance systems for drafting contracts are Template Engines. They allow users to create contracts (and all sorts of other documents) by selecting pre-written templates and template-snippets and filling them out with individual information such as names and addresses. Machine Learning methods for Contract Generation have not yet reached the maturity for widespread adoption but advancements in LLM research might be able to further advance the capabilities for automated Contract Generation in the future.

Evaluation

Relevance	Interest	Concerns	# Reports
4.29	2.30	2.60	5.00

3-2 Legal Document Enrichment

Enriching legal documents with relevant information can mean extracting metadata from the document (such as company names, addresses, dates etc.) or finding related legal documents such as state law, case law or other literature. It can also include adding references to all sorts of claims in legal documents.

The first task is often done by Document Management tools to enrich search results and provide better overviews. The latter tasks, traditionally done by human legal assistants, can nowadays be augmented or partly automated by large legal databases (e.g., Juris, Beck Online, etc.).

Literature

- SEBI Regulation Biography, Buggana, Sathvik Sanjeev, et al.
- NLP-based Extraction of Modificatory Provisions Semantics, Alessandro Mazzei

Literature TL;DR

- **SEBI Regulation Biography**: A system that performs semantic processing of SEBI documents using state-of-the-art language models to produce enriched regulations containing timelines of amendments and cross references to legal case files is presented.
- **NLP-based Extraction of Modificatory Provisions Semantics**: An approach which pairs deep syntactic parsing with rule-based shallow semantic analysis relying on a fine-grained taxonomy of modificatory provisions is proposed.

Evaluation

Relevance	Interest	Concerns	# Reports
4.13	1.30	2.28	2.00

3-3 Summarization

Summarization is the process of creating a summary – a shorter version of a long document. The summary preserves the meaning and key messages of the original document in a more concise and structured manner. Legal work often includes working with long documents, such as legislature, statutes, court rulings, contracts, homologations, etc. Having a summary of these documents can facilitate the work of legal practitioners by quickly providing them with the key takeaways and insight into the content of the whole document.

Methods of NLP can automate the process of summarization by generating summaries. The process of summarizing can be controlled with

respect to the length, informativeness, style, and other aspects, by taking into account the needs of stakeholders using them. Modern generative large language models have shown impressive advancements in automated summary creation for long documents.

Literature

- Organizing Portuguese Legal Documents through Topic Discovery, Vianna, D., & Silva de Moura, E.
- A Natural Language Processing Survey on Legislative and Greek Documents, Panteleimon Krasadakis, Evangelos Sakkopoulos, and Vassilios S. Verykios
- Summarising Legal Texts: Sentential Tense and Argumentative Roles, Grover, C., Hachey, B., & Korycinski, C.
- NLP Based Latent Semantic Analysis for Legal Text Summarization, K. Merchant and Y. Pande
- Summarization of German Court Rulings, Glaser, I., Moser, S., & Matthes, F.

Literature TL;DR

- **Organizing Portuguese Legal Documents through Topic Discovery**: This work shows that it is possible to efficiently organize the collection using the syllabus from each court decision as they concisely summarize the main points presented by the entire decision.
- **A Natural Language Processing Survey on Legislative and Greek Documents**: This work serves as a rigorous research of the bibliography on the field focusing on Legal and Greek documents on Natural Language Processing, and presents the current challenges of the field and some future considerations.
- **Summarising Legal Texts: Sentential Tense and Argumentative Roles**: This work uses state-of-the-art NLP techniques to perform the linguistic annotation of a small sample set in order to explore correlations between linguistic features and argumentative roles and focuses here on the predictive capacity of tense and aspect features for a classifier.
- **NLP Based Latent Semantic Analysis for Legal Text Summarization**: An automated text summarization system that generates short and useful summaries from lengthy judgements is proposed that makes use of a natural language processing technique called latent semantic analysis (LSA) to capture concepts within a single document.
- **Summarization of German Court Rulings**: This paper introduces a new dataset consisting of 100k German judgments with short summaries and creates a pre-processing pipeline tailored explicitly to the German legal domain, which implements multiple extractive as well as abstractive summarization systems and builds a wide variety of baseline models.

Evaluation

Relevance	Interest	Concerns	# Reports
4.49	2.50	2.20	4.00

3-4 Deadline Management

In the modern world, lawyers are overwhelmed with the number of cases coming in, for example in India or Germany. As such, lawyers are constantly faced with the pressure of impending deadlines and tight schedules. This might make it very difficult to manage a proper daily schedule.

Using AI, lawyers can better manage their cases via the use of scheduling software and time management tools. This may help in a variety of legal processes, such as probation, as well as tracking and monitoring critical legal deadlines.

Evaluation

Relevance	Interest	Concerns	# Reports
4.30	4.66	2.36	1.00

3-5 E-Mail

Legal professionals are often overburdened with emails. Particularly in the cases where e-mail serves as the primary means of communication with clients, keeping up with emails remains a vital process in daily legal work.

Using Legal Tech tools to manage email communications, keep track of email lists, and aid in the drafting and sending of emails could help to simplify the sometimes tedious task of emails. Such tools could be especially helpful in the automation of rote tasks, such as reminder emails or regular communications.

Evaluation

Relevance	Interest	Concerns	# Reports
4.30	1.20	2.36	2.00

3-6 Class Action Lawsuits

Class action lawsuits involve cases where a group of people is represented collectively by a member or members of that group. Managing potentially large groups of people, particularly from a document point of view.

Legal Tech solutions can aid in managing such cases, for example in mass compensations for flight delays. These tools are important to large-scale cases (and trials), as such numbers would traditionally be very hard to manage without a large legal team. Therefore, technological solutions are serving to reduce the overhead of such cases significantly.

Evaluation

Relevance	Interest	Concerns	# Reports
4.30	2.79	2.36	1.00

ER3 LLM Usage at a German Law Firm

Who is using it?

A large German law firm is developing their own solution to assist in their legal work but the solution is also provided to interested legal professionals who need to generate documents in their daily work, e.g., contracts.

What problem(s) are they solving?

The main use case aims at generating legal documents based on templates and data inputs but the solution is also able to assist in other legal tasks surrounding document management. The company is currently evaluating the usage of AI in various aspects of their work to derive new use cases that can benefit from its usage.

Which NLP technologies are they using?

The company uses AI pipelines (i.e., Retrieval Augmented Generation) that are independent of a specific LLM and always aim to use the best LLM depending on use case. Currently, they are working with GPT-4 deployed on their own Azure instance but are aiming at also including Claude Opus. The company took all their documents, anonymized them, and embedded them in a vector database to allow for a semantic search. From this existing knowledge base new documents can be generated through pre-defined prompts. The functionality is accessible through a Word Add-In that is connected to the pipeline built on the deepset cloud. Subtasks of the pipeline also employ other NLP methods such as Named Entity Recognition (NER).

Stage

Research - the solution is under active development and different users are evaluating its usage

Challenges

- Developing your own AI is resource-intensive and not practical in an environment with frequent law changes
- Users require proper training in order to utilize the full potential of novel AI-based solutions

Source

Interview conducted in April 2024, led by sebis researchers. The interviewee is the CEO of a spin-off company.

ER4 AI Usage at a German Law Firm

Who is using it?

A large law firm with over 300 lawyers is evaluating the use of legal AI at their firm. The target audience of the tools are legal professionals.

What problem(s) are they trying to solve?

The firm is interested in understanding the potential benefits of using AI in their practice, such as automating repetitive tasks, improving decision-making speed, and increasing overall efficiency. Therefore, the firm called into action an AI initiative consisting of multiple lawyers to explore and evaluate the use of legal AI.

The use cases under investigation include:

- Document analysis
- Document generation (e.g., contracts)
- Document summarization (e.g., summarizing court decisions)
- Due diligence
- Question Answering

For Question Answering, they are building a curated knowledge base containing all admissible company data that can then be queried through the chat interface. The semantic search also provides references to the sourced documents.

Which NLP technologies are they using?

The law firm is evaluating the use of different LLMs including proprietary models like ChatGPT (OpenAI) and Luminous (Aleph Alpha), as well as open-source models like Llama.

For their daily work, all employees have access to ChatGPT deployed on their own Azure instance to ensure data is not used for training. To manage and reduce the costs associated with LLM usage, token length is limited.

Some users are also testing Copilot for their daily work needs.

Stage

Production - different users are utilizing AI technology regularly in their workflows

Challenges

- Costs of AI usage are not insignificant and need to be managed
- Employees need to be properly trained to ensure compliant usage of the AI solutions and maximize their usefulness
- The speed at which AI technology advances makes it difficult to keep up, e.g., context window increases (tokens)
- Societal implications, e.g., risk of fraud and scams

Source

Interview conducted in March 2024, led by sebis researchers. The two interviewees are both lawyers at the law firm.

ER5 LLM Usage at a German Law Firm

Who is using it?

The corporate Merger & Acquistions department of a law firm totaling over 100 employees and specializing on German law is testing the usage of AI and LLMs to speed up their work.

What problem(s) are they solving?

The employees use an LLM-based tool in hopes of improving their efficiency to draft contracts. Normally, new contracts are constructed by reusing and adapting clauses from past contracts. The tool helps automate this task by importing clauses from other documents and adapting them to the new context. The tool is used for assistance as it still requires a good amount of manual effort.

One reason for incorporating AI technology into their weekly routine is the perception that customers now expect it in this day and age.

Which NLP technologies are they using?

A few selected lawyers of the department are testing Henchman (https://henchman.io/), a multi-LLM contract drafting and negotiating AI solution, to assess a potential department-wide adoption of the tool. One of the employed LLMs is ChatGPT running on an Azure instance so that the data is not used to train the model and remains within the EU. Users can interact with the system through an Add-In in Word or Outlook.

Stage

Research - different users are experimenting with the usage of LLMs

Challenges

- Lawyers need to invest time and effort to incorporate the tool into their routine before any efficiency gains can be realized
- The tool is only as good as the existing documents from the past. Changes in legal regulations are naturally not reflected yet for future contracts.

Source

Two interviews conducted in April and May 2024, led by sebis researchers. One interviewee is a lawyer working in corporate Mergers and Acquisitions at a German law firm and the other is a legal tech consultant.

ER6 AI Solution Provider: Herlock Insights

Who is using it?

The solution is targeted at law firms and legal professionals.

What problem(s) are they solving?

The main focus is to provide transparency regarding legal case data, i.e., every legal case is self-contained and builds the foundation that the software solution operates upon. Users can query the documents for information and ask about information related to each case.

Which NLP technologies are they using?

The company provides an AI-based case analysis tool called Herlock.ai (https://www.herlock.ai/) that uses natural language processing (NLP) and vector embeddings to analyze legal case data. The solution is provided as SaaS deployed on a private cloud running on GCP or AWS. One of the used language models is ChatGPT but the company is looking at alternatives that can be deployed on-premise for customers that have this requirement. The solution organizes relevant information around individual legal cases and provides a visual timeline of chronologically sorted events next to allowing to search and compare documents and ask questions about them.

Challenges

- Hallucinations can occur but are mitigated by providing references to the sources of the information
- Legal landspace is very diverse and many users are still uncertain about employing AI in their workflow

Source

Interview conducted in April 2024, led by sebis researchers. The interviewee is the co-founder and CTO of the company.

ER7 LLM Usage at a German Accounting Firm

Who is using it?

The employees of a large German accounting firm with over 15.000 employees are exploring the usage of LLM-based tools to improve their efficiency.

What problem(s) are they solving?

The employees use an LLM-based tool for document analysis, contract drafting, negotation assistance, and legal research. The most important use case for the users is document summarization, e.g., of contracts.

Which NLP technologies are they using?

The employees are using Leah offered by ContractPodAI (https://contractpodai.com/leah/). ContractPodAI provides a contract lifecycle management suite and Leah is a standalone SaaS solution that enables the usage of generative AI without having to implement the full CLM solution. Leah provides various functionality out-of-the-box and utilizes multiple LLMs under the hood to generate its responses but it can also be fine-tuned to the needs of the customers.

Stage

Production - users are using the tool in their daily workflow

Challenges

- Continuous change management and data migration is required to keep up with new requirements
- Integration of the tool into the existing IT landscape
- Many lawyers are not very tech-savvy and require training to use the tool effectively

Source

Interview conducted in May 2024, led by sebis researchers. The interviewee is the head of legal tech at the company.

4

Use Case Category

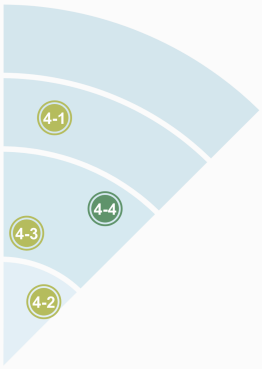
Information Processing and Extraction

Use Cases

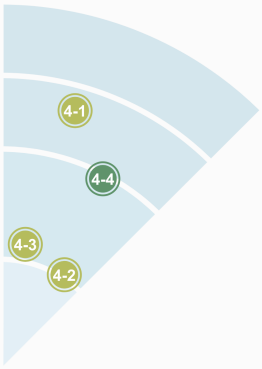
4-1 Anonymization / Text Scrubbing
4-2 Information Extraction
4-3 Document Retrieval
4-4 Transcription

Information processing is an important category of legal technology comprising all use cases that extract valuable insights from documents, anonymizing sensitive information of clients, transcribing spoken word to textual format, and any other form of processing data from one type to another.

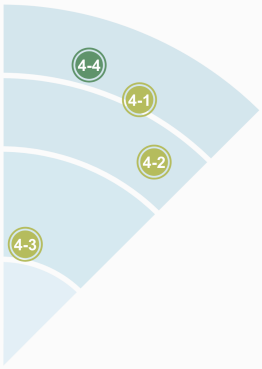
Legal Relevance



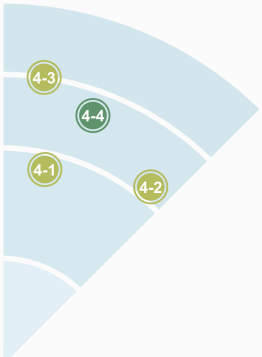
Academic Interest



ELSA Concerns



Number of Reports



4-1 Anonymization / Text Scrubbing

As can be imagined, legal professionals often handle sensitive information relating to their clients, much of which is captured in the documents and other written material held on these clients. In order to safeguard the privacy of the people being represented, such sensitive information must be held with utmost caution, particularly in light of the regulatory requirement to do so. If personal information is not properly handled, lawyers may face hefty fines for non-compliance.

A potential solution comes with the idea of text scrubbing, also sometimes referred to as text sanitization. In this, sensitive parts of a document are either removed completely, “blacked out”, or pseudonymized, in which identifying information is replaced with pseudonyms. The particular case of anonymization refers to the handling of personally identifiable information (PII). NLP research has actively explored the automatic privatization of textual information, and this can certainly be applied to legal documents.

Literature

- An Anonymization Tool for Open Data Publication of Legal Documents

Literature TL;DR

- **An Anonymization Tool for Open Data Publication of Legal Documents**: Evaluation shows that ANOPPI performs well with different types of documents, however, further improving the performance of the named entity recognition and disambiguation methods would enhance the usefulness of the software.

Evaluation

Relevance	Interest	Concerns	# Reports
3.78	1.50	2.50	2.00

4-2 Information Extraction

Legal documents tend to be longer in length, yet their contents are typically rich with extractable information entities, such as persons and locations, or more topical information such as keywords and keyphrases. Manually extracting such information can present a daunting task for even the most skills of legal professionals.

Moden NLP techniques can help to facilitate the automation of information extraction tasks, transforming large masses of unstructured text into pre-defined extracted entities. Such capabilities can also be useful to clients and consumers who must read through large legal texts and would like to capture the key information. As the breadth of Information Extraction in NLP is quite large, the possibilities for incorporation into Legal Tech solutions are likewise great.

Literature

- CLIEL: Context-Based Information Extraction from Commercial Law Documents
- Identifying Legal Party Members from Legal Opinion Documents using Natural Language Processing
- Reference Extraction from Vietnamese Legal Documents
- Deep Semantic Interpretations Of Legal Texts, McCarty, L. T.
- Named Entity Recognition for Rental Documents Using NLP, Patil, C., Patil, S., Nimbalkar, K., (...), Sengupta, S., Rajadhyax, D.
- Legal knowledge extraction for knowledge graph based question-answering, Sovrano, F., Palmirani, M., Vitali, F.
- Automated Extraction of Semantic Legal Metadata Using Natural Language Processing, Stoykov, K., Chelebieva, S.
- Litigation Analytics: Case outcomes extracted from US federal court dockets, Thomas Vacek, Ronald Teo, Dezhao Song, Timothy Nugent, Conner Cowling and Frank Schilder
- Automated Extraction of Sentencing Decisions from Court Cases in the Hebrew Language, Mohr Wenger, Tom Kalir, Noga Berger, Carmit Klar

- Chalamish, Renana Keydar and Gabriel Stanovsky

Literature TL;DR

- **CLIEL: Context-Based Information Extraction from Commercial Law Documents**: Work on a flexible and scalable IE environment, the CLIEL (Commercial Law Information Extraction based on Layout) environment, for application to commercial law documentation that allows layout rules to be derived and then utilised to support IE.
- **Identifying Legal Party Members from Legal Opinion Documents using Natural Language Processing**: This study proposes a novel deep learning methodology which can be effectively used to find a solution to the problem of identifying legal party members in legal documents and introduces a novel data set which is annotated with legal party information by an expert in the legal domain.
- **Reference Extraction from Vietnamese Legal Documents**: The task of extracting references from law and regulatory documents, which are necessary for recognition of the relations between documents and document parts, and other problems, is addressed and several extraction models are introduced.
- **Deep Semantic Interpretations Of Legal Texts**: It is shown that a state-of-the-art statistical parser can handle even the complex syntactic constructions of an appellate court judge, and that a deep semantic interpretation of the full text of a judicial opinion can be computed automatically from the output of the parser.
- **Named Entity Recognition for Rental Documents Using NLP**: This paper presents a method for custom training the spaCy NLP library to perform Named Entity Recognition on rental documents, streamlining the extraction of key information such as names, addresses, and dates, thus aiding legal professionals.
- **Legal knowledge extraction for knowledge graph based question-answering**: The Open Knowledge Extraction tools combined with natural language analysis of the sentence in order to enrich the semantic of the legal knowledge extracted from legal text is presented.
- **Automated Extraction of Semantic Legal Metadata Using Natural Language Processing**: A harmonized conceptual model for the semantic metadata types pertinent to legal requirements analysis, and automated extraction rules for these metadata types based on NLP are proposed and shown to generate metadata annotations with high accuracy.
- **Litigation Analytics: Case outcomes extracted from US federal court dockets**: This work uses Natural Language Processing (NLP) techniques and deep learning methods allowing us to scale the automatic analysis of millions of US federal court dockets and feed it into a Litigation Analytics tool used by lawyers to plan how they approach concrete litigations.
- **Automated Extraction of Sentencing Decisions from Court Cases in the Hebrew Language**: It is found that while supervised models can identify the sentence containing the punishment with good accuracy, rule-based approaches outperform them on the full APE task.

Evaluation

Relevance	Interest	Concerns	# Reports
4.77	2.30	2.30	3.67

4-3 Document Retrieval

Legal work often involves working with large corpora of legal documents, containing previous court rulings, legislation, or patent databases. Document retrieval refers to the process of fetching relevant documents from large databases. The basis for this can be specific information about the documents, such as the year of its publication, domain, or source. More commonly, document retrieval is tied to document search, where for a given query, the documents with the most relevant title or content are retrieved for the user.

Document retrieval is solved in the NLP domain using the methods of Information Retrieval (IR), a field spanning six decades of existence. Traditionally, the user's search query is decomposed to a set of keywords that are then forwarded to a document ranking function, which takes into account the frequency and rarity of given search terms. More recently, semantic search has moved away from keyword matching and tries to match the semantic meaning of a given query to the content of documents in the database. Numerous search engines are powered by these NLP and IR methods.

Literature

- When is the Time Ripe for Natural Language Processing for Patent Passage Retrieval? Andersson, L., Lupu, M., Palotti, J., Hanbury, A., & Rauber, A.

Evaluation

Relevance	Interest	Concerns	# Reports
4.57	4.30	1.75	3.67

4-4 Transcription

Transcription is the process of transferring voice recordings into a written format. Legal work involves conducting interviews with clients, meetings with stakeholders, and other forms of oral exchange. Some of these sessions are recorded with the intention of using or analyzing their content in the future. Transcription can help this use case by generating a written artefact stemming from the original speech recording.

There are numerous Machine Learning models that work well with audio data, especially including speech data. They can be leveraged to transform the speech input into a textual output. While earlier models were still prone to generating errors and incorrect sentences, recent generative models work remarkably well and contain little errors, including recording of English, German, and other languages.

Evaluation

Relevance	Interest	Concerns	# Reports
4.37	1.20	2.18	1.00

ER8 AI Solution Provider: Elephant Labs

Who is using it?

The solution is targeted at public institutions like the government, courts, and other regulatory offices. The company is currently in contact with the justice ministry of Bavaria to explore how the solution can provide value to them.

What problem(s) are they solving?

The company Elephant Labs (https://www.elephantlabs.ai/) was founded in December 2022 in an attempt to develop a solution that increases the efficiency of lawyers through the use of computer science. For example, court verdicts need to be published to the public but the regulations as to how and when are not clear. In order to publish such data, however, sensitive information needs to be masked first and this is what VerdictLLM was initially developed for.

Which NLP technologies are they using?

The tool VerdictLLM utilizes the power of open-source LLMs and statistical methods to anonymize sensitive data. Additionally, the company uses embeddings to classify which information needs to be anonymized. The LLM is fine-tuned through synthetic data specifically optimized for applicability in the legal context.

Challenges

- Establishing trust in LLM-based solutions with potential customers who primarily work with sensitive data
- Public institutions are reluctant to change existing processes (independent of AI)

Source

Interview conducted in April 2024, led by sebis researchers. The interviewee is the founder of the company.

ER9 Usage of an Anonymization Solution at Courts in the Canton of Aargau, Switzerland

Who is using it?

The High Court of the Canton of Aargau in Switzerland with overall roughly 470 employees of which 124 are using an anonymization solution.

What problem(s) are they solving?

The court wanted to publish court decisions but needed to anonymize sensitive data before being able to do so. Therefore, they chose Balo.ai (https://www.balo.ai) which allows for the anonymization of text documents while preserving the readability of the document and keeping all data on-premise. Through the usage of the anonymization solution, the court was able to publish a lot more decisions than before (1673 in one year as opposed to roughly 100 in the past).

Which NLP technologies are they using?

Balo.ai works with an on-premise language model so that no data ever leaves the environment the tool is used in, which is particularly beneficial from a data protection perspective as the target users are mostly public institutions in the legal sector who operate under strict data protection regulations. The model is specifically trained for anonymization tasks and doesn't require a lot of computing resources, which makes it possible to host it on machines with limited resources. Additionally, there is a MS Word Add-In that makes anonymization suggestions that the user needs to manually accept and a separate tool for PDFs with the same functionality.

Stage

Production - the courts are using the solution for anonymization

Challenges

- The LLM is not able to understand all legal terminology and ideally needs to be fine-tuned with specific data for the customer
- Users would like a fully automated process which is not trivial
- Integration of AI-based tools into existing office software (e.g., through plugins) is not trivial as new versions require adaptations (also because many companies use no longer supported legacy software)

Source

Two interviews conducted in April and May 2024, led by sebis researchers, one with a co-founder of Balo.ai and one with a test manager working for the courts of the Canton of Aargau.

ER10 LLM Usage at a German Technology and Engineering Company

Who is using it?

The patent department of a global technology and engineering company, which includes 26 direct employees and around 200 in total, is testing the usage of AI and LLMs to speed up their work.

What problem(s) are they solving?

The employees use the LLM for various tasks surrounding text generation and analysis. Since September 2023, they are testing what is possible concerning patents including patent drafting, mapping of patents, and patent analysis, i.e., retrieving key aspects out of the documents. The results are perceived to be quite promising but one still needs to invest some time refining them as they are not good enough to just be copy pasted and used as is.

The initial expectation was that you can just give the LLM a job and wait for it to come back with the results. However, one key learning is that you need to teach the model what you want, i.e., give it a persona and break down the instructions into very small parts.

Further use cases revolve around assistance in their daily jobs such as drafting emails or parts of reports and translations.

In the future, they would like to expand their usage of LLMs by leveraging the voice input capabilities. Ideally, the LLM will act as a personal assistant helping with their daily tasks, e.g., answering questions, providing explanations, finding and opening files, etc.

Which NLP technologies are they using?

The employees have access to ChatGPT 3.5 with 128k tokens through the company's Azure instance which provides a certain level of security and confidentiality.

The department is considering the costs and benefits of prompt optimization or the potential fine-tuning or even training of own models.

Stage

Research - different users are experimenting with the usage of LLMs

Challenges

- Context window insufficient - 128k tokens are not enough for working with large documents
- Domain-specific knowledge required - LLMs are not specialized enough for such a technical domain especially when it comes to novel technology that is not part of training data
- Fine-tuning / Training models requires necessary know-how and good training data

Source

Interview conducted in June 2024, led by sebis researchers. The interviewee is a lawyer and head of the patent department at the abovementioned company.

ER11 AI Solution Provider: fastlaw

Who is using it?

The solution is targeted at law firms and notaries working with land registration data.

What problem(s) are they solving?

The company fastlaw (https://fastlaw.online/) was founded as a spin-off from a law firm that has been working completely digitally for the past ten years alreay. Their AI solution is designed to read land register data and extract relevant information.

Which NLP technologies are they using?

The company provides a CRM solution for law firms and an AI-based tool called GREGOR available as a SaaS solution that is able to read land register data through OCR and then extract relevant information which in turn can be exported again in a structured format. To achieve this, the company together with an undisclosed partner trained their own language model.

Challenges

- Adapting the AI to correctly identify the relevant text passages
- Land register data is not standardized and can consist of multiple document excerpts assembled into one single document

Source

Interview conducted in April 2024, led by sebis researchers. The interviewee is the head of legal engineering and business development of the company.

ER12 AI Solution Provider: Libra Tech

Who is using it?

The solution is targeted at law firms and legal professionals.

What problem(s) are they solving?

Libra (https://libratech.ai/) wants to become an AI-powered law firm assistance provider to increase the efficiency of lawyers. For example, the tool is able to classify and extract information from documents and generate new documents like contracts.

Which NLP technologies are they using?

The company is currently building modules in an AI pipeline to automate different tasks in a lawyer's workflow. They started out with using commercial APIs like ChatGPT but then proceeded to fine-tune their own models that will be used exclusively in the future. The solution is under active development and the company is building their own evaluation data sets while simultaneously receiving feedback from customers to evaluate their application.

Challenges

- Compliance requirements
- Acquiring high-quality training data to fine-tune models to the legal domain
- Aligning the technical side with the business side

Source

Interview conducted in April 2024, led by sebis researchers. The interviewee is a co-founder and the CTO of the company.

ER13 LLM Usage at a Global Law Firm

Who is using it?

The Mergers and Acquistions department of a large international law firm with roughly 70 lawyers in Germany (900 globally) is exploring the usage of AI in their daily work. The law firm has a global technology committee consisting of multiple employees including the CIO that evaluates new technologies and makes executive decisions about adopting them into the firm.

What problem(s) are they solving?

The employees are using AI-based tools for document analysis, information extraction, and translation. They believe AI tools will eventually replace a lot of the work that is nowadays being done by junior associates.

Which NLP technologies are they using?

The department is using Kira (https://kirasystems.com/) for document analysis and information extraction from legal documents like contracts. The firm has access to its own instance running the software to ensure the confidentiality of the data.

For translations the lawyers use DeepL (https://www.deepl.com/), an AI-based translation tool specifically trained for translation tasks.

Furthermore, the firm also tested ChatGPT but deemed it not good enough to be used as-is in their daily professional work and is now evaluating Harvey (https://www.harvey.ai/) for document analysis.

Stage

Production - AI-based tools are used regularly in their legal work

Challenges

- Ensuring GDPR compliance and confidentiality
- Trust in AI systems needs to be established
- Support for multiple languages is important for an international firm
- Not enough use cases (at the time of the interview) to justify large investments in AI
- Rethinking of business model (hourly billing vs. flat fee) might be necessary if AI increases efficiency

Source

Interview conducted in February 2024, led by sebis researchers. The interviewee is a lawyer working in Mergers and Acquistions at a large law firm.

ER14 LLM Usage at a German Law Firm

Who is using it?

A German law firm with roughly 180 employees has established a small legal tech lab and is exploring the usage of AI-based solutions to support their daily legal work. The department consists of 6 employees and is responsible for the digital transformation and legal tech strategy.

What problem(s) are they solving?

The employees are trying to improve their knowledge management. The main goal is to make all relevant documents and data accessible through semantic search so that lawyers can easily find what they are looking for and then query these documents and receive appropriate responses from the AI. One example is to upload a document and ask for a summary of the decision. If the answer is not specific enough, the lawyer will ask a follow-up question to clear up any uncertainties. The users perceived big improvements in their efficiency as the solution is able to assist them in finding relevant information quicker than when looking for it themselves, especially considering that some cases consist of many documents which in turn consist of many pages. As LLMs may hallucinate responses, all users are urged to double check the generated responses.

Which NLP technologies are they using?

The law firm is currently integrating Prime Legal AI (https://primelegal.de/en/) into their workflow. Depending on the use case, the AI solution utilizes multiple already existing LLMs (e.g., GPT-4, GPT-4-Turbo, Claude-3-Opus) under the hood to provide its various services. The users can select from a library of pre-defined prompts (or write their own) and the data they want them used upon. The anonymization functionality works on-premise whereas the rest of the functionality is available through the cloud. The service is accessible through a web application but also through an API. An entity-relationship model was used to train knowledge graphs which are the foundation for Prime Legal AI.

Stage

Production - users are using the tool in their daily workflow

Challenges

- Introduction of new tools requires training and marketing for the potential new users and ideally an IT department that takes care of the integration
- Data needs to be anonymized first before it can be fed into the tool
- Usage of AI leads to a paradigm shift from billing by the hour to a flat fee model

Source

Two interviews conducted in May 2024, led by sebis researchers, one interviewee is the CEO of Prime Legal AI and the other is a lawyer specializing in corporate law and responsible for legal tech at their law firm.

5

Use Case Category

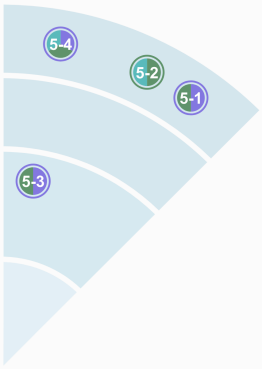
Legal Decision Making and Dispute Resolution

Use Cases

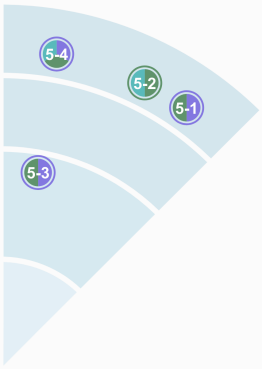
5-1 Judge: Decision Making
5-2 Legal Reasoning
5-3 Strategy Recommendations
5-4 Dispute Resolution Mechanism

Legal professionals use legal argumentation, reasoning, and logic to make decisions related to legal matters, such as court rulings or dispute resolution. Legal technology can assist by recommending the best strategies and logical reasoning based on background legal knowledge and principles.

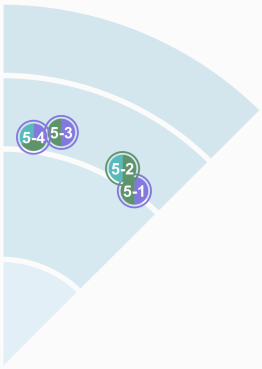
Legal Relevance



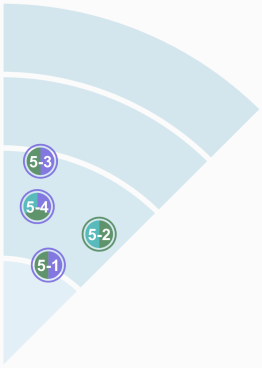
Academic Interest



ELSA Concerns



Number of Reports



5-1 Judge: Decision Making

Final Legal Decision Making is executed by judges and (unless going into revision) marks the end of a legal dispute. Because of its potentially high impact on individuals and companies it can take a long time and is always done by highly skilled legal professionals (judges).

While there are ideas and experiments for automated Legal Decision Making (e.g., predicting the outcome of cases at the European Court of Human Rights), the accuracy remains unsatisfactory till now. Additionally, even if the accuracy reaches very high levels in the future, the nature of the matter itself might prevent automation for a long time, potentially forever.

Literature

- AI & Law: Formative Developments, State-of-the-Art Approaches, Challenges & Opportunities, Jack G. Conrad, Shirsha Ray Chaudhuri, Shounak Paul, and Saptarshi Ghosh

Literature TL;DR

- **AI & Law: Formative Developments, State-of-the-Art Approaches, Challenges & Opportunities**: This tutorial will give an overview of the various aspects of applying AI to legal textual data, and discuss the current state of AI & Law research including the techniques that have produced the biggest impact.

Evaluation

Relevance	Interest	Concerns	# Reports
1.84	2.30	4.99	1.00

5-2 Legal Reasoning

Legal Reasoning is a subtask of every problem that involves knowledge and understanding of legal rules to apply them on a given question or problem. It can involve reading and referencing state law, previous court rulings and contracts and it is needed to justify claims, write new contracts, laws, and other legal documents.

Automating this process is therefore also an important subtask for automating higher level processes such as Contract Generation or Contract Analysis. It involves searching for relevant literature to then read, understand and reason about it, which has proven to be a challenging task for computers and even Machine Learning approaches. Solving this issue to a decent degree would enable major advancements in the tasks mentioned and the legal field.

Literature

- Finding Contextually Consistent Information Units in Legal Text, Seyler, D., Bruin, P., Bayyapu, P., & Zhai, C. X

Literature TL;DR

- **Finding Contextually Consistent Information Units in Legal Text**: This work combines NLP and data mining techniques to develop novel methodology that can find contex-tually consistent information units in an unsupervised manner when reading legal text within a codified corpus by finding contex-tually consistent information units.

Evaluation

Relevance	Interest	Concerns	# Reports
2.35	2.20	4.25	1.67

5-3 Strategy Recommendations

With the sheer number of court rulings that exist in the archive of many legal systems, it may be very difficult for lawyers to find relevant cases for precedent in a timely and efficient manner. This can slow down trial preparation, thus leading to overall delays.

The challenge here can be alleviated by NLP-based retrieval systems, whose purpose would be to fetch all relevant court rulings based upon a given request. Using advanced semantic

search, finding past cases could be performed in a fraction of the time, especially as compared to manual filtering of cases. This reduces both the time needed as well as the personnel required to perform such searches.

Literature

- Towards Recommendations from User-specific Insights based on Historical Legal Cases, Saxena, Krati, Sagar Sunkle, and Vinay Kulkarni
- Semantics-Based Legal Citation Network, Paul Zhang

Literature TL;DR

- **Towards Recommendations from User-specific Insights based on Historical Legal Cases**: This work presents a template-based recommendation system based on the user's profile and insights obtained from similar past cases, which uses natural language processing techniques to parse the relevant text to create user-specific legal insights.
- **Semantics-Based Legal Citation Network**: Formal evaluation confirmed the Systems capability of accurately identifying citations relevant to given legal issues and the Systems User Interface allows users to easily navigate in the citation networks and study how citations are interrelated and how legal issues have evolved in the past.

Evaluation

Relevance	Interest	Concerns	# Reports
4.39	2.00	3.00	1.67

5-4 Dispute Resolution Mechanism

Dispute resolution involves the settling of disputes between parties. This is also referred to as conflict resolution. For these resolution processes, whether mediated by judges or lawyers, to be successful, skillful intervention is required.

The use of technology to automate dispute resolution has already been in the works. Particularly Online Dispute Resolution (ODR) has been developed to analyze disagreements, provide relevant information, and mediate discussion (chatbots), all of which drastically reduce the manual time investment traditionally required in dispute resolution.

Evaluation

Relevance	Interest	Concerns	# Reports
2.86	2.45	4.08	1.00

6

Use Case Category

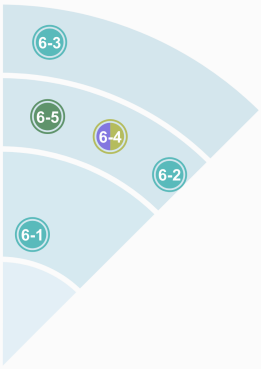
Legal Information Retrieval and Support

Use Cases

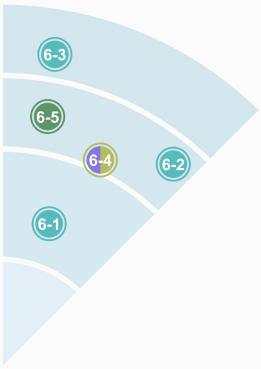
6-1 Chatbot: Client-intake and Drafting
6-2 Question Answering
6-3 Ranking of Laywers
6-4 Credibility of Witnesses
6-5 Translation

Legal technology can support both legal practitioners and clients by retrieving important information from legal knowledge sources, answering questions and concerns, translating documents in foreign languages. Additionally, databases of lawyers can help the general public get access to justice, and assess the credibility of witnesses for court processes.

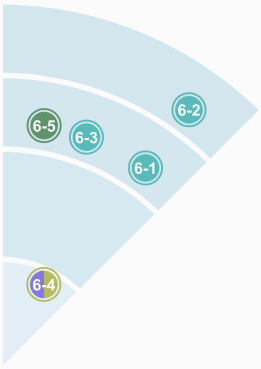
Legal Relevance



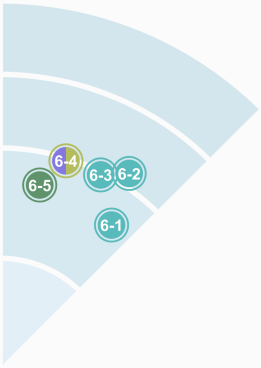
Academic Interest



ELSA Concerns



Number of Reports



6-1 Chatbot: Client-intake and Drafting

The day-to-day work of a legal professional may involve several recurring tasks, such as client intake or the drafting of emails and standard contracts. In a traditional setup, such tasks must be performed repetitively and manually, which imaginably does not represent the most efficient solution.

The development of chatbots, in which humans can communicate in turns with an automated system, would be well-served to automating tasks that can be performed with the domain expertise of legal professionals. In the case of client intake for example, collecting an individual's information can be performed by a chatbot to expedite the processing of the new client. In the same example, a chatbot may even assist the legal professional directly, helping to draft and send emails to new clients. Therefore, chatbots can help to automate the lines of communication in the legal process, thus reducing delays and wait times.

Evaluation

Relevance	Interest	Concerns	# Reports
4.57	2.30	3.00	3.67

6-2 Question Answering

Question answering involves providing an answer to a specific question or query coming either from legal professionals or clients requesting legal advice and services. In the sea of complex legal matters, many clients might be faced with uncertainty, while legal professionals may be overwhelmed with an influx of questions from clients.

In order to alleviate this challenge, question answering systems employing NLP technologies can be leveraged to facilitate the exchange between clients and their representation. Particularly in the case where questions can be answered with the help of existing knowledge bases, such systems can serve as a first responder to clients before reaching out to a legal professional.

Literature

- BERT-based Ensemble Methods with Data Augmentation for Legal Textual Entailment in COLIEE Statute Law Task, Yoshioka, M., Aoki, Y., & Suzuki, Y.
- WestSearch Plus: A Non-factoid Question-Answering System for the Legal Domain, McElvain, G., Sanchez, G., Matthews, S., Teo, D., Pompili, F., & Custis, T.
- Legal data extraction and possible applications, K Stoykov and S Chelebieva

Literature TL;DR

- **BERT-based Ensemble Methods with Data Augmentation for Legal Textual Entailment in COLIEE Statute Law Task**: A BERT-based ensemble method with data augmentation with a systematic method to make training data for understanding the syntactic structure of the questions and articles for entailment to solve the COLIEE 2020 problem.
- **WestSearch Plus: A Non-factoid Question-Answering System for the Legal Domain**: WestSearch Plus aims to provide concise one sentence answers for basic questions about the law that are legally accurate, jurisdictionally relevant, and conversationally responsive to user-entered questions in the legal domain.
- **Legal data extraction and possible applications**: The functioning of the modern society provokes creation of significant number of documents, most of them in text form, which are legally relevant and complex in nature, which makes their understanding difficult.

Evaluation

Relevance	Interest	Concerns	# Reports
3.68	1.34	2.28	4.00

6-3 Ranking of Laywers

Even in an age where internet access can ease the process of finding a suitable lawyer for a particular legal need, it may still be difficult to assess the competence of a particular legal professional, as well as the fittingness of this person's skills to the need in question. This may be especially challenging in the cases of complex legal inquiries.

One solution employing the use of technology comes with a system or database of legal professionals, which can serve to provide an impression of experience, competence, and offerings. Not only would this help clients to find suitable help, but it would also promote competition among legal service providers, who would be incentivized to provide the best service possible.

Literature

- Performance in the Courtroom: Automated Processing and Visualization of Appeal Court Decisions in France, Boniol, P., Panagopoulos, G., Xypolopoulos, C., Hamdani, R. E., Amariles, D. R., & Vazirgiannis, M.

Literature TL;DR

- **Performance in the Courtroom: Automated Processing and Visualization of Appeal Court Decisions in France**: This work uses NLP methods to extract interesting entities/data from judgments to construct networks of lawyers and judgments and proposes metrics to rank lawyers based on their experience, wins/loss ratio and their importance in the network of lawyers.

Evaluation

Relevance	Interest	Concerns	# Reports
1.00	2.30	3.10	1.00

6-4 Credibility of Witnesses

In court cases, the testimony of a witness can be crucial in steering the course of the trial. Because of this, assessing the credibility of a witness is an important step before admitting the testimony of the witness. Such a process must be performed with scrutiny from legal professionals, as an incredible witness can taint the integrity of a trial.

Using AI tools, the credibility of a witness may be initially vetted. By incorporating background information, as well as the provided testimony by a witness, the suitability of a particular witness can be preliminarily assessed in an automated fashion. Such automation can be significantly helpful to reduce the time invested by a lawyer in a case, as well as to shorten the duration of a trial overall.

Evaluation

Relevance	Interest	Concerns	# Reports
3.08	4.20	2.79	1.00

6-5 Translation

Translation refers to the process of converting text or speech from one language to another language, while preserving the meaning and structure of the original text. Legal work, especially in international law firms, can involve working with legal documents from different parts of the world and e-mail exchange with foreign clients. Therefore, having a reliable translation tool can help make international collaboration easier and more efficient.

Machine translation is one of the oldest NLP research directions. The emergence of recent advancements in NLP models, such as the transformer architecture, is a direct result of improving the task of automatic text translation. These generative language models perform increasingly well, with hardly any or only a few errors present in final translation. This process works remarkably well between languages from the same language family and language group, such as English and German, but difficulties remain between distant languages, such as

translating from Asian to European languages, and vice-versa.

Evaluation

Relevance	Interest	Concerns	# Reports
3.08	2.30	2.79	3.33

ER15 AI Usage at a German Publishing Group

Who is using it?

A large publishing group with its own legal department consisting of 6 lawyers is evaluating the usage of AI tools for their daily legal work.

What problem(s) are they trying to solve?

The employees have access to a company-wide chatbot that was developed in-house and that they can use for their daily work. The use cases include:

- Document analysis
- Document summarization
- Text generation (e.g., email, rephrasing)
- Translation
- Question Answering
- Research

Which NLP technologies are they using?

The company chatbot is based on models from OpenAI but does not have access to the internet or company data directly. However, users can upload documents through the chatbot interface to use them in ensuing prompts.

The company is also testing Semantha (https://www.semantha.de/) for document analysis and semantic search.

How do they test the quality of the tools?

The legal professionals do not have a predefined set of evaluation metrics but come together regularly to discuss the usage of AI and other relevant topics revolving around AI. The general sentiment is that there is a lot of potential in AI solutions but we are still just at the beginning and the tools currently do not work satisfactorily enough yet.

Stage

Production - employees use company-wide chatbot for their daily work

Challenges

- Hallucinations - LLMs do not always produce accurate information
- Finding the right AI solution(s) for each use case
- Ensuring that employees understand how to use the chatbot effectively through proper training
- Ensuring that company data is not used for AI training

Source

Interview conducted in March 2024, led by Prof. Dr. Florian Matthes and Nektarios Machner. The interviewee is working at the firm's legal department as a lawyer with a focus on IT.

ER16 AI Solution Provider: Neur.on AI

Who is using it?

The solution is targeted at professionals from the legal and financial sector.

What problem(s) are they solving?

The company Neur.on AI (https://neur-on.ai/) specializes in translations and translation management.

Which NLP technologies are they using?

The company currently provides multiple separate solutions like Lex Machina and Corrext that they eventually want to integrate into one overarching software solution. The solution is offered as a collaborate SaaS solution accessible through a web application. The system preprocesses data with the help of multiple LLMs, e.g., to categorize what kind of law documents pertain to, and then the system can provide machine translations but also humans can collaborately check the results and work on creating the translations through a web interface manually. The models were trained specifically for legal and financial terminology.

Challenges

- Ensuring confidentiality of the data

Source

Interview conducted in May 2024, led by sebis researchers. The interviewee is the COO at the company.

7

Use Case Category

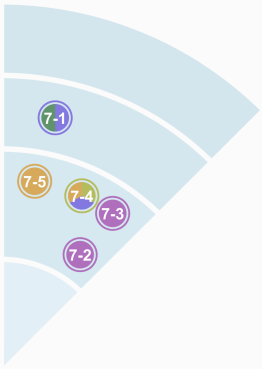
Legal Research and Information Management

Use Cases

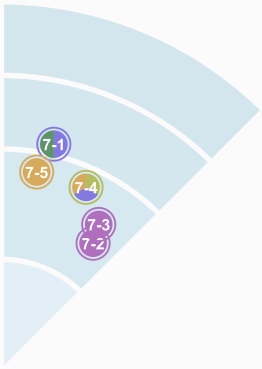
7-1 Changes in Law
7-2 Database for Court Decisions
7-3 Law Systems Divergence
7-4 Research Tool / Research Automation
7-5 e-Discovery

Whether preparing for court and reading up on past cases, performing legal research is crucial to a legal professional's daily work. Not only does finding such cases present a challenge, but managing this information as well does not come without hurdles. The use cases in this category comprise of useful tools and technologies that serve to assist in making the research process more efficient and streamlined.

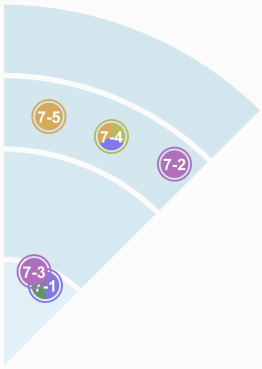
Legal Relevance



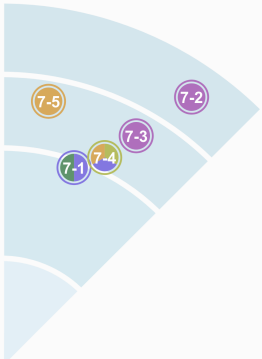
Academic Interest



ELSA Concerns



Number of Reports



7-1 Changes in Law

In a constantly changing regulatory environment, figuring out how to keep track of legislative updates can be difficult. The legislature often contains new amendments or parts that were added, inserted, omitted, renumbered, or repealed. Staying up to date with the most recent changes to law is crucial for complying and performing most legal tasks.

Automated solutions based on NLP technology can assist in this task. More so than just highlighting which parts were changed, NLP solutions can show how a legal document has semantically changed and what are the new legal implications of these changes.

Literature

- Semi-automatic Triage of Requests for Free Legal Assistance, Mistica et al.

Literature TL;DR

- **Semi-automatic Triage of Requests for Free Legal Assistance**: This paper describes a collaboration with a major provider of free legal assistance, and the deployment of natural language processing models to assign area-of-law categories to real-world requests for legal assistance.

Evaluation

Relevance	Interest	Concerns	# Reports
4.03	4.30	2.50	1.00

7-2 Database for Court Decisions

With the overwhelming number of legal cases being carried out and recorded as time goes on, it becomes important to store these cases in a proper manner. This becomes especially crucial for legal professionals to access, in order to stay informed of the legal precedent set by past cases.

A database for court decisions is such a solution which can serve as a repository for cases. This would not only provide a storage space for the recording of legal history, but also can serve as a "legal library" of sorts for quick and convenient access.

Literature

- Searching Case Law Judgments by Using Other Judgments as a Query, Sami Sara, Eero Hyvönen

Literature TL;DR

- **Searching Case Law Judgments by Using Other Judgments as a Query**: It is shown that a linear combination of similarities derived from the individual models provides a robust automatic similarity assessment for ranking the case law documents for retrieval.

Evaluation

Relevance	Interest	Concerns	# Reports
4.67	2.00	1.75	1.33

7-3 Law Systems Divergence

As legal systems and the practice of law can differ quite significantly between jurisdictions, nations, and cultures, it may become difficult for those who wish to interact with clients outside of their field of practice, or in some cases, to practice law across these jurisdictions. This may also be relevant for legal practitioners who wish to learn about relevant legal cases in other countries, but who simply lack the legal education of this different system.

The use of NLP can help to ease this challenge, as modern language models and tools built upon them can serve as helpful guides when faced with questions or inquiries. Models trained on a vast variety of sources, particularly those from multiple languages, can help to bridge the gap between law systems and be used by professionals to inquire about other law systems.

Evaluation

Relevance	Interest	Concerns	# Reports
4.35	4.30	2.13	1.00

7-4 Research Tool / Research Automation

A large part of the day-to-day of legal professionals comes in the form of research: reviewing documents, researching previous court cases, preparing for trial. This process can often involve quite an effort, particularly in the form of ingesting information.

A potential area where AI models can help is in this knowledge acquisition. Modern language models are capable of taking large amounts of textual data as input, and moreover, they possess the ability to make sense of this information quickly and efficiently. Such tools could be invaluable to legal practitioners who are faced with the task of large-scale legal research. The utilization of NLP as a research assistant presents an exciting path going forward for Legal Tech.

Evaluation

Relevance	Interest	Concerns	# Reports
4.35	2.30	2.13	3.67

7-5 e-Discovery

As many documents in today's world exist primarily in digital form, the process of discovery often involves e-discovery, in which digital documents, emails, etc. are shared for a legal case. With this, new challenges are introduced, but at the same time, this opportunity for the assistance of software arises.

Platforms developed to facilitate the management of discovery material, as well as the transfer and storage of these documents, would ease the process of discovery and reduce the need for burdensome and time-consuming traditional processes.

Evaluation

Relevance	Interest	Concerns	# Reports
4.35	2.20	2.13	1.00

ER17 AI Solution Provider: 913.ai

Who is using it?

The solution is targeted at legal service providers.

What problem(s) are they solving?

913.ai (https://www.913.ai/) wants to provide an automation infrastructure that allows users (e.g., legal engineers) to connect various already existing tools in a law firm with each other. Use cases include but are not limited to document classification and information extraction. The solution aims to represent and assist in typical workflows in the daily legal work of lawyers.

Which NLP technologies are they using?

913.ai uses open-source LLMs but also fine-tunes their own models for specific tasks like text extraction or classification. They offer a pipeline builder that allows users to select and link various modules together to depict their own unique scenarios as they need them. They are currently adding more modules and improving already existing ones to make them more adaptable by the users.

Challenges

- GDPR Compliance
- Gaining new customers as customers in the legal domain tend to be more averse to cloud solutions

Source

Interview conducted in April 2024, led by sebis researchers. The interviewee is a lawyer, co-founder and the CEO of the company.

ER18 LLM Usage at a German Law Firm

Who is using it?

The legal tech department of a German law firm is developing and using an AI-based solution for their daily legal work. The department is responsible for legal operations and tries to model legal processes as a series of steps that can be automated with software solutions.

What problem(s) are they solving?

The motivation for the solution was an ever increasing influx of legal correspondence that took too much time sorting through and properly linking it to the respective cases.

Using an AI-based solution to go over all incoming correspondence automatically improves their efficiency since documents are classified and information like deadlines is extracted automatically.

Which NLP technologies are they using?

The law firm uses Salesforce as CRM where they integrated their AI solution through multiple complex workflows. The solution Blaubach.ai (https://www.blaubach.ai/) was specifically developed for internal use first but is now also offered to other interested parties and can be adapted to their specific needs.

The general workflow is that incoming data is passed through the AI solution that automatically detects the docket number and extracts relevant information from the document assigning it to the correct case.

The lawyers annotated the training data themselves and handed the labels off to the data scientists in the team to adapt the AI.

Stage

Production - users are using the tool in their daily workflow

Challenges

- The tool occassionally makes mistakes that need to be double-checked manually by humans
- Integrating new solutions into the existing legal IT landscape and adapting it to existing APIs is not trivial

Source

Two interviews conducted in April 2024, led by sebis researchers, one interviewee is a lawyer and the head of the legal tech department at the company, the other is a data scientist.

ER19 AI Usage at a German Law Firm

Who is using it?

A German law firm with roughly 120 lawyers is exploring the use of AI in their daily legal work. The firm put together an AI Task Force consisting of multiple lawyers from the firm to evaluate AI-based tools regarding their applicability in their daily workflow.

What problem(s) are they trying to solve?

The main use cases are document analysis and document generation, e.g., for documents submitted by a party in a legal proceeding or to create pitch decks. Further use cases include translation and general research. To assist with cases concerning intellectual property, an AI-based tool is used to do similarity analysis, e.g., comparing two logos or design.

Overview of use cases:

- Document analysis
- Document generation
- Translations
- Research
- Similarity Analysis

Which NLP technologies are they using?

The law firm is currently evaluating ChatGPT to find out what for and how it can be used in their legal work. Additionally, Microsoft's Copilot is being explored as a personal assistant, e.g., to search for specific files on the file system. DeepL Pro (https://www.deepl.com/), an AI-based translation tool specifically trained for translation tasks, is used for translations.

How is data privacy cared for?

No privacy-sensitive data is used for testing to avoid any privacy-related issues.

Stage

Production - lawyers use AI-based tools for their daily legal work

Challenges

- Hallucinations - LLM output cannot be used as-is but needs to be double-checked and verified
- A lot of interesting AI solutions are put on the market but there is no proper overview to keep track of developments
- GDPR compliance, privacy and confidentiality need to be ensured
- AI solutions need to be integrated properly into the existing IT landscape and processes, which is not trivial for law firms without or with only a small IT department

Source

Interview conducted in February 2024, led by sebis researchers. The interviewees are working as lawyers at the law firm.

ER20 LLM Usage at a German Healthcare Solution Provider

Who is using it?

A team of several in-house legal experts from a multi-national, German-based technical corporation specializing in healthcare solutions and services. 300 users are currently testing the usage of MS Copilot.

What problem(s) are they solving?

The employees use LLM-based tools for various tasks in their daily work life. For one as a personal assistant for various tasks including quick general questions, translations, summaries of text, and searching for specific files on the system. Another task can be summed up under the umbrella term of content generation, e.g. for email drafts, marketing texts, etc.

The rise in popularity of ChatGPT led legal experts at the company to evaluate if they could also harness the power of LLMs to assist in the daily, routine work of legal contract generation and analysis, which typically requires a great deal of manual time and human effort. The usage of LLMs can help highlight important parts of contracts and give guidance on where a human expert should have a closer look. The contracts are based primarily on German law. Other legal tasks are also being considered.

Another emerging use case is the usage of LLMs to assist in software development wherefore it's currently being tested regarding legal regulations.

Finally, the organization is thinking about deploying chatbots to assist in the communication with customers which could result in a reduction of costs.

Which NLP technologies are they using?

As a technical-oriented organization, employees already had existing access to the Microsoft Office products, which facilitated for the convenient experimentation with MS Copilot and ChatGPT on the Microsoft Azure Cloud. This cloud solution was chosen due to its ease of use, as well as the perceived privacy of using ChatGPT in the cloud, with no need for further training or fine-tuning on proprietary data. Prompt engineering is employed to optimize results.

Software engineers are also evaluating open-source models for generating code and documenting it automatically.

How do they test the quality of their service?

The organization started using the ChatGPT playground in summer 2022. Before that, interested parties experimented with their personal ChatGPT accounts and non-sensitive data, subject to guidelines provided by the organization. The employees do not employ any prompt engineering guides on department level or use any evaluation metrics to determine the effectiveness of the model. The experts manually test the models for their various tasks to determine if their usage for the respective use cases makes sense. One finding is that the more the respective field is legally regulated, the less sense it makes to employ AI, e.g. German lease contracts are too strictly regulated so that LLMs struggle with producing accurate and correct results.

How is data privacy cared for?

Documents are anonymized manually before uploading them to the cloud and making them accessible to the model.

Usage of the public ChatGPT interface is only allowed for non-privacy sensitive matters. For everything else the ChatGPT playground needs to be used as Microsoft claims to not use that data for training purposes.

Stage

Research - different users are experimenting with the usage of LLMs

Barriers to Adoption

- Hallucinations -– Quality, reliability, and correctness of generated responses varies depending on use case.
- Copyright infringement and ensuing liability risk - It's not always clear whether generated responses from the model contain copyrighted content.
- Privacy issues - Data fed into the model should not be used for training.

Source

Interview conducted in January 2024, led by Prof. Florian Matthes and Nektarios Machner. The interviewee is a lawyer and responsible for the IT department at the abovementioned company, where he also looks into what is going on in the IT world regarding useful tools.

8

Use Case Category

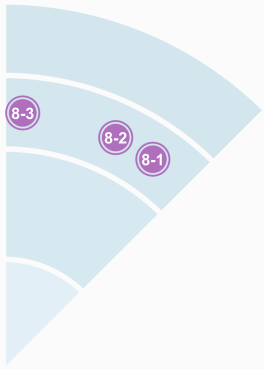
General-Purpose Legal Assistance

Use Cases

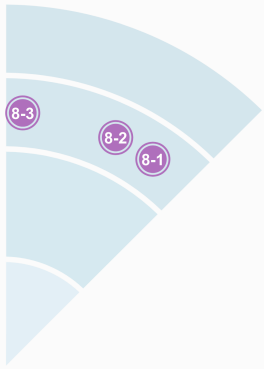
8-1 Matter Management
8-2 Litigation Status
8-3 Legal Hold

The tasks of a legal professional are not limited to the categories listed in this collection. Instead, many other tasks may benefit from automation or the incorporation of NLP solutions. Processes such as matter management or legal hold are some examples of common legal activities which may be well served to automate and expedite.

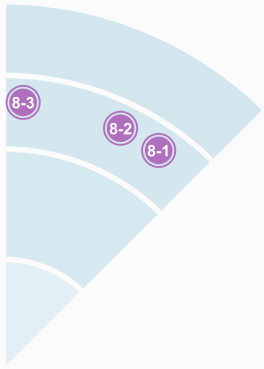
Legal Relevance



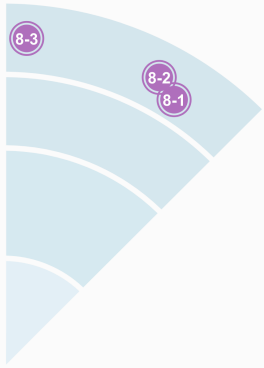
Academic Interest



ELSA Concerns



Number of Reports



8-1 Matter Management

Legal matter management refers to activities involved in managing all aspects of the corporate legal practice ("matters"). Traditionally, this involved managing all the activities related to outside counsel engagement and e-billing. Today, the modern approach to matter management covers the entire range of tasks originating from an organization's internal legal processes, including research, claims, compliance, disputes, litigation, contracts, and intellectual property.

Matter management software systems serve a variety of functions including conflict and ethics control, accurate matter opening, day-to-day matter work, business intelligence, and marketing. NLP tools can also help with these activities, by generating document templates and automatic analysis of documents, to facilitate the work involved with managing legal matters.

Literature

- Orchestrating NLP services for the legal domain, Moreno-Schneider et al.

Literature TL;DR

- **Orchestrating NLP services for the legal domain**: A workflow manager that enables the flexible orchestration of workflows based on a portfolio of Natural Language Processing and Content Curation services as well as a Multilingual Legal Knowledge Graph that contains semantic information and meaningful references to legal documents is described.

Evaluation

Relevance	Interest	Concerns	# Reports
3.88	2.30	1.35	2.33

8-2 Litigation Status

Litigation is a common case in the legal system in which a party or parties aim to settle a dispute in a civil court of law. While some cases may be simple, others may be quite complex in nature, spanning a longer duration of time.

In helping to manage litigation, Legal Tech solutions can serve to keep track of the current status, upcoming court dates, action items to be taken care of, and so on. This can also serve as an important communication tool between representation and clients, in keeping both parties informed of the general timeline and happenings of a particular case.

Evaluation

Relevance	Interest	Concerns	# Reports
3.88	2.00	1.35	1.00

8-3 Legal Hold

The process of discovery is a very important and necessary process in most court cases. Oftentimes, the employment of a “legal hold” may take place in order to preserve relevant documents for (e-)discovery purposes. This can be a cumbersome process, especially if it is not clear which processes should be put on hold, i.e., what relevant documents and materials to preserve.

The automation of this process would be well-served to prevent errors in the legal hold process, as well as to make more efficient the collection and holding of documents for discovery. With such software in place, practitioners would be less burdened by the process of discovery. Overall, this could serve all parties involved well, helping to create a transparent and efficient discovery process.

Evaluation

Relevance	Interest	Concerns	# Reports
3.88	2.30	1.35	1.00

ER21 AI Solution Provider: Hyde

Who is using it?

The solution is targeted at law firms and legal professionals.

What problem(s) are they solving?

The motivation to focus on the legal sector stems from the fact that legal professionals primarily work with text which is predestined to being used with large language models. The offered AI suite aims to assist with multiple legal use cases including case management, document analysis, and document generation based on custom templates specific to the customer.

Which NLP technologies are they using?

Hyde (https://www.hyde.to/) is an AI suite based on language models. The company transitioned from building one large language model into building multiple smaller models specific for individual use cases such as semantic search to query documents for information. The solution is offered as SaaS in the cloud or on-premise depending on the customer's need.

Challenges

- Customer acquisition is not easy in the legal domain as law firms are focused on their work and tend to not have much time for sales calls

Source

Interview conducted in May 2024, led by sebis researchers. The interviewee is a late co-founder and the CPO at the company.

ER22 AI Usage at a German Law Firm

Who is using it?

A large law firm with over 100 lawyers and accountants organized in teams of 10-12 employees distributed over 3 locations is in the process of evaluating legal AI usage at their firm. The target audience of the tools are the lawyers.

As of the date of the interview, the law firm has not yet adopted any company-wide legal AI solution but is testing various tools and models in a decentralized way to determine in which cases an adoption is feasible. Some lawyers already use personal ChatGPT accounts to assist them in their daily tasks.

What problem(s) are they trying to solve?

The employees are in the phase of testing and figuring out what problems related to the legal domain can feasibly be solved with the usage of LLM-based tools.

Some lawyers already use personal ChatGPT accounts as a personal assistant to assist them in their daily tasks which are not restricted to the legal domain such as creating and summarizing texts (e.g., emails) or helping with translations, etc.

Regarding the legal use cases, due to the decentralized nature of the law firm the respective tasks of each department are diverse.

The use cases under investigation include but are not limited to:

- Document generation
- Document analysis of large(r) collections of documents
- Document summarization
- Information research and retrieval

Which NLP technologies are they using?

The law firm is looking at various tools on the market, especially ones also being used by other German law firms, to get an overview of the current tool landscape. The solutions under investigation mainly operate with OpenAI and LLaMa models and are either deployed in the cloud or on-premise. In general, the law firm would prefer an on-premise solution to maintain control over the service. The language requirements are German and English. There is no intention of building their own tools but rather wait for the establishment of market standards that can then be adopted into their own IT landscape.

How do they test the quality of the tools?

Since the rise of LLMs there have been multiple individual uncoordinated tests of LLM usage on a personal level but in the past few months an effort has been made to coordinate the testing and conduct it in a more organized way.

For this purpose, the various departments of the law firm individually test tools regarding their feasibility for their respective use cases. The employees do not use any specific evaluation metrics but come together and define success criteria and test scenarios for each task and then later on get together in working groups to discuss the findings.

How is data privacy cared for?

No privacy-sensitive data is used for testing to avoid any privacy-related issues.

Stage

Research - different users are experimenting with the usage of AI

Challenges

- Commercial / Effort - For a revenue-driven firm the willingness to expend resources on adopting a new solution is limited as it requires additional effort for data preparation and testing before a solution can be integrated into the existing IT landscape.
- Privacy issues - Data fed into the model should not be used for training. For older data (historic data) there are no privacy agreements that allow the usage of the data in such tools.
- Compliance with AI Act

Source

Interview conducted in February 2024, led by sebis researchers. The interviewees are working at the law firm in the position of lawyer and Digital Transformation Manager respectively.

ER23 AI Solution Provider: Justin Legal

Who is using it?

The solution is targeted at law firms and legal professionals.

What problem(s) are they solving?

The company focuses on data collection and data quality to enable digitalization. Clients of law firms can use the solution to provide relevant data for their case in a structured form by following the steps in the tool. Lawyers are then able to review the data digitally and ask questions about the document to the AI assistant.

Which NLP technologies are they using?

Justin Legal (https://justin-legal.com/) provides their service through a SaaS web application. The underlying LLM is ChatGPT 4 deployed on an Azure instance which is used to provide features like text summarization and question & answering. The data can be used to generate new documents, export in various formats, or directly passed via API to standard software solutions.

Challenges

- Properly modeling legal real-world scenarios in a digital system
- GDPR Compliance

Source

Interview conducted in May 2024, led by sebis researchers. The interviewee is the CEO at the company.

NLP TECHNOLOGIES

To support the picture painted by our identified use cases, we also categorize Natural Language Processing (NLP) technologies relevant to the use cases. This is meant to provide a broad overview of the available technologies in the NLP sphere that serve as the technological foundation for Legal AI. Each category is presented with a list of specific NLP technologies, once again along with supporting resources from the literature.

Note that the categorization of NLP technologies was performed by our research team, and it does not necessarily follow any established taxonomy for NLP technologies.

1

NLP Tech Category

Syntactic Analysis

Syntactic analysis, also known as parsing, involves analyzing the grammatical structure of sentences to understand relationships between words. The fundamental purpose of syntactic analysis is to derive meaning from a text. In the analysis, checks are in place so that texts which are not meaningful or which do not make sense can be rejected. The analysis is done at an in-depth level starting from the basic symbols to all the way to an entire sentence. The concept is of critical importance since it enables machines to understand human language. It plays an instrumental role in bridging the gap between humans and systems. Example NLP techniques for syntactic analysis include dependency parsing, construction of a syntax tree, or part-of-speech tagging.

Technology List

- Lexical Normalization
- Tokenizations
- Dependency Parsing
- Part-of-speech tagging

Related Literature

- A semi-automatic system for the consolidation of Greek legislative texts, John Garofalakis
- Towards Recommendations from User-specific Insights based on Historical Legal Cases, Krati Saxena
- Deep Semantic Interpretations Of Legal Texts, L. Thorne McCarty

2

NLP Tech Category

Text Extraction

Text extraction is the process of pulling specific information or data from unstructured text. As machines need the information to be in a structured form, for example in a table, text extraction serves to identify relevant information in unstructured text and transforms it into a type of structured information that is easier to process. The goal of text extraction or information extraction (IE) is to make the text's semantic structure explicit so that we can make use of it. More precisely, it is the process of analyzing text and identifying mentions of semantically defined entities and relationships within it. The entities and relationships that are of interest can be detected and extracted with NLP techniques involving named entity recognition, relation extraction, or event extraction.

Technology List

- Named Entity Recognition
- Keyword Extraction

Related Literature

- CLIEL: Context-Based Information Extraction from Commercial Law Documents
- Identifying Legal Party Members from Legal Opinion Documents using Natural Language Processing
- Reference Extraction from Vietnamese Legal Documents
- Semantics-Based Legal Citation Network, Paul Zhang
- SEBI Regulation Biography, Buggana, Sathvik Sanjeev, et al.
- NLP-based Extraction of Modificatory Provisions Semantics, Alessandro Mazzei
- A Combined Rule-Based and Machine Learning Approach for Automated GDPR Compliance Checking, Rajaa EL HAMDANI
- An Anonymization Tool for Open Data Publication of Legal Documents, Oksanen, A., Hyvönen, E., Tamper, M., (...), Kokkonen, M., Hietanen, A.
- Hybrid AI Framework for Legal Analysis of the EU Legislation Corrigenda, Palmirani, M., Sovrano, F., Liga, D., Sapienza, S., Vitali, F.
- Named Entity Recognition for Rental Documents Using NLP, Patil, C., Patil, S., Nimbalkar, K., (...), Sengupta, S., Rajadhyax, D.
- Legal knowledge extraction for knowledge graph based question-answering, Sovrano, F., Palmirani, M., Vitali, F.
- Searching Case Law Judgments by Using Other Judgments as a Query, Sami Sara, Eero Hyvönen
- Frequent use cases extraction from legal texts in the data protection domain, Leone, V., Di Caro, L.
- Legal data extraction and possible applications, K Stoykov and S Chelebieva
- Automated Extraction of Semantic Legal Metadata Using Natural Language Processing, Stoykov, K., Chelebieva, S.
- Litigation Analytics: Case outcomes extracted from US federal court dockets, Thomas Vacek, Ronald Teo, Dezhao Song, Timothy Nugent, Conner Cowling and Frank Schilder
- Automated Extraction of Sentencing Decisions from Court Cases in the Hebrew Language, Mohr Wenger, Tom Kalir, Noga Berger, Carmit Klar Chalamish, Renana Keydar and Gabriel Stanovsky
- Named Entity Recognition in Indian court judgments, Prathamesh Kalamkar, Astha Agarwal, Aman Tiwari, Smita Gupta, Saurabh Karn and Vivek Raghavan

3

NLP Tech Category

Document Analysis

Document analysis encompasses techniques for understanding and processing entire documents. It refers to the process of systematically examining meaningful information from text documents and deriving use and added value from them. Document analysis is crucial within NLP as it enables the automation of understanding and organizing large volumes of text data, transforming unstructured data into structured insights. This capability is essential for various applications, including information retrieval, customer feedback analysis, legal document review, and content recommendation systems.

Technology List

- Entity Linking/Named Entity Disambiguation
- Document Similarity Analysis

Related Literature

- Towards Recommendations from User-specific Insights based on Historical Legal Cases, Saxena, Krati, Sagar Sunkle, and Vinay Kulkarni
- BERT-based Ensemble Methods with Data Augmentation for Legal Textual Entailment in COLIEE Statute Law Task, Yoshioka, M., Aoki, Y., & Suzuki, Y.
- Organizing Portuguese Legal Documents through Topic Discovery, Vianna, D., & Silva de Moura, E.
- When is the Time Ripe for Natural Language Processing for Patent Passage Retrieval? Andersson, L., Lupu, M., Palotti, J., Hanbury, A., & Rauber, A.
- A Combined Rule-Based and Machine Learning Approach for Automated GDPR Compliance Checking, Hamdani, R. E., Mustapha, M., Amariles, D. R., Troussel, A., Meeùs, S., & Krasnashchok, K.
- An Anonymization Tool for Open Data Publication of Legal Documents, Oksanen, Arttu, et al.
- Searching Case Law Judgments by Using Other Judgments as a Query
- Understanding Legal Documents: Classification of Rhetorical Role of Sentences Using Deep Learning and
- Natural Language Processing, S. R. Ahmad, D. Harris and I. Sahibzada
- Design of Contract Review System in Enterprise Legal Department Based on Natural Language Processing, L. Yaqin, C. Gang, Z. Runkai and S. Mengting
- Litigation Analytics: Case outcomes extracted from US federal court dockets, Thomas Vacek, Ronald Teo, Dezhao Song, Timothy Nugent, Conner Cowling, and Frank Schilder
- Finding Contextually Consistent Information Units in Legal Text, Seyler, D., Bruin, P., Bayyapu, P., & Zhai, C. X
- Processing Long Legal Documents with Pre-trained Transformers: Modding LegalBERT and Longformer, Dimitris Mamakas, Petros Tsotsi, Ion Androutsopoulos, and Ilias Chalkidis

4

NLP Tech Category

Text Representation

Text representation involves converting text into numerical vectors or embeddings that machine learning models can work with. These representations should ideally capture the semantic and syntactic nuances of language. Effective text representation is crucial because it directly influences the performance of all downstream NLP tasks, such as document retrieval or text classification. Good representations preserve the meaning and context of text, enabling models to learn patterns and make accurate predictions. Basic approaches include techniques such as Bag-of-Words (BoW), while advanced techniques such as contextual embeddings have significantly improved the ability of models to understand and generate human language. This highlights the importance of sophisticated text representation in achieving state-of-the-art results in NLP.

Technology List

- Word Embedding
- Language Modeling

Related Literature

- BERT-based Ensemble Methods with Data Augmentation for Legal Textual Entailment in COLIEE Statute Law Task, Yoshioka, M., Aoki, Y., & Suzuki, Y.
- Deep Semantic Interpretations Of Legal Texts, McCarty, L. T.
- Towards Automated Auditing with Machine Learning, Sifa, Rafet, et al.
- Intelligent BERT-BiLSTM-CRF Based Legal Case Entity Recognition Method, Sun, M., Guo, Z., & Deng, X.
- A Combined Rule-Based and Machine Learning Approach for Automated GDPR Compliance Checking, Rajaa EL HAMDANI
- NLP Based Latent Semantic Analysis for Legal Text Summarization, K. Merchant and Y. Pande
- jurBERT: A Romanian BERT Model for Legal Judgement Prediction, Mihai Masala, Radu Cristian Alexandru Iacob, Ana Sabina Uban, Marina Cidota, Horia Velicu, Traian Rebedea, and Marius Popescu
- Learning from Limited Labels for Long Legal Dialogue, Hong, J., Chong, D., & Manning, C. D
- Processing Long Legal Documents with Pre-trained Transformers: Modding LegalBERT and Longformer, Mamakas, D., Tsotsi, P., Androutsopoulos, I., & Chalkidis, I.

5

NLP Tech Category

Text Generation

Text generation involves constructing new textual content by automatically producing words, sentences, and documents. This task is in the legal domain often approached with rule-based techniques that leverage templates, i.e., pieces of pre-filled text that serve as the backbone of a document that will be constructed. Modern large language models have tremendously improved the generative capabilities and are a commonly used tool for quickly producing and refining long textual outputs. Text generation encompasses many NLP tasks such as summarization, translation, simplification, and paraphrasing.

Technology List

- Text Summarization
- Machine translation

Related Literature

- When is the Time Ripe for Natural Language Processing for Patent Passage Retrieval? Andersson, L., Lupu, M., Palotti, J., Hanbury, A., & Rauber, A.
- Summarising Legal Texts: Sentential Tense and Argumentative Roles, Grover, C., Hachey, B., & Korycinski, C.
- NLP Based Latent Semantic Analysis for Legal Text Summarization, K. Merchant and Y. Pande
- Summarization of German Court Rulings, Glaser, I., Moser, S., & Matthes, F.
- Automating Claim Construction in Patent Applications: The CMUmine Dataset, Tonguz, O., Qin, Y., Gu, Y., & Moon, H. H.

6

NLP Tech Category

Conversational NLP

Conversational AI or conversational NLP refers to technologies, such as chatbots or virtual agents, that users can talk to. They use large volumes of data, machine learning and natural language processing to help imitate human interactions, recognizing speech and text inputs and translating their meanings across various languages. These NLP processes flow into a constant feedback loop with machine learning processes to continuously improve the AI algorithms. Conversational agents can be used to assist end users with various tasks and needs. NLP techniques involve dialogue state tracking and natural language understanding of user intents.

Technology List

- Chatbot Development
- Question Answering

Related Literature

- WestSearch Plus: A Non-factoid Question-Answering System for the Legal Domain, McElvain, G., Sanchez, G., Matthews, S., Teo, D., Pompili, F., & Custis, T.
- Legal knowledge extraction for knowledge graph based question-answering, Sovrano, F., Palmirani, M., Vitali, F.
- Learning from Limited Labels for Long Legal Dialogue, Hong, J., Chong, D., & Manning, C. D

7

NLP Tech Category

Text Classification

Text classification categorizes text documents into predefined classes or labels. It's applied in tasks like sentiment analysis, spam detection, and topic classification, helping automate content sorting and analysis. Text classifiers can structure, arrange, and classify almost any type of text, including articles, medical research, and customer tickets, as well as text found on the internet. By automating the classification of text, organizations can efficiently process and organize large volumes of data, extract valuable insights, and enhance decision-making processes.

Technology List

- Topic Modeling
- Concept Models
- Text Classification

Related Literature

- Organizing Portuguese Legal Documents through Topic Discovery, Vianna, D., & Silva de Moura, E.
- Intelligent BERT-BiLSTM-CRF Based Legal Case Entity Recognition Method, Sun, M., Guo, Z., & Deng, X.
- Prediction of monetary penalties for data protection cases in multiple languages, Ceross, A., & Zhu, T.
- When is the Time Ripe for Natural Language Processing for Patent Passage Retrieval? Andersson, L., Lupu, M., Palotti, J., Hanbury, A., & Rauber, A.
- NLP-based Extraction of Modificatory Provisions Semantics, Alessandro Mazzei
- Modificatory Provisions Detection: a Hybrid NLP Approach, Davide Gianfelice, Leonardo Lesmo, Monica Palmirani, Daniele Perlo, and Daniele P. Radicioni
- Hybrid AI Framework for Legal Analysis of the EU Legislation Corrigenda, Palmirani, M., Sovrano, F., Liga, D., Sapienza, S., Vitali, F.
- Understanding Legal Documents: Classification of Rhetorical Role of Sentences Using Deep Learning and Natural Language Processing, S. R. Ahmad, D. Harris and I. Sahibzada
- Litigation Analytics: Case outcomes extracted from US federal court dockets, Thomas Vacek, Ronald Teo, Dezhao Song, Timothy Nugent, Conner Cowling and Frank Schilder
- Legal Area Classification: A Comparative Study of Text Classifiers on Singapore Supreme Court Judgments, Soh et al.
- Performance in the Courtroom: Automated Processing and Visualization of Appeal Court Decisions in France, Boniol, P., Panagopoulos, G., Xypolopoulos, C., Hamdani, R. E., Amariles, D. R., & Vazirgiannis, M.
- Finding Contextually Consistent Information Units in Legal Text, Seyler, D., Bruin, P., Bayyapu, P., & Zhai, C. X
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- Semi-automatic Triage of Requests for Free Legal Assistance, Mistica et al.
- On What it Means to Pay Your Fair Share: Towards Automatically Mapping Different Conceptions of Tax Justice in Legal Research Literature, Gubelmann et al.
- ClassActionPrediction: A Challenging Benchmark for Legal Judgment Prediction of Class Action Cases in the US, Semo et al.

8

NLP Tech Category

Other

As the field of Natural Language Processing is highly diverse and continually expanding, not all identified technologies could be conveniently placed into one of the above NLP Technology categories. Therefore, we place two technologies in this final category, namely NLP in General and Version Control. With the former, we hope to capture NLP papers not necessarily introducing new technologies, but rather those that provide surveys or meta-analyses.

Technology List

- NLP in General
- Version Control

Related Literature

- AI & Law: Formative Developments, State-of-the-Art Approaches, Challenges & Opportunities, Jack G. Conrad, Shirsha Ray Chaudhuri, Shounak Paul, and Saptarshi Ghosh
- A semi-automatic system for the consolidation of Greek legislative texts, John Garofalakis, Konstantinos Plessas, and Athanasios Plessas
- A Natural Language Processing Survey on Legislative and Greek Documents, Panteleimon Krasadakis, Evangelos Sakkopoulos, and Vassilios S. Verykios
- Orchestrating NLP services for the legal domain, Moreno-Schneider et al.

Conclusion

The field of Legal AI presents the opportunity for a wide and diverse range of use cases, and some of them are presented here in this report. Powered by emerging AI technologies, we hope that these use cases will serve to accelerate the legal domain forward into a more efficient and digitalized future.

Our set of experience reports aims to solidify this point: companies ranging from large to small are beginning to harness the promise of AI in the legal sphere, and we find ourselves largely in a period of exploration and experimentation. We predict that this period will persist over the next year as legal practitioners continue to validate the usability of such technologies in their daily work.

Already in the planning stages for the next iteration of our study, we strive to extend the basis presented in this work, mainly to measure the direction of Legal AI use cases over time, based on our four defined metrics. We also plan to refine and improve our methodology, with the goal of broadening the insights we gain from practitioners and accurately representing this in our metric set.

As Legal AI technologies continue to become more available and capable, it is important to keep their practical applicability in sight, as without defined use cases, the promise of AI technologies will not reach their full potential in the legal domain. The Legal AI Use Case Radar will continue to identify and update these use cases in a yearly fashion, providing researchers and practitioners alike with an up-to-date and comprehensive survey of the Legal AI landscape.

sebis

Garching, 01.07.2024

FOR MORE INFORMATION

https://wwwmatthes.in.tum.de/

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