Conceptual Framework Guided Legal Case Perspectives for Strategic Case Planning

Krati Saxena, Sagar Sunkle and Vinay Kulkarni

Tata Consultancy Services Research, Pune, India

Abstract

When a plaintiff or a defendant finds themselves engaged in a legal case, they often turn to legal practitioners for getting perspective on their legal standing and how the argument and conflicts play a part in the court's decision making. Since much of the past legal proceedings are accessible online, many individuals seeking legal counsel use a search engine to obtain some knowledge of related historical cases on their own. In this research, we present a conceptual framework based generation of legal case perspectives for further case planning. For previous legal proceedings, we construct conceptual frameworks led by a surrogate template generic to all court cases. We generate concept classifications and indications using these conceptual frameworks, used later in the text search to extract relevant text spans to generate numerical analyses for getting perspective on the historical data. We provide users with a case characterization system, in which users select case elements that apply to their situation. We construct the numerical perspective evaluation based on case characterization by parsing the text from historical cases. We explain our system using two case studies: Divorce and Parental alienation cases demonstrating the effectiveness of the system in case planning.

Keywords

Conceptual Framework, Legal Case Perspectives, Legal Domain, Knowledge Engineering

1. Introduction

Nowadays, a large volume of legal data is available online in the form of court cases from specific courts, articles, acts, and other secondary materials. When individuals encounter a legal situation, they look for these points of information to get a legal interpretation of their case. However, because of the formal and specialized vocabulary used in legal documents, they may find it hard to understand it. As a result, people seek legal counsel from practitioners to anticipate their position in the case and what factors impact the decision-making of the trial.

Likewise, legal professionals may also choose to analyze historical data to gain insight into the interests of their customers. Nevertheless, it is a tedious job to look for client-specific cases and understand the significant insights from them.

Current research in this area explores the use of natural language processing on legal texts to assist legal professionals in various ways. Case summaries [1, 2, 3, 4, 5], legal entity extraction [6, 7, 8], creation and application of legal ontology [9, 10, 11, 12, 13, 14, 15], argument extraction [16] are some of the widely explored areas in legal research. However, for generating concrete perspectives for individual case scenarios, users have to invest effort with these outputs at their disposal.

In this work, we introduce a human-in-the-loop procedure for strategic case planning to produce legal case perspectives. Both the clients or the parties contesting the legal case and the legal experts can use the system to gain information from similar prior proceedings, thus helping them prepare their next steps in the case.

For generating the legal perspectives from past cases, we present a generalized surrogate template applicable in most of the court's cases. The surrogate template drives the creation of conceptual frameworks for the data. We create concept classifications and indications from the conceptual framework. For filtering the past cases that are similar to the user's situation, we provide a case characterization system. Using text search and parsing on the filtered data, aided using concept classifications and indications, we generate numerical perspective evaluation that enables planning the future case-related activities.

Two of our specific contributions are:

- In a way that is readily accessible by both legal and non-legal users with some legal knowledge, our method provides numerical perspectives evaluation from historical cases.
- The proposed framework advocates a fairly abstract categorization system applying to every legal realm adept at facilitating strategic legal planning.

Following is the organization of this paper. In the Section 2, we explain the method. In Section 3, we explicate our approach using two legal spheres, namely divorce and parental alienation. In Section 4 , we address the findings. We discuss the existing research and summarize the paper in Section 5 and 6, respectively.

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krati.saxena@tcs.com (K. Saxena); sagar.sunkle@tcs.com (S. Sunkle); vinay.vkulkarni@tcs.com (V. Kulkarni)

0000-0001-7049-9685 (K. Saxena)

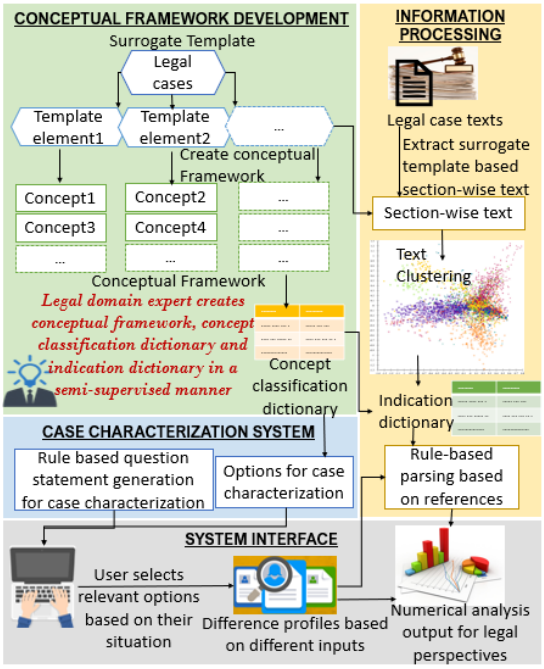

Figure 1: Overview of the proposed method

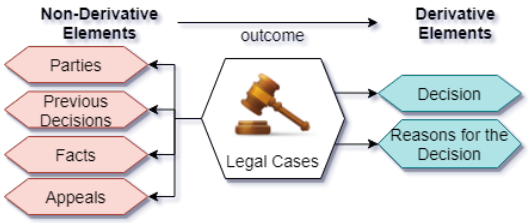

Figure 2: Surrogate template for legal cases

2. Methodology

The overview of the method is shown in Figure 1. In *Conceptual Framework Development*, we establish the conceptual structures for the legal domain and describe concepts and concept-identifying references for these notions. To define additional indications for the concepts used for the search and parse operation for generating numerical analysis, we use *Information Processing* techniques. We create a *Case Characterization System* used to capture the case of the user. Lastly, to present input options and monitor the results, we use the *System Interface*. Next, we explain all the stages in-depth.

2.1. Conceptual Framework Development

We note that all legal proceedings consist mainly of six elements. Four non-derivative elements are the parties concerned, previous decisions (on an ongoing case(s)), the parties' facts, and the parties' appeals. The two derivative elements are the decision of the court and the reasons for the decision. The derivative elements are the outcome of non-derivative elements in the case. Using these elements, we build a surrogate template to represent legal cases, as shown in Figure 2.

We map the text into these six surrogate template elements and collate them from all the files. We extend the surrogate template to create the element-wise conceptual framework for a legal domain. We use the approach proposed by Sagar et al. [17], which is a human-in-the-loop strategy of formulating the conceptual framework. The concept model generator [17] provides an automatically generated baseline model. The legal expert modifies the baseline model by adding, deleting, or changing the concepts and their references by checking the text.

The conceptual frameworks aid us in the creation of concept classifications for each surrogate template element. The conceptual context, for example, a) shows who are the parties fighting the case, b) what the relevant factual topics are, c) what problems did the past verdicts raised, d) what are the categories of appeal in the proceedings, and e) what are the final verdicts and relevant topics in the reasoning for the verdicts. While creating the conceptual framework, the expert saves the concept classifications in the form of a dictionary, where surrogate template elements are the keys, and the concepts in each element are the values. We call this a *concept classification dictionary*. The expert also saves the references of the concepts in the text as a dictionary, in which keys are the concepts and values are the references. References are the terms in the text which correspond to the concept. For example, the appellant, applicant, the plaintiff are the references for the concept appellant. We call this an *indication dictionary*.

2.2. Information Processing

At this point, the *indication dictionary* contains the terms which correspond to the concepts. However, there may be phrases that are representative of such concepts. We process the case files to classify those. We apply standard normalization to the text. Countries around the world document their cases in various ways. They may contain different section names or no sections at all, still communicating all the information mentioned in the surrogate template. In the cases under consideration, we map the particular set of sections into six elements specified in the surrogate template. If there are no sections in the text,

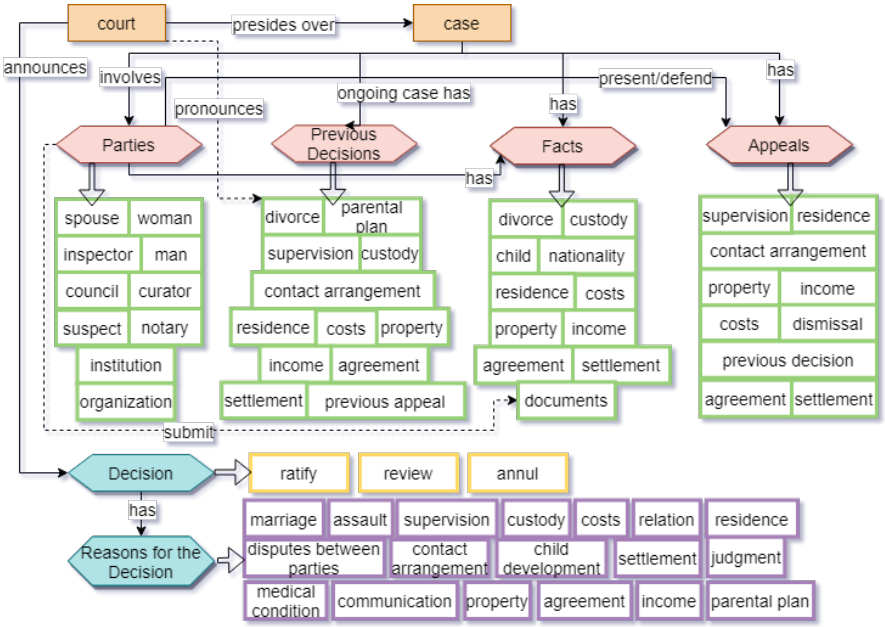

Figure 3: Conceptual framework for divorce cases: hexagonal structures represent surrogate template elements, rectangular boxes are the concepts, both making keys and values of the divorce concept classification dictionary.

one needs to map the text to various surrogate template elements manually.

We collate the element-wise text from all the files and cluster the sentences. We vectorize the text using TF-IDF vectors and use Principal Component Analysis (PCA)[1] for dimension reduction. We apply K-means Clustering[2] to the resultant embedded text. We keep the number of clusters, k as a variable that can be adjusted based on the results one is getting. We get relevant clustered sentences for $k = 10$. From each group, we show 20 sentences at random. The expert goes through the sentences and identify any phrases that represent a concept, and add it to the *indication dictionary*.

We use the *indication dictionary* later for search and parsing operations for getting the relevant text spans to generate the numerical perspective output.

2.3. Case Characterization System

The designing of the case characterization system requires the use of the *concept classification dictionary*. This system creates question statements and options for the users to characterize their case. We create rule-based question statements from the non-derivative elements of the surrogate template. We add “Select the most appropriate" before the non-derivative element followed by “categories for your situation". We parse the *concept classification dictionary* to obtain the corresponding options. Since these questions are case category-specific, we add one more question statement before all of them: “Select the case category" for filtering the legal domain. The options for this statement are all the legal domains available in the dataset.

2.4. System Interface

System interface shows the question statements and options from the case characterization system. Based on the options selected by the user, the *indication dictionary* provides the terms and phrases to search the text. We calculate the numerical statistics of count and percentages from the text spans where values of *indication dictionary* appears. We display text spans and statistical results as the output.

3. Case Studies

We describe two case studies: parental alienation (PA) and divorce proceedings. Parental alienation often referred to as PA, is a condition in which, one parent employs techniques such as manipulating, isolating, or conditioning to distance a child from the other parent [18].

[1]Principal component analysis in sklearn https://scikit-learn.org/stable/modules/generated/sklearn.decomposition.PCA.html

[2]K-Means clustering https://scikit-learn.org/stable/modules/generated/sklearn.cluster.KMeans.html

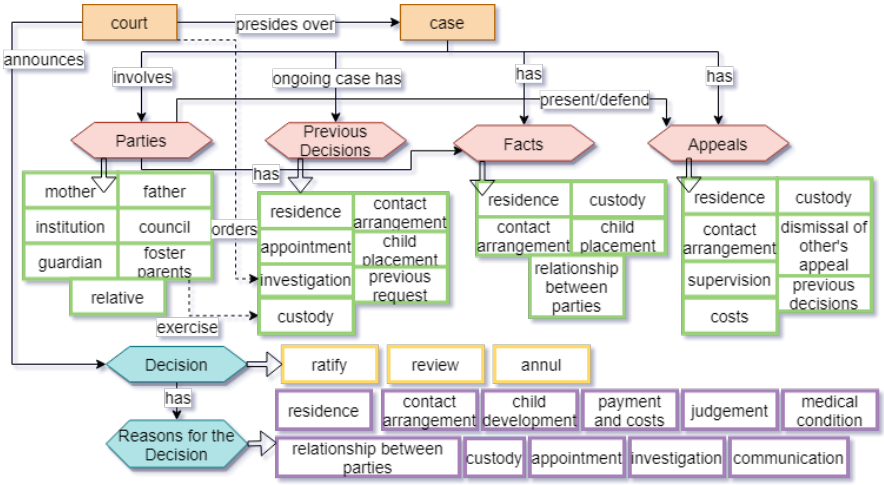

Figure 4: Conceptual framework for Parental Alienation cases: hexagonal structures represent surrogate template elements, rectangular boxes are the concepts, both making keys and values of the PA concept classification dictionary.

Divorce refers to the separation of husband and wife. The rationale behind choosing these civil spheres is that the psychological and mental health of the people involved is significantly influenced by both parental alienation and divorce cases [19]. In helping the parties to understand the dynamics of such situations, a framework of legal perspectives may be helpful, for instance, to a poor married spouse or an estranged parent.

Statistics[3] show that Europe is the top continent with the highest divorce rates in the world. Divorce is one of the major causes of parental alienation. Due to the easy availability of data, we use legal cases from Dutch civil court. The Netherlands[4] is in the top 10 countries with the highest divorce rates in Europe.

For PA[5] and divorce[6] proceedings, our case datasets contain 109 and 102 case files, respectively.

Using Google Translate API[7], we change the language of legal documents from Dutch to English. The translated data of the Dutch civil court already contains sections mappable to the surrogate template elements. If the data has varying section names, then one can manually create a section-mapping dictionary to map the sections. If there are no sections, one needs to add the relevant section names to the text. We collate the resultant text, and then the expert creates the element-wise conceptual frameworks.

Due to limited space availability, we show a succinct representation of conceptual constructs for divorce and parental alienation cases in Figures 3 and 4 respectively. The hexagonal structures are part of the surrogate template that informs the conceptual framework modelling. The classifications of the groups that appear in each surrogate template element are the rectangular constructs in the conceptual frameworks. Solid lines in the figures reflect how the surrogate template elements relate to each other. We also show dotted lines that explicate how the classifications relate to each other. We only show two sample classification concept relations due to space restrictions. The figures also show the *concept classification dictionary*, where the keys are the hexagonal structures (surrogate template elements), and the values are the rectangular elements (the classifications in each element).

Composition of PA and Divorce Cases The cases of parental alienation apply specifically to child custody cases. Multiple stakeholders, such as parents, relatives, foster care, and institutions (such as youth care centres) may start the cases. The key subjects of the dispute are the residence of the child, provisions for contact among the parties and the child, custody of the child, supervision of child with child care services, and the expenses of child development and legal proceedings.

The cases of divorce between men and women are contested mainly with the participation of other stakeholders. The cases primarily concern marriage disputes, costs and fees to be borne by the spouses, including costs of child care, housing expenses, costs of subsistence and litigation costs, distribution of marital assets, arrangements

[3]Divorce demography https://en.wikipedia.org/wiki/Divorce_demography

[4]Divorce rates in Europe in 2017, by country https://ec.europa.eu/eurostat/statistics-explained/index.php/Marriage_and_divorce_statistics

[5]Sample file available at https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:GHAMS:2019:44, more files available with other nomenclatures.

[6]Divorce cases https://jure.nl/echtscheiding

[7]Google Translate API https:/translate.google.com/

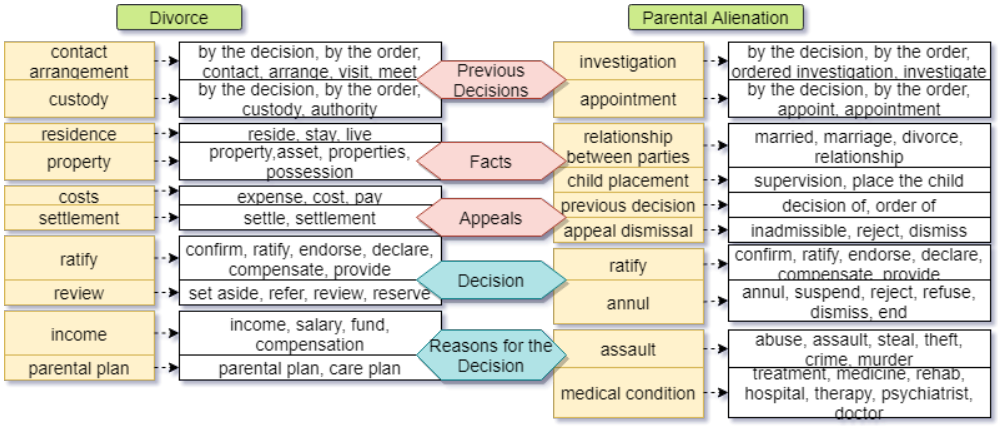

Figure 5: Sample keys and values from indication dictionary for divorce and parental alienation cases

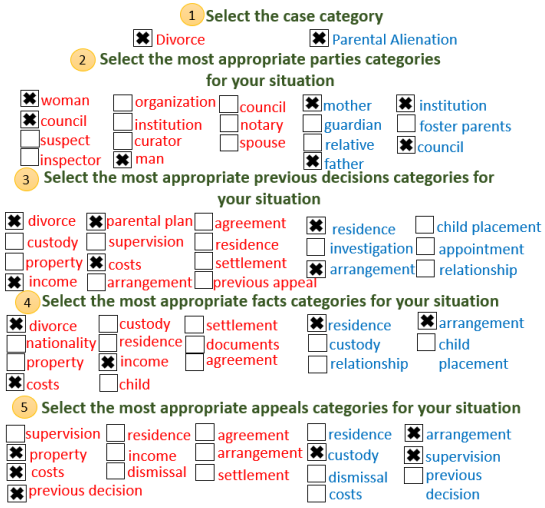

Figure 6: Case characterization questions (green) along with the selected (cross-marked) options for divorce (red) and parental alienation (blue) cases.

between the parties, and other agreements. If the man and woman have children the issues in PA cases often become applicable in divorce cases, such as jurisdiction over children, care of children, their home, and communication agreements between the divorcing parties and their children.

In the two cases, the common factor is the judge. The court chairs the proceedings. The parties send to the court items of evidence and records and address their disputes. The court directs the investigation, appoints the board, and announces a judgement requiring the parties to take the requisite measures.

Text Processing and Case Characterization The expert creates the *concept classification dictionary* using the conceptual framework. We process the case texts and cluster the sentences to aid the expert in identifying additional references of the concepts to generate the *indication dictionary*. Figure 5 shows the sample keys and values for a few concepts for divorce and PA cases.

As described in Section 2.3, we create the question statements for the case characterization of the user shown in dark green color in Figure 6.

We parse the *concept classification dictionary* for providing the options for each question statements. For creating the numerical analysis, we parse the text using the *indication dictionary* values based on the options chosen by the user, which are the keys of the *indication dictionary*.

4. Perspectives and Case Planning through Numerical Analysis

The System Interface lets the user choose the options that are most relevant in their situation as mentioned in the Section 2.4. We show sample outputs for the chosen options shown in Figure 7, 8, 9, 10, 11. In Figure 6, the cross-marked options are the set of options selected by the user. With each input, the system shows the output before presenting the next question.

A different set of choices return a different set of perspectives from the historical legal cases.

4.1. Case Category

Input-Output The first question statement posed to the user is to Select the case category. All the jurisdictions domain present in the dataset are included in the choices.

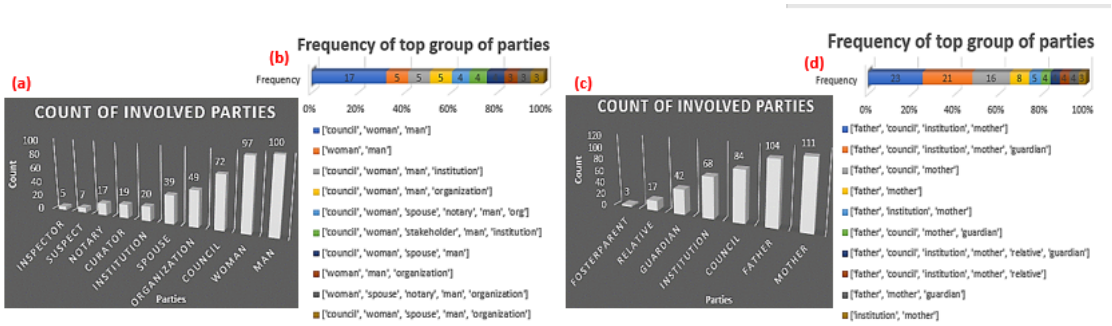

Figure 7: Case category results: (a) parties count in divorce cases, (b) frequency of top parties in divorce cases, (c) parties count in PA cases , (d) frequency of top parties in PA cases.

In our case, they are Divorce and Parental Alienation. Based on the user's choice, further options are based on the legal domain-specific concept classifications as shown in red and blue colour in Figure 6 for divorce and PA respectively.

The output returns numerical information on the involved parties, and the text spans from which the numerical results are calculated. The outcome indicates the number of parties that usually compete in the selected court cases and the top group of parties fighting together. Figure 7(a),(c) shows the party count and Figure 7(b),(d) shows top group of parties for divorce and PA cases respectively.

Perspective and Case planning Parties' data discloses general stakeholders in a civil sphere. It also includes details on the groups which mostly appear together, which helps the non-legal user explore who may get involved in their cases that the user might not have realized previously. For example, man and woman are the top parties in divorce cases. Nevertheless, council, man, and woman are the top-most occurring group in divorce cases. The user also learns that there may be some cases involving specific organizations, notaries, curators.

Similarly, the father and mother are the top fighting parties for child custody in PA cases. The council and the institution are part of the top group involved in the PA cases alongside father and mother. Also, the user recognizes that there may be other parties that may be a part of the case, such as foster parents, relatives, and guardians.

The legal user also gets this information readily available to them. The legal professional might like to introduce or use one of those parties in the current case to get maximum benefit in their appeal.

4.2. Parties

Input-Output The second question statement presented to the user is Select the most appropriate parties categories for your situation. The user is shown the options for all the parties involved according to the legal domain chosen in the first step. We present the outputs for the situation when man, woman and council are selected for divorce cases, and mother, father and council are chosen for PA cases.

The choice of the parties yields the text spans and numerical results on previous decisions and the parties associated with each category of the previous decision. Figure 8(a), 8(c) shows percentage distribution of categories and Figure 8(b), 8(d) shows a stacked graph of counts of parties in the previous decision for divorce and PA cases.

Perspective and Case planning The results for divorce cases show that divorce, previous appeals, the residence of the child, and the arrangements between the parties are the top previous decision categories. Similarly, in PA cases, they are child placement with the institution, arrangement between the parties, and previous requests. The results also convey the association of the parties in various categories. Divorce results show that man and woman plays a vital role in most of the previous decision categories. It shows that man is more engaged in specific categories, such as costs, income, and arrangement. Other categories such as agreement and divorce have an equal engagement of both man and woman.

Similarly, the PA results show major involvement of mother, father, council, and institution in various categories. The institution and council are more likely to be involved in child placement decisions and previous requests. Father and mother are concerned with topics like arrangement, custody, child placement, and residence.

For a non-legal user, these results show insights on the topics where decisions get pending, or some actions

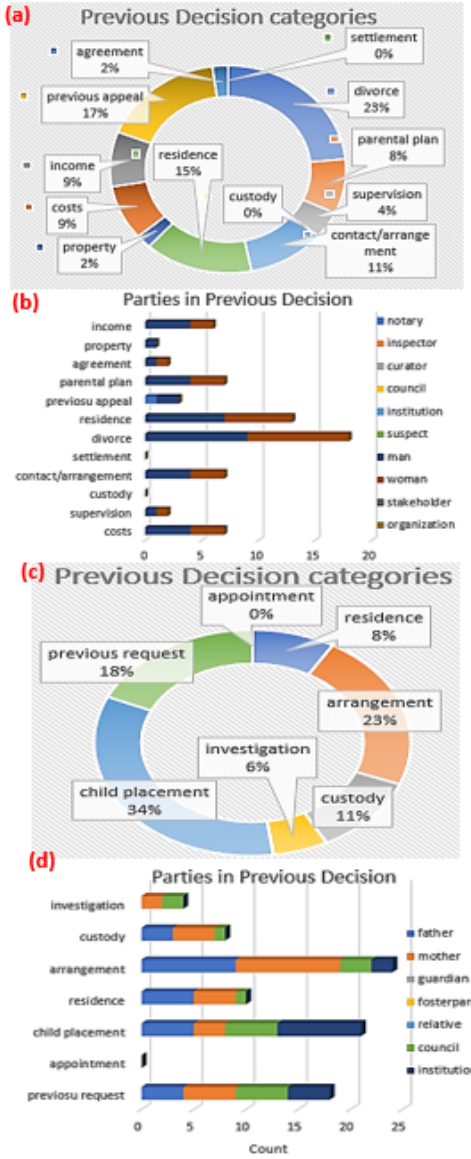

Figure 8: Party results: (a) previous decision categories in divorce cases, (b) parties involved in previous decision for divorce cases, (c) previous decision categories in PA cases, (d) parties involved in previous decision for PA cases.

can be requested from the parties. For legal professionals, perspective on previous decisions can be extremely beneficial. They can plan the case around the relevant topics to get the court's decision in a particular way, for example, if the attorney needs time to search more information or evidence in a particular circumstance, appeals around certain subjects may stall the case till the next hearing.

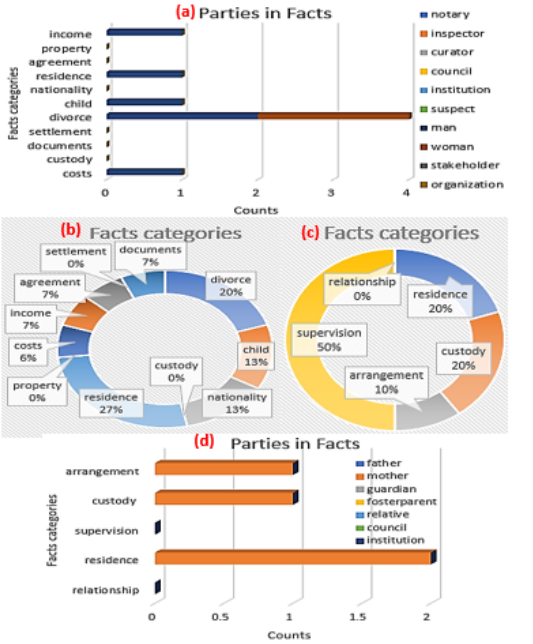

Figure 9: Previous Decision results: (a) parties involved in facts categories for divorce cases, (b) facts categories in divorce cases, (c) facts categories in PA cases, (d) parties involved in facts categories for PA cases.

4.3. Previous Decisions

Input-Output The next question statement is Select the most appropriate previous decisions categories for your situation.

We present the results for divorce cases where the user chooses to divorce, parental plan, costs, and income categories and for PA cases where the user selects residence and arrangement categories.

The selection of previous decisions leads to numerical results and text spans of the facts of the cases. We show the percentage distribution of fact categories and the parties involved in facts for divorce cases in Figure 9(b) and 9(a) and analogously for PA cases in 9(c) and 9(d).

Perspective and Case planning Divorce outcomes show that facts related to divorce, residence, child, and nationality are the most significant. The facts of divorce are relevant to both the man and the woman. But, mostly the facts related to the income, costs, child, and residence of the child are related to the man. Likewise, for PA cases, supervision, residence, and custody-related facts are the most significant. The mother plays a vital role in the arrangement, custody, and residence of the child.

Non-legal users discover the crucial facts that may help in their situation. By presenting persuasive evidence and facts on specific topics concerning certain parties, the

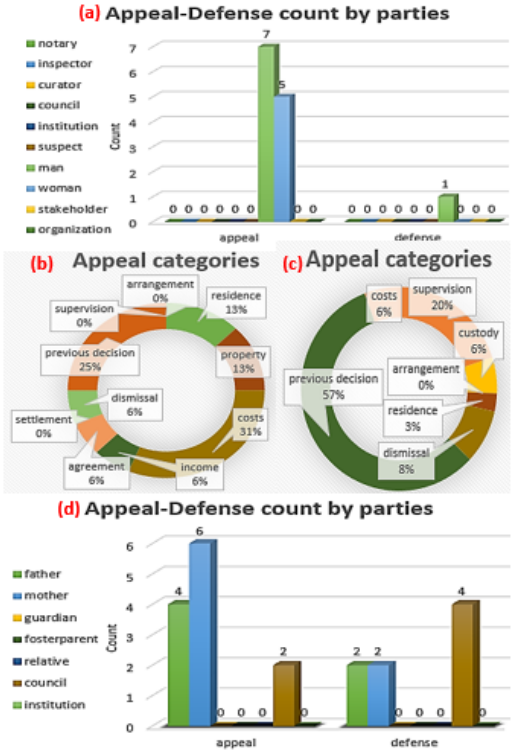

Figure 10: Fact results: (a) appeal-defense party count for divorce, (b) appeal categories for divorce, (c) appeal categories for PA cases, (b) appeal-defense party count for PA.

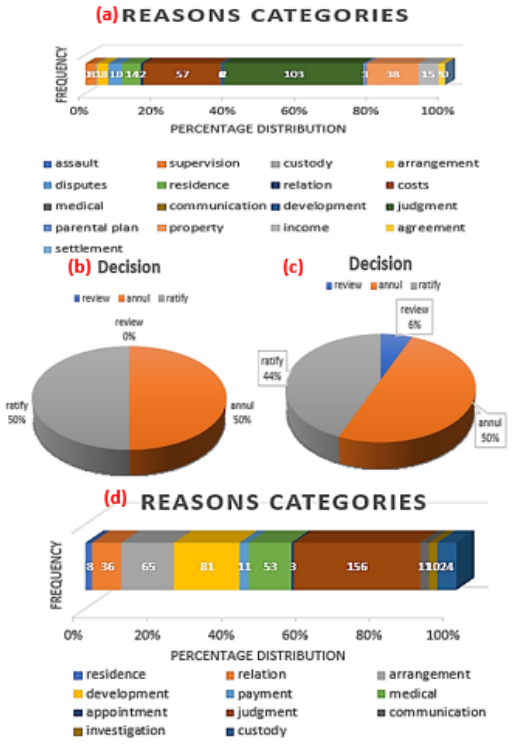

Figure 11: Appeal results: (a) reason categories in divorce, (b) decision in divorce, (c) decision in PA, (d) reason categories in PA cases.

relevance of the facts revealed through the numerical results can assist the legal professionals in designing their case.

4.4. Facts

Input-Output The fourth question statement is Select the most appropriate facts categories for your situation.

We present the results for divorce cases where the user chooses the divorce, costs, and income categories and for PA cases where the user selects residence and arrangement categories.

The selected fact categories show the text spans and the results related to appeal categories and statistics on the appealing and defending parties. Figure 10(a) and 10(b) shows the appeal-defense count of the parties and the percentage distribution of appeal categories for divorce cases. Figure 10(d) and 10(c) shows the same results for PA cases.

Perspective and Case planning Divorce results show that the man and the woman are the parties who appeal for a particular dispute, and the man appeals more than the woman in this situation. The man is also a defending party in one of the cases. Similarly, the father and the mother are appealing and defending parties, where the mother appeals the most. Council is mostly defending the cases followed by the mother and the father. Most appealed categories in divorce are costs, a previous decision, property, and residence. In the case of PA, a previous decision, supervision, and custody are the most significant appeals.

This perspective informs the non-legal users about the critical appeal topics and the parties who appeal and defend. Non-legal users may prepare their appeal or defence by comprehending how the appeals were made in the previous cases and how can they be presented in the current case.

4.5. Appeals

Input-Output The last question statement is Select the most appropriate appeals categories for your situation. We show the numerical results for divorce cases when the chosen options are property, costs, a previous decision, and for PA cases when the chosen options are custody and supervision.

This selection displays the final results and the text spans of the decision and the reasons for the decision. The reasons categories and the decision for divorce cases are shown in Figure 11(a) and 11(b) . The same results for PA cases are shown in Figure 11(d) and Figure 11(c).

Perspective and Case planning Divorce cases show half of the cases ratified and half of them annulled. The most relevant reasons for the decision are judgment, costs, and property. In PA cases, half of the cases are annulled, 6% gets pending for review, and the rest are ratified. The most important reasons for the decision include judgment, child development, medical condition, and arrangement between the parties.

Decisions reveal the probable outcome of the case based on the relevant reasons categories for the non-legal users. This perspective aids the legal user to plan their case. The prosecutor may plan to show substantial facts and evidence relating to the most relevant factors shown in the reasons that may support their argument and disprove the appeal of the opponent.

4.6. Limitations and Future Work

Following are the limitations of our study and the way forward:

- We generate the results using separate sections under each question statement. For this, we manually map the text into the surrogate template elements. Since the data may contain no section or sections in different formats or with variable names, we plan to introduce a classifier to divide the case text into specified surrogate template elements.
- We rely on the manual intervention of legal experts for the conceptual framework development (supported by [17] to aid the creation). In the future, we consider using word embeddings, relation matching, and ranking to strengthen the expert's recommendations.
- The output shows the text spans from which the numerical results are obtained. For a large number of files and huge text spans, it becomes tedious for the user to read all the text. In the future, we plan to provide text recommendations to the user by comprehending and categorizing meaningful text using structured prediction models, which requires a huge amount of annotated data. It is part of our ongoing work.

5. Related Work

Legal Ontologies and Applications various researchers widely research legal ontology creation and its applications [9, 10, 11, 12, 13, 14, 15]. These works present a systematic review of legal ontology literature, easy interaction, and creation with legal ontologies, information extraction to represent them as ontologies. Conversely, we present a conceptual framework of the legal database made from a generalized surrogate template that is used to produce legal perspectives for the end-user based on their situation.

Legal Text Summarization Various NLP and machine learning techniques [1, 2, 3, 4, 5] have been used to explore text summarization for legal documents. The summaries are a form of insight in some context. However, unlike our approach that offers perspectives focused on the characterization of the user's situation, summaries are decision or case-specific. Unlike our method that is accessible for both legal and non-legal consumers, reading the summaries can still entail some legal expertise.

Legal Information Extraction Many researchers have introduced various techniques for different types of legal information extraction like legal entity extraction from legal documents [6], legal argument extraction and indexing [16] and event extraction from legal proceedings [7, 8]. Our focus is to generate legal perspectives for strategic case planning by legal and non-legal users which we accomplish using conceptual modelling instead of focussed information extraction from the data as the work mentioned above offers.

In terms of the use of mathematical modelling-based knowledge extraction provided by our methodology, we differentiate our approach from the works mentioned above. Also, our approach focuses on providing perspectives for users to support them in further case planning.

6. Conclusion

Historical court proceedings may provide users with perspectives on the parties that are often engaged in a case, pertinent facts and past rulings, what appeals are being made and the parties that are appealing and defending, and the key reasons for different decisions. These insights will help users prepare their case carefully in order to achieve the optimal result in the current case. We present a conceptual framework guided legal case perspectives for divorce and parental alienation cases, proving the usefulness of the system. In the future, we plan to work on the manual method automation and fine-grained information presentation in the production.

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