

Events in the legal domain: first impressions

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Abstract. Dealing with events is a challenging task in Artificial Intelligence; just trying to define what is an event and deciding what information should be considered relevant to it is a difficult and domain dependent endeavour. Despite this task has been already tackled in the legal domain, no consensual definition nor standard representation for legal events has been established yet. In this paper, we analyze current approaches to event representation and extraction in the legal domain, and we review generic approaches as well. We expose our first impressions derived therefrom, and we offer a first round of event annotations of judgments of the European Court of Justice. Aspects such as the concept of *relevance* are discussed, along with choices for evaluation. Possible strategies for extraction of legal events are described. Finally, a roadmap for a formal, complete definition and delimitation of events in the legal domain is presented.

Keywords: legal events, court decisions, relevance, European Court of Justice

1 Introduction

Extracting legal relevant events from a sheer scale of legal corpora is challenging because of the fine grained information contained therein. For example, case-law³ can be long (and rambling) and information related to important legal events of the case can be scattered. Moreover, there is no settled way a factual element can be depicted, and the information is not complete as presented, in the sense that inferences must be made to determine a definite value. By locating

³ Research on legal information-seeking behavior [1] and legal information retrieval [2] posit that lawyers search for useful legal documents that are relevant for their task at hand, to enable decision-making or problem solving (“situational relevance”). Haruna et al. [3] assert that the most common information needs that lawyers have refer to the latest higher court decisions and the most recent legislation. Therefore, in this work we refer to the judgments of the European Court of Justice (ECJ), identifying therein the legal events.

textual regions likely to compact relevant legal events will avoid incurring the expense of reading entire texts. Also, common event-based constituents [4] eases the detection of events: *the legal history of a claim* (what give raise to the dispute and occurrence of events time-line, among others); *parties* (who are the people involved in the dispute); *final decision*, etc. Perusal and a defined consensual definition of legal events will enable further harvesting thereof.

Events can also be found in other kind of legal documents, such as contracts and regulations, so they could be used, for instance, to check compliance among different jurisdictions based on the information surrounding a same event.

In this paper, we describe the preliminary steps we have taken towards extraction of legal events. We elaborate on the qualification and scope of legal events, having as a use-case the ECJ judgments. The research question of this paper consists in identifying which linguistic and legal information is required to reliably identify legal events.

The remainder of the paper is organized as follows. Section 2 reviews different proposals in the literature both for extraction and representation, from generic to legal specific ones. Section 3 analyses how the previous approaches addressed the evaluation of event extraction. Section 4 further elaborates on the varying criteria to which legal events are bounded to, and introduces our first impressions on the task. Finally, Section 5 presents the conclusions and the future work.

2 Concept of event and previous approaches

For the tasks of event extraction and representation, different approaches have been proposed in the literature. Most of them provide for their own definition and formalization of the concept of event. In this section we will review different proposals, both for extraction and representation, from generic to legal specific ones.

2.1 General approaches

Regarding representation, there are several ontologies available dealing with events. The W3C Time Ontology⁴, focusing on temporal expressions, is usually combined with the PROV Ontology⁵ to represent events stressing their temporal information. The Event Ontology of Yves Raymond⁶ allows representing a basic concept of event, considering just as surrounding information *where* it happens, *when* it happens, and *who* intervenes in that event, as well as the *factor* and the *product* of it. Also sub events can be declared. Similarly, the Simple Event Model (SEM)⁷ also deals with that information, but adding concepts such as *Role*, *Authority* or *EventType*; SEM has also been later expanded⁸ to its use in EventKG

⁴ <https://www.w3.org/TR/owl-time/>

⁵ <https://www.w3.org/TR/prov-o/>

⁶ <http://motools.sourceforge.net/event/event.html>

⁷ <https://semanticweb.cs.vu.nl/2009/11/sem/>

⁸ http://eventkg.l3s.uni-hannover.de/schema_model.html

[5], a event-centric knowledge graph. Besides ontologies, frames, scripts or case frames [6] are also used to represent events; Ontology Design Patterns⁹ suggest how to represent events for different kind of situations.

Different annotation schemas are also often used for event extraction. One of the most used mark up language in the temporal domain is TimeML¹⁰. TimeML allows to annotate temporal expressions (such as dates or times), events and temporal relations among them. TimeML events can be of several types (like *reporting*, *aspectual* or *state*); by using the tag *MAKEINSTANCE*, several instances can be linked to a given event and also attributes like polarity or aspect can be expressed. Also the ACE model [7] has been widely-used in previous literature, and has its own definition of event¹¹. The ACE project guidelines focus on different types of events, among which we find JUSTICE, with its own subtypes (namely, *arrest-jail*, *release-parole*, *trial-hearing*, *charge-indict*, *sue*, *convict*, *sentence*, *fine*, *execute*, *extradite*, *acquit*, *pardon* and *appeal*). Several studies were conducted to compare these approaches [8,9]. Finally, Chambers et al. [6,10] consider that verbs sharing coreferring arguments are semantically connected, what they call *narrative coherence*; they use this information and Semantic Role Labeling to learn new events in an unsupervised way.

Nevertheless, regarding extraction, most approaches develop their own definition and strategies. Hagege et al. [11] claim the difficulty of defining an event from a concept perspective, so they decide to consider an event any verb (state or action), any deverbal noun, any noun argument of the preposition *during*, or any *time span noun*. Carpet et al. [12] developed their own ad hoc way to represent events, consisting on some templates with the core of the event and some coordinates (agents, other participants, places and time). The work of Hogenboom et al. [13] gives an overview on different event extraction methods.

Existing proposals lack therefore of a common definition of an event, usually using ad hoc representations for very specific type of event extraction. Annotation formats are on the other hand too generic, and uneasy to adapt to the legal domain needs. The ontologies available for representation are also very similar, having as a basis the same information (what, who and where).

2.2 Approaches in the legal domain

Regarding the legal approaches to event extraction and representation, we have divided previous literature in three different communities: Legal Information Retrieval (LIR) proposals, Events in Legal Requirements Engineering and Events in Legal Knowledge Representation. An overview of the different approaches analyzed can be found below in Table 1. Therein we mention, in relation to each paper or contribution, their objective, if whether and which there is a definition of legal event, the analyzed corpus (if any), the methodology and the level of implementation readiness.

⁹ http://ontologydesignpatterns.org/wiki/Community:Event_Processing

¹⁰ <http://www.timeml.org/>

¹¹ “An event is a specific occurrence involving participants. An Event is something that happens. An Event can frequently be described as a change of state.”

Table 1: Different approaches to event extraction and representation in the legal domain.

Name	Objective	Event	Corpus	Methodology	Implementation Readiness
Legal Information Retrieval					
Evaluation of semantic events for legal case retrieval [14]	Applied event extraction for Legal case retrieval	Any eventuality (event, state or attribute) related to expressions in legal texts, and by its compositionality. Can be decomposed and composed into great or lesser events.	18 sentences from the Canadian Supreme court. The authors claim to develop a 500,000 word legal corpus as future work	Use of SRL (Semantic Role Labelling). From the corpus, 150 events were reviewed to compare with the automatic Event extraction performed on 2 cases.	Preliminary study
Event Extraction for Legal Case Building and Reasoning [15]	Legal case building and reasoning for litigation	Events are viewed as temporally bounded objects that have entities important within the application domain (e.g. persons and organizations) as participants.		NLP semi automatic approach to enable the use of entity related information corresponding to the relations among the key players of a case, extracted in the form of events.	Event-based abstractions: role-based events, interaction-based, reference events, cognitive events. System to support litigation case construction
Event Extraction from Legal Documents in Spanish [16]	Finding patterns in Legal Language in Mexican Spanish in order to extract events in writs of 'amparo'.	No proposed definition; in essence is litigation-based information	300 documents downloaded from the Mexican 'Instituto Federal de Telecomunicaciones' (IFT)	Use of patterns from legal text. The description of events usually follows a regular pattern involving at least two elements: the action, determined by the main verb, and the date on which the event occurred. An analysis was made of the verbs that occur in the writings of amparo, as well as the direct objects of each verb.	Work in progress, using human evaluation
Cognitive Linguistic Representation of Legal Events. Towards a semantic-based legal information retrieval [17]	Improve Brazilian courts information retrieval systems	Legal events understood as the cognitive connections that specialists make when they are reading a legal document		Recognize possible legal event structures to be described in legal documents; use of semantic frames – e.g. "Lawsuit frame" has as participants and props "Type of Action" which indicates the type of lawsuit that was filled against a defendant (administrative, criminal, familiar), 'Author', who is the person that goes to the court with a request, 'Defendant', who is the person that is been sued, and 'Concrete case', which is the legal base that gives the author the right to make a legal request.	Manual, no implementation. Still work in progress. Legal events are described as semantic frames; they have identified 10 legal frames
Events in Legal Requirements Engineering					
Automating the Extraction of Rights and Obligations for Regulatory Compliance [18]	Automatic extraction of legal requirements from legal text	The concept of event is not defined <i>per se</i> , but framed as "event, date and information". They state that they "(...) found other terms that we could generalize into a common, abstract type, including event, date, and information. Thus, on the basis of the definition section, we derived a list of hyponyms for the basic concepts: actor and policy as well as event, date and information."	U.S. HIPAA Privacy Rule and the Italian accessibility law	Elicit "events" as one legal concept, and also date and information. Other concept elicitation is observed, e.g. cross-references, actors, policies.	Automatic tool
Nomos framework [19]	Automatic legal metadata extraction	No consideration of "event" <i>per se</i> , but other core concepts related to events (situations, roles)		Nomos models are built around 4 core concepts: <i>roles</i> (the holder of beneficiary of provisions); <i>norms</i> (either duties or rights); <i>situations</i> (describing the past, actual or future state of the word); and <i>associations</i> (describing how a provisions affects a given situation).	Modelling language (Nomos 3) implemented

Table 1: Different approaches to event extraction and representation in the legal domain.

Name	Objective	Event	Corpus	Methodology	Implementation Readiness
Legal Knowledge Representation¹²					
LKIF [20]	Rule modeling language	Events are considered <i>changes</i> (“ <i>Changes events occur against this canvas of temporal and spatial positions</i> ”)	It includes more than 200 classes	At a phrase level, “events” are represented, and it further provides for the antecedents and consequences of events. Other important concepts herein are: actors, objects, time, locations, trades and transactions, among others. Also statements are classified into facts and norms.	Upper ontology
LegalRuleML ¹³	For expressing and inferring over legal knowledge. Gandon et al. [21] proposed an extension of the LegalRuleML that supports modeling of normative rules.	It does not model events <i>per se</i> , but only temporal dimensions of the norms.		The concept of event is introduced at the level of phrases. Other concepts are: participants, time, locations, jurisdictions, artifacts, and compliance. Participants may be designed as agents, bearers or third parties, who may have roles and be part of an authority.	On the way to be a OASIS Standard
Akoma Ntoso ¹⁴	An XML markup schema for describing legal resources of various types, for example, laws, regulations and court decisions.	Events are considered “Actions and occurrences”, although they are not specifically targeted and are considered “other concepts” ¹⁵			It is an OASIS standard.

There has not been, at a representative scale, an instantiation of LKIF neither of LegalRuleML. It was neither used for formalizing or annotating the content of a legal corpora, either automatically or manually, to understand how events in the legal domain are ascertained. In general, event in the legal domain is used as a fine grained structure, and also combined with others (entity, relation, event, temporal expression, value).

3 Evaluation

Since there are several interpretations and formalizations on what is an event, evaluation is also a controversive issue. Different concepts imply different representations and attributes, needing therefore of different metrics to measure relevant aspects. An example of this difference becomes evident when comparing TimeML

¹² Some of these concepts have correspondences with RE literature on Legal Requirements

¹³ https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=legalruleml

¹⁴ <http://www.akomantoso.org>

¹⁵ http://www.akomantoso.org/?page_id=47

concept of event and the one by Ji et al [22]. While the first tackles events from a pure temporal point of view, marking them up as temporal entities with attributes and linking them just to other temporal expressions, the second focuses in argument detection, centering its evaluation on Named Entities and temporal ordering. It must be noted that the latest deals with cross-document event extraction, where common entities are a useful lead to connect related events and ordering tends to be more tricky than in a single (and usually chronological) document. In this section we will analyze the different evaluation methods proposed in previous literature, trying to derive the one that fits the most to our aim in the legal domain.

Time-related tasks in SemEval have been for many years the reference venue where different temporal tools demonstrated their capabilities. While first editions of TempEval [23, 24] made use of the TimeML standard for dataset annotation, evaluation consisted in using the figures Precision, Recall and F-measure on the extent and the type of event (among the nine classes defined in TimeML guidelines), and optionally other attributes (tense, aspect, polarity, and modality). Additionally, Temporal relations were also extracted in another task, and could be considered additional information of an event, but not a part of its formalization. Nevertheless, in SemEval-2015 [25] the evaluation changed to temporal question-answering, prioritizing therefore temporal understanding over simple annotation in the text, where just differing in the span of the annotated event led to an error. On the other side, ACE 2005 evaluation plan [26] proposes the ACE value VDR (Event Detection and Recognition), a metric developed considering the extent of the annotation, the arguments of the event and the attributes *value* and *modality*.

Other proposals include several levels of evaluation. It is the case of BioNLP'09 shared task on event extraction¹⁶, where different tasks tackled different levels of detail of event extraction, from just identifying the so called *core of the event* (namely, its trigger, type and main argument) to surrounding entities (such as the location of the action) and its factuality (e.g., if it actually happened or is negated or introduced as a mere possibility)

One of our main concerns was *relevance*. A judgment can contain thousands of events in the broadest sense of the word, but not all of them are relevant from the legal point of view. How could relevance be measured? Is it related to the agents intervening in the event? By the appearance of this event in other judgments from the same court? From the same legal field? Is it possible to extract a common structure of most legal procedures in a court? A jurisdiction, a country? Regarding relevance, some efforts have been previously made in literature to distinguish important events [27], although no specific evaluation metrics on this aspect were found. Just when these events were further used for an alternative task (e.g., summarization), some evaluation was performed using metrics of the final format [28].

¹⁶ <http://www.nactem.ac.uk/tsujii/GENIA/SharedTask/>

4 Our first analysis

In this section we introduce the results of a first study of events on the legal domain. First, with some general observations on the concept of legal events; then, with more specific considerations derived from the first annotation of a corpus of judgments from the ECJ.

4.1 General Observations

Legal events (and the annotations thereof) may vary according to different criteria contingent to the legal realm. We present possible differential criteria in a general perspective:

Multi-jurisdictionality and multilingualism: legal events fluctuate according to common law or civil law jurisdictions, and to the languages in which they are expressed in or translated to.

Document-dependency: qualification of legal events can vary according to the heterogeneity of the embedding document: legal/corporate documents, e.g. contracts, parliamentary documents, doctrine books, court decisions (landmark cases vs commonplace cases), legislation (primary, secondary, domestic, European, international). Moreover, both the jurisdiction and the underlying *domain* of the document (civil, criminal environmental, taxes, business, etc.) are pertinent when determining the relevance of an event. For instance, comprising the domestic judicial hierarchy and their procedural rules, and the procedural rules of the higher Courts, e.g. request for a preliminary ruling, hearings, submitting observations, opinions, citing case-law, etc.

Level of abstraction: legal events can be considered from a casuistic analysis (a specific argument of a case), to a general consideration of the facts of a case. For example, the same event (e.g., someone declares something) can be seen as a declaration (a reporting event), a procedural event (specifically, part of the timeline of the proceedings) or as an abstract legal event (an event in the document level); also, what is being reported could suppose events on their own.

Agents and role: the consideration of legal events can vary according to an agent, which is a participant in some juridical relationship, e.g., the applicant (a victim vs perpetrator), or a reputed judge, a notary, a legal scholar. The role of the court is also influenced by their level of authority (first, second national instances).

Temporal, contextual and spatial features: this quadrant (time, context and space) can be illustrated by chronological events within court proceedings, such as the submission of an application in a certain date in the applicant's national Court; pleadings; ulterior appeals to a different located court; judgment delivery by the ECJ (located in a different State) –as the ultimate decision that ends all proceedings, etc.

Scenario or application-based: annotation of legal events might vary according to the sought application, purpose or scenario. If one considers predicting judicial

decisions, events referring to case-facts will be mostly regarded [29]. If however the devised application aims to detect arguments for legal argumentation, then the party’s claims will be the target annotation [30]. The same holds for considering the most cited case-law for the purposes of considering the authoritative and relevant ones [31].

These criteria gives a hint on the different dimensions to take into account when sketching a first definition of an event. They are also a good starting point for building a event extractor in the legal domain.

4.2 Lessons learned from our case study

In this section we refer to the composition and specificities of the corpus, and the adopted methodology on the annotations; then we expound on the lessons learned and finally we provide an initial scope of legal events.

Corpus, data collection and annotations The current sourced corpus consists of 10 European Court of Justice (ECJ) decisions, dated of 2014, extracted from the EUR-LEX database. These sources were collected because the ECJ decisions contain different types of events related to different actors and they contain a standard (but not fixed) structure in which different legal events are embedded. The ECJ decisions generally include the following structural sections (according to the Rules of Procedure of the ECJ):

- i. Preamble, stating information on the parties and the main object of the judgment;
- ii. Legal context: listing all the legal instruments used in the judgment;
- iii. Background of the case. Two settings are observed therein: it is depicted the factual background of the case; and an account of the procedural history of the case (typically) followed at national level, before domestic courts or the state’s authorities, before the application was lodged by the Court. The ECJ contains also the questions referred therein to the Court, normally titled as “the dispute in the main proceedings”;
- iv. Considerations of the questions referred: the observations submitted to the Court by the parties and other actors, such as the Governments of Member States, and the responses of the Court;
- v. Cost attribution; and finally
- vi. The ruling, i.e., the final decision and the orders to the parties.

The judgments were manually annotated following a procedure herein described. While analyzing the decisions, we considered the subsequent constituent parts:

- i. preamble;
- ii. background of the case;
- iii. consideration on the questions referred
- iv. final ruling, as they contain legal relevant events.

However, we discarded ii. the legal context and v. the costs attribution, as no legal events are put forth.

As the text of the decisions is divided into numbered paragraphs, in selecting the events, we proceeded as follows. For each paragraph, if events were present, we labeled (i) the contextual information, (ii) the event, and (iii) related synonyms, along with the natural-language content of the judgment.

Observations From our text analysis, we present the ensuing event-aware observations:

- Events can cover a great deal of linguistic information, consisting of verbs (declare), nouns (appeal) and nominal phrases (the facts of the case). Additionally, it gets more complex to denote its boundaries in terms of the extension to actors and also their roles, within the time/space/context axis.
- As usual while processing texts in the legal domain, legal terminology, characterized by synonymy, ambiguity, vagueness, polysemy – suppose an extra challenge. We captured the following variations:
 - a. Conventional terms change their meaning in the judicial decision-making; this is the case, for instance, of the expressions “lodging an application *before the Court*”, or “criminal proceedings were instituted *against the applicant*”, where the terms *before* and *against* do not have the conventional meaning;
 - b. Terms can have several interpretations. For instance, two verbs (*submit*, *argue*) are indicative expressions of an argument. However, the verb “submit” can also refer to submitting written observations or pleadings, which consist in procedural documents lodged before the Court.
- In the preamble we can find different types of *event-aware information* regarding to:
 - a. *Identity-related event* on identifiable information related to all the participants involved in the main proceedings:
 - i. The referring court, and ECJ (and its internal composition);
 - ii. The litigant parties: applicant/defendant
 - iii. Agents (States, European Commission, etc);
 - b. *Location-event and date-related event*: it is possible to identify both the date of the request and the place of the national referring court, e.g., “10 September 2014, Request for a preliminary ruling from the *Krajsky Sud v Presove (Slovakia)*”.
 - c. *Domain-related event* of the judgment: the initial summary of the judgment indicates for the domain at stance, e.g., consumer protection (or others, illegal migration, genetic modified food, etc.)
- The background of the case is the most interesting part to annotate, as it includes the relevant events, arguments and facts of the parties, e.g. “On 26 February 2009, Mrs *Kusionova* concluded a consumer credit agreement with *SMART Capital* for an amount of EUR 10 000”, Case 34/13, paragraph 25.

- Events can be subsumed to decisions of the national courts (first-instance and second-instance courts that refer to the ECJ). Expressions on the text mentioning “Regional Court”, “District Court”, “national court” illustrate what are the juristic positions of the former courts according to a legal problem.
- Interpretative issues were considered when analysing the different versions alleged by each of the parties in the dispute with regard to the same event, e.g. the claimant alleges there was illegal use of goods and no smuggling. Each of the involved parties claim that the other one is at fault, which consists in an interpretative indicator of a same event.
- Negation and Factuality: it must be noted that some events can be negated or not actual facts, but “possibilities, intentions or preferences” [32]. Examples of paragraphs 51 and 82, respectively:

“The Court does not have before it any evidence which might raise doubts as to the compliance of the legislation at issue in the main proceedings with that principle”; (...) “In the light of the answer to the first three questions, it is not necessary to respond to that request by the Slovak Government.”

- As for event-related relations, we observed that two-way (bi-directional) relationships can be found in the same judgment engaging both parties, e.g. actions “submitted by”, “brought by”; or “the facts of the case, as submitted by the parties; or “observations submitted by the Government and the observations in reply submitted by the applicant”.
- Legal related events can be identified at different (internal) structures of the documents, e.g. at a paragraph level of a court decision, or in the summary, or in the conclusion thereof.
- Within the ECJ judgments, we considered as legal relevant events the following descriptors/indicative expressions, among:
 - a. Concerning identification elements: petition type, e.g. preliminary ruling; composition of the court, date of the judgment; parties involved; topical content of the case; facts;
 - b. Quoted case-law; The Courts attempt to ground the decision by reference to established past case-law;
 - c. Judgment delivery, where the merit of the case is assigned.

5 Conclusions and future work

This paper presents a theoretical reflexive work on events in the legal domain, wherein an account of their varied definitions, representations and application-base uses is offered.

We performed a literature review of events in the legal domain in three different communities: Legal Information Retrieval (LIR), Legal Requirements Engineering and Legal Knowledge Representation. Even if events in the legal domain are slightly considered within known frameworks – as it is the case

of LegalRuleML, Akoma Ntoso, LKIF – no consensual definition nor standard representation for legal events has been established.

Our initial analysis, based on a small corpus of ECJ annotated judgments, permitted to convey an initial scope of legal events. The qualification of event in the legal domain seeks to be wide-ranging in scope and facilitating the detection and extraction thereof, regardless of their applicable domain (criminal, civil), but customizable/modular for instantiation.

The envisaged usefulness and wide prospective applicability of event extraction/representation as a supportive tool can be evidenced in legal information retrieval (LIR), in legal knowledge engineering, in Legal Requirements Engineering, and legal argumentation communities, where events are already accounted. Other applicable scenarios can be contemplated, among the following: e-discovery; case-based reasoning (CBR); legal argumentation; determining contractual positions and concept definition; contract review; prediction technology; electronic billing.

As future work, the authors will further prune the definition of legal events by atomizing their properties, instances, and attributes and set some competency questions relevant for extracting necessary information from court decisions. Forth bringing annotations of a corpus of ECHR judgments will proceed for reviewing, canvassing and consolidating the annotation frames acquired in this paper. A semantic model will be constructed from these annotations to provide for structured legal data on the web. Regarding evaluation, assessment criteria for validating the relevance of an event within a legal text will be developed.

Acknowledgments

This work was supported by a Predoctoral grant from the I+D+i program of the Universidad Politécnica de Madrid.

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