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DOI

[10.3233/978-1-61499-167-0-143](https://doi.org/10.3233/978-1-61499-167-0-143)

Publication date

2012

Document Version

Author accepted manuscript

Published in

Legal knowledge and information systems: JURIX 2012: the twenty-fifth annual conference

[Link to publication](#)

Citation for published version (APA):

Sileno, G., Boer, A., & van Engers, T. (2012). Analysis of legal narratives: a conceptual framework. In B. Schäfer (Ed.), *Legal knowledge and information systems: JURIX 2012: the twenty-fifth annual conference* (pp. 143-146). (Frontiers in Artificial Intelligence and Applications; Vol. 250). IOS Press. <https://doi.org/10.3233/978-1-61499-167-0-143>

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Analysis of legal narratives: a conceptual framework

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Abstract. This article presents a conceptual framework intended to describe and to abstract cases or scenarios of compliance and non-compliance. These scenarios are collected in order to be animated in an agent-based platform for purposes of design and validation of both new regulations and new implementations, or to be used as reference base for a diagnosis tool. In our approach, legal narratives become a source of agent-roles descriptions, i.e. abstractions of individual characters/agents from singular stories, feeding the target applicative framework.

Keywords. Legal narratives, Legal reasoning, Agent-based modeling, Legal knowledge, Administrative organisations

Introduction

Storytelling in any form remains a core method of knowledge transfer, between individuals, and within society. Experts tend to present their domain knowledge in the form of anecdotes, sharing acquired experience in the form of prototypes of modes of failure and proper function. Similarly², court decisions are described in a narrative form, reporting, discursively, the process of proof, the theory construction, and the logic connecting the case to its legal conclusions.

For these reasons, we consider legal narratives as a fundamental source for knowledge acquisition in our field. The implicit models that narratives contain have a huge applicative potential. In the tax administration, for example, experts at the operational level regularly invent or discover new tax evasion schemes, not yet taken into account in organizational designs. If these experiences are collected in a database of stories, we can test, using an appropriate simulator, how a new regulation responds to them. Furthermore, abstracting the schemes with the facts relevant to their normative context, we can monitor business processes in real-time for the occurrence of similar cases.

The first step toward this applicative framework remains to construct an appropriate knowledge representation framework, and this paper will briefly present this work, following the direction traced by our previous works [1,2].

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²Court cases could in fact be considered the diagnosis process of the legal system, activated because of a presumed normative failure mode.

1. How narratives contains stories and system descriptions

Talking about the process of proof, [3] characterizes a story as *complete* if some causality connections (typically in the form of actions performed by actors with certain goals) bring the initiating events up to the conclusions. In this sense the story becomes expression of forward-chaining rules, linking inputs with outputs, and its validation can follow a simulation methodology. We will call this process *story animation*.

However, things are not that easy. People interpret and report the same series of events in very different ways, and the descriptions given may not correspond to reality. This is mainly because the perspective of the narrator influences both his interpretation of reality and his acts of communication.

Perspective firstly determines what is, or is considered to be, *inside* and *outside* the visible range of the observer. This visibility qualification is not only related to actual seeing, but to every (potential) action of knowledge acquisition, either direct or indirect (through interpretation of artifacts or communication with other agents). Moreover, the content of the acquired information refers not only to the perception of the physical world, but also to the mental (e.g. psychological, institutional, ..) world, and the acquired information is associated not just to the self, but to other agents too. The frontier of the visible range is not a line, but a gradient of assumed reliability and trustworthiness of the acquired information.

Secondly, a narrator selects and traces in the narrative only a few components of his (meta)representations of the world, typically the ones that are worth to be communicated, neglecting for example what he considers common knowledge. A legal expert, illustrating a certain case, will also refer to few parts of the normative context in which the story has to be interpreted. Thus, the narrative provides the components in the *foreground*; in order to animate the story, the modeler has to add *background* theories to cover the missing causality connections between all (physical or mental) events. The best way to investigate systems in the background is to collaborate with the expert-narrator. Story animation is in the first place a validation of the narrator's conceptualization of the world.

Finally, the intentions of the agent-narrator play an important role, both in the observation (e.g. focusing more on certain aspects of the world, more relevant to its goals) and in the communication (e.g. by choosing what to say).

2. Toward an ontology for legal narratives

The aim of this research is a conceptual framework, expressed as a formal ontology. The framed ontology is mainly intended as a mapping device between applications that share the same conceptualisation. As presented in the introduction, the core application will be an agent-role based simulator, animating cases from an institutional perspective. The ontology has to satisfy both a *conceptual* requirement, i.e. sufficient descriptive power for legal stories, and an *implementation* requirement, i.e. a strong correlation between its entities and the components of the target multi-agent platform.

The main components of the proposed ontology are: (1) a foundational framework, with a common-sense perspective for events and objects, in a similar direction to the one suggested in [4]; (2) an intentional domain, defining mental objects and events with

a BDI perspective, maintaining a one-to-one relationship between the components of the ontology and the component of the target MAS platform; (3) social concepts, i.e. an institutional framework, defined proceeding with Searle [5] and implemented as an extension of the intentional framework; (4) narratological concepts, extending Barthes analysis [6]. As a result, our conceptual framework covers several realities: *physical*, *mental*, *institutional* and *narrative*.

While this short paper presents few aspects of it, a formal description in OWL and a more detailed documentation are available³.

Narrative realms Similarly to [7], we identify three ontological realms in a narrative entity. Firstly, the **story**, i.e. *what* is being told. The story level contains multiple realities, as described in the narrative. A narrative time and space define the internal physical coordinates. Secondly, the **discourse**, i.e. *how* it is being told. The discourse adds to the story level information about the source and a temporal coordinate in relation to the telling event, i.e. the order of facts as told in the narration. Lastly, the **conversation**, i.e. *why* it is told, contextually related to the occurrence in which the discourse is being told, in a defined social context and to a concrete or imaginary audience. The conversation is equivalent to the related *speech act* and as such it subsumes an intention of the narrator. The three levels are always simultaneously present. Moreover, narratives are recursive. If a character is telling something inside the story, we have a narrative inside a narrative. This is for example the case of the judges' and lawyers' speech acts in court proceedings texts.

Functions, roles Removing all verbal considerations from the analysis, Propp [8] introduces the concepts of narrative **functions** (in the sense of atomic, functional components of a narrative) and **roles** (associated to patterns of behaviour). A function is basically the occurrence of an event - and within the events, the performance of an action by a character - defined from the point of view of the meaning (the "function") that it has in the story. Roles are important because they connect the *function* components. Following the extension to this theory given by Barthes in [6], in a narrative everything becomes functional, although related to different levels of abstraction. All information about, for example, intentions of the character or norms are **clues**, referring respectively to the mental or to the institutional reality. Information related to the description of the physical reality are instead **informants**, that may become clues when they are interpreted as facts also in other realities.

For example, let us consider the sentence "Post was hunting a fox with a horse and hounds"⁴. The core function would be resumed as "someone was hunting an animal". *Someone* is related to the role level, and it is the continuous entity connecting functions. In this, "a fox" and "a horse and hounds" are informants, but they are also clues when we interpret the "ferocity" qualification of the animal, or we assess the investment that the character did for the hunt.

Agent-roles Our **agent-role** definition links the concepts of *role* as given by Propp, *institutional role*, and *intentional agent*. In practice, we add to the *role* all the characteristics in the story that are important factors according to the constructed normative theory, and we describe its behaviour using an intentional approach. An agent-role description is de-

³<http://justinian.leibnizcenter.org/In-core>

⁴*Pierson vs Post*, cited, amongst others, in [9].

picted starting from a character in the story. We start considering only the core functions (events, acts) related to our character. The result is a purely behavioural plan. But for an intentional agent, every action subsumes at least one intention. Clues about the intention of the character can be explicitly found in the story, or are discovered using a common-knowledge interpretation. Then, an analysis of intentions allows us to reconstruct the goal reduction process. The passages describing norms are also clues: they build the institutional domain of reference⁵. As a consequence they identify which informants in the story are also clues (i.e. which actions or qualifications are discriminating).

Conclusions and further developments

Narratives in court decisions have been investigated, amongst others, by [9], using an approach that can easily be included in the proposed conceptual framework. We, however, explicitly stress the importance of the intentional stance ascribable to the involved agents, and consider the fact that also the narrative containing the case is an (intentional) speech act of the narrator.

The proposed framework supports a partial alignment between representations of law and representations of other resources and social structures. This alignment is intended to benefit development and policy making in organizations more than legal practice at the operational level.

Besides completion and refinement of the conceptual framework, further developments cover the implementation and the deployment of the applicative framework: a targeted extension of the MAS platform for *agent-role based modeling* [1], integrating the possibility of using alternative descriptions (economic, institutional, criminal, etc.) of the intentions of the agents, a related knowledge acquisition application, a model-based diagnosis application [2], and empirical, comparative studies making use of the platform with actual cases.

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⁵The character in the story might have also a different/wrong conceptualization of the norm.