

Sisma DL: an ontology to represent post-disaster regulation

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Roadmap

- Introduction
- Background knowledge
- SismaDL entities and relations
- Analysis
- Conclusion and future works

Introduction

- Natural disasters have a big impact on human beings
- The arisen emergency must be tackled promptly by the Government using specific laws
- This is the case of 2009 and 2016 earthquakes that hit *L'Aquila* and *Centro Italia* respectively



Motivation

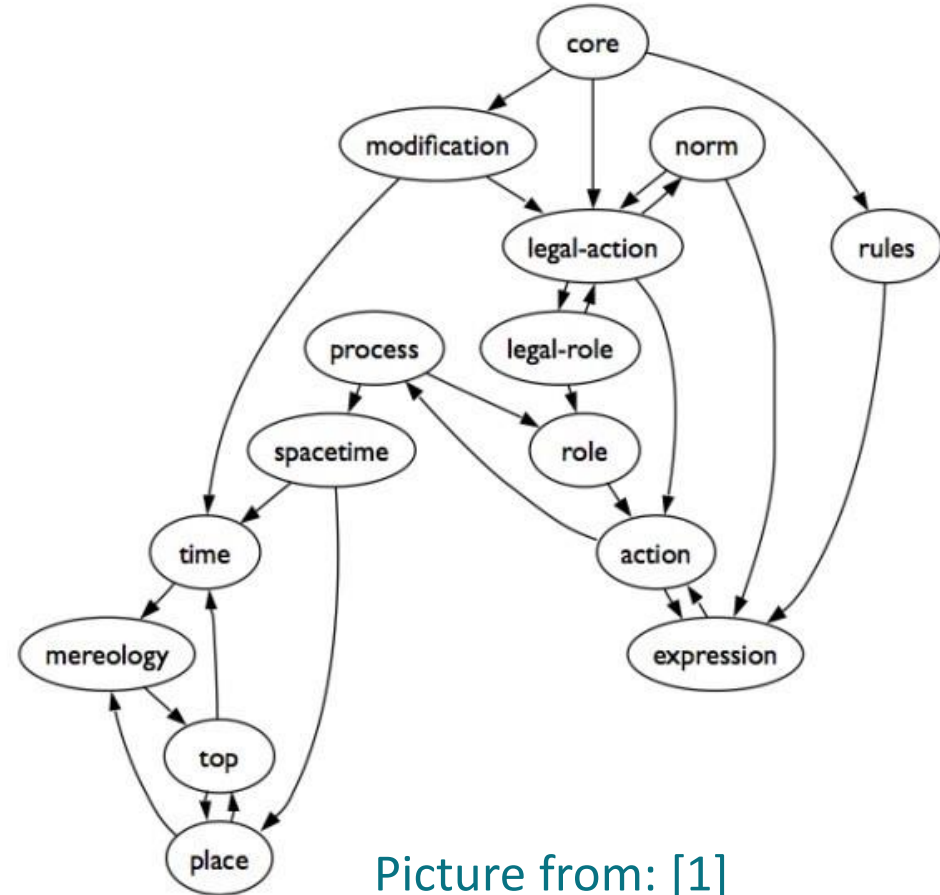
- In case of 2009 and 2016 earthquakes the Italian Government issued a series of normative acts, namely *law-decrees*, in order to regulate a series of critical aspects
- Although the two events are similar in the socio-economic context, they differ in a series of important characteristics
- A semantic analysis of the two decrees is needed in order to understand the reasons behind these differences

Reasons for using an ontology

- We decided to adopt the ontology formalism to model the decrees' content since it offers:
 1. To structure the laws providing a clear representation of them
 2. To capture and highlight the differences of existing decree-laws, by using queries and inference tools
- The ontological representation of a decree should be done with the support of legal experts and should be published with the decree itself.

LKIF ontology

- SismaDL is built on top of LKIF [1], which is an ontology used to model the legal domain
- Made of different modules which characterize the elements of the legal domain in a very detailed way.
- SismaDL extends this ontology to model the more specific Italian regulation

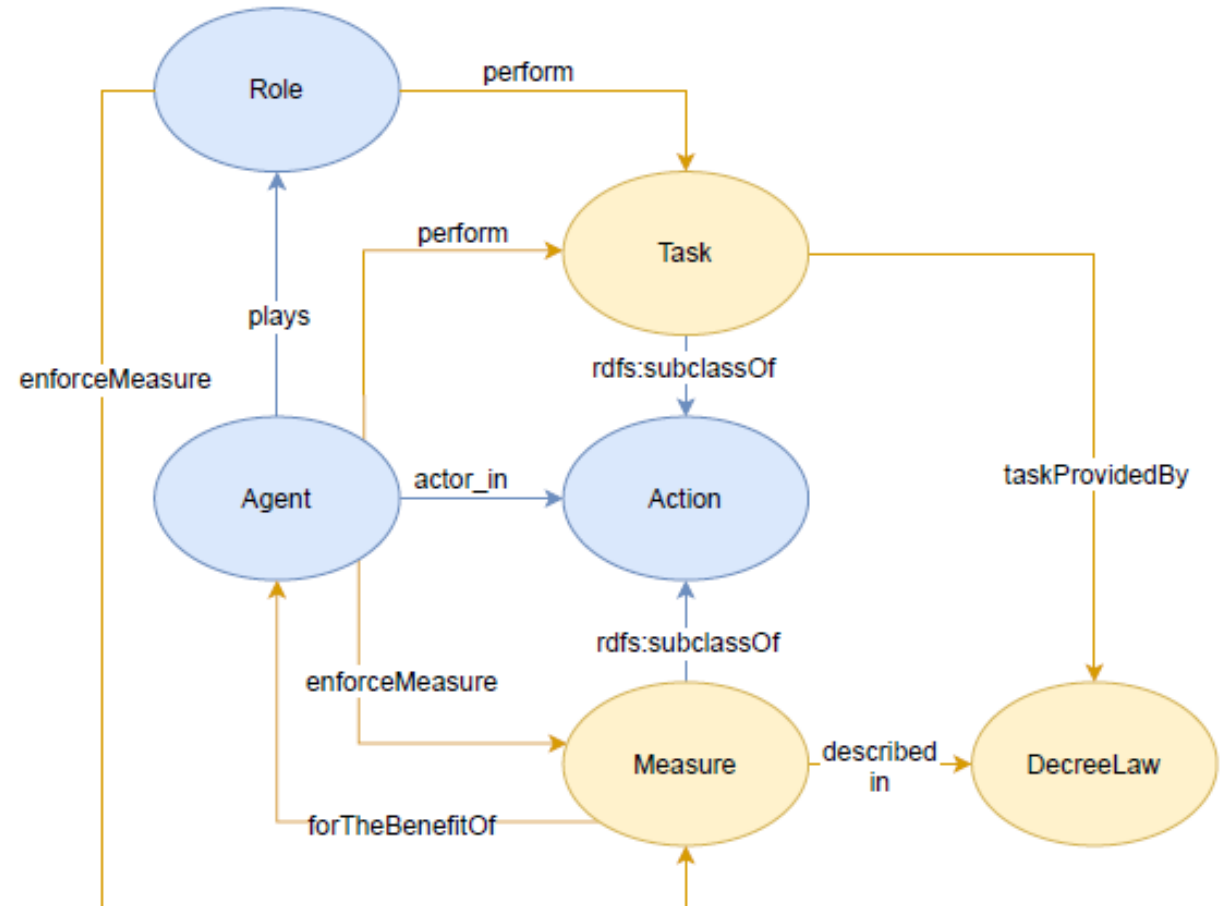


Picture from: [1]

[1] Hoekstra, R., Breuker, J., Di Bello, M., Boer, A., et al.: The LKIF core ontology of basic legal concepts. LOAIT 321, 43–63 (2007)

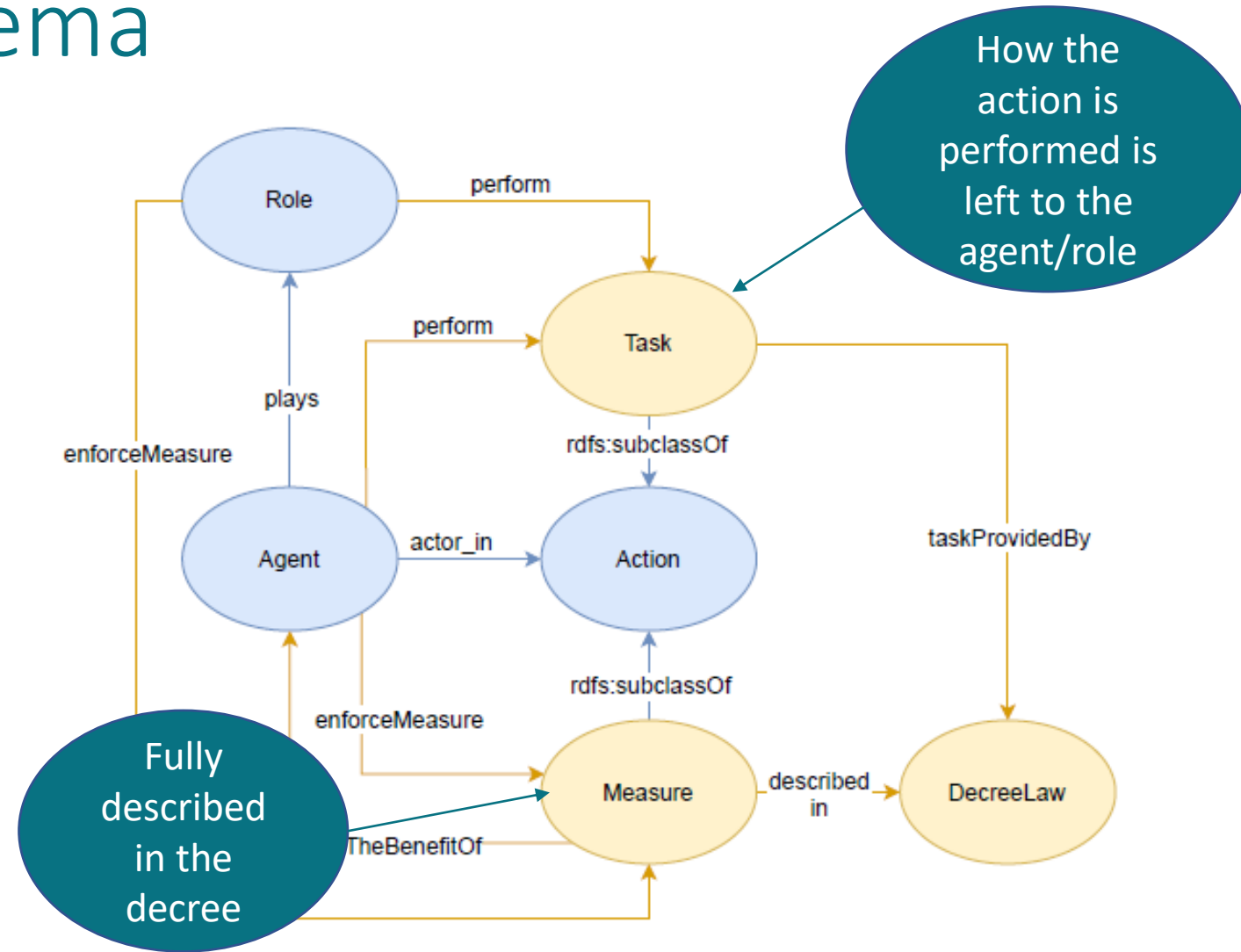
SismaDL logical schema

- In this picture we see the principal entities and properties of SismaDL
- In blue are the entities and properties of LKIF while in yellow are the entities and properties original of SismaDL

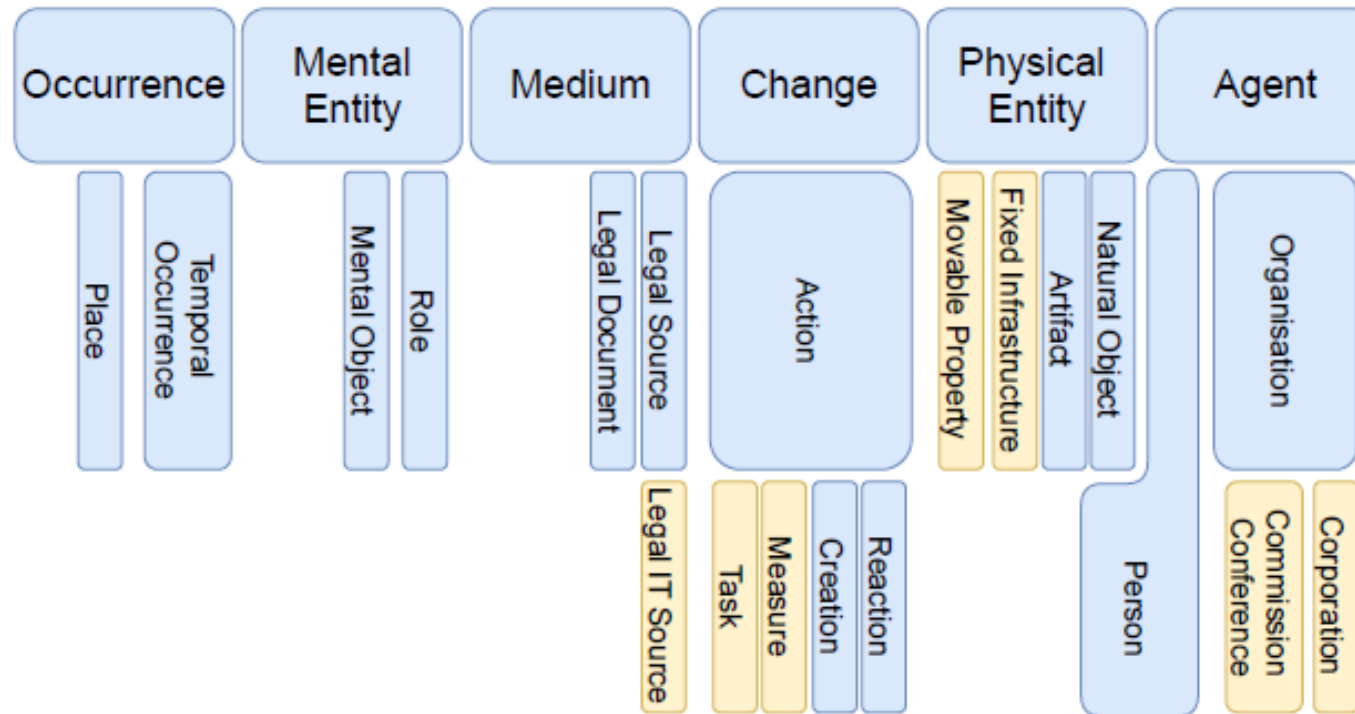


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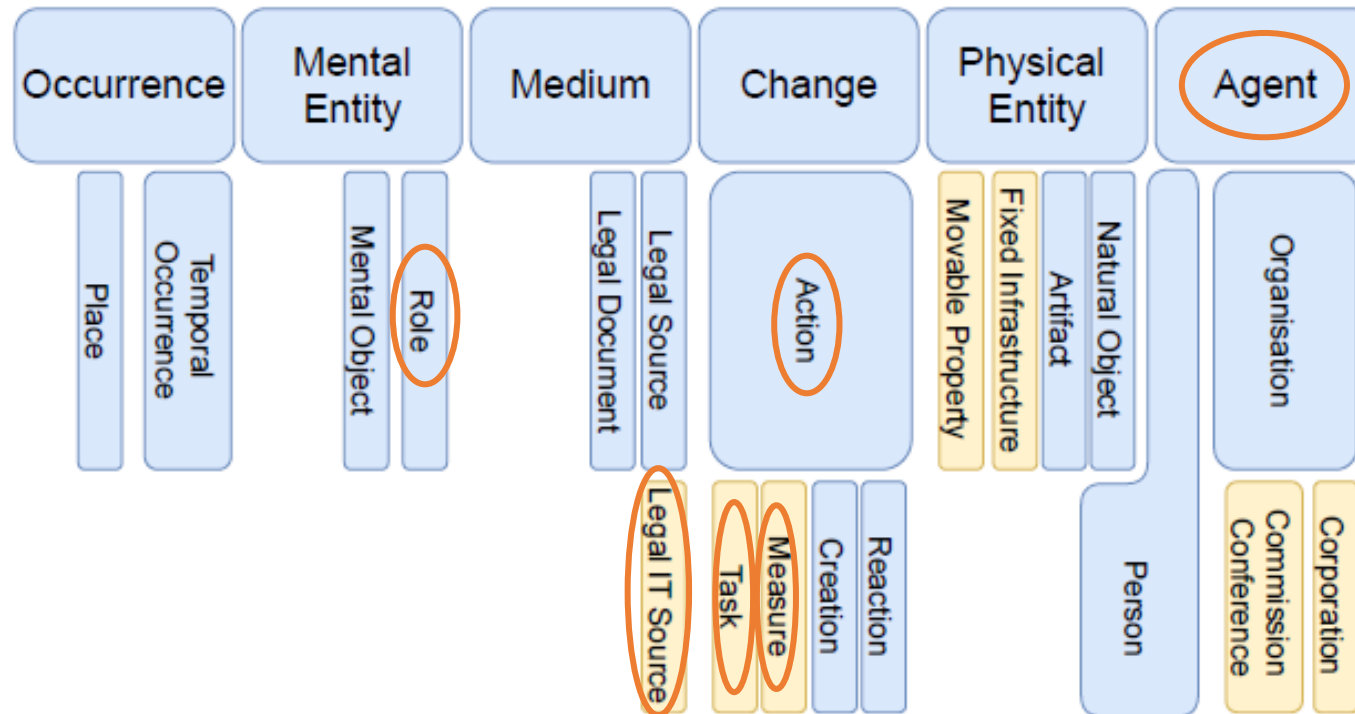


Hierarchy of entities



- As before blue entities are from LKIF while yellow entities are from SismaDL
- The individuals are the extracted from the analyzed decrees

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Analysis results

- In order to analyze the semantic of the decrees we query the ontology using SPARQL
- The analysis confirmed a series of differences in the two decrees concerning the regulatory model, the social measures and the financial mechanism

	17/10/2016 n.189 Amatrice	27/06/2009 n.77 L'Aquila
Legal Model	Defined Legal Function	Flood model
Social Measure	Direct and Indirect	Only Indirect
Financing Mechanism	Ordinary public means	Private institutions (FINTECNA)

Conclusion and future works

- SismaDL is a novel ontology built on top of LKIF to represent decrees issued for natural disasters and to provide reasoning support to legal questions
- We used SismaDL to model and analyze the content of two decrees issued for *L'Aquila* and *Centro Italia* earthquakes
- In future we plan to fully address a range of issues and to extend the ontology with more decrees.
- Through the extension of SismaDL, we aim to identify a functional scheme for legal regulation and specify guidelines for an efficient regulation for emergencies.

Thank you for your attention!