

# A Domain Ontology: Italian Crime Ontology

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## Introduction

There are some projects currently in progress, in Italy, that aim to implement support tools for the judge's activity in the criminal field. Among them we mention the following:

- the Minerva project of the “Ministero della Giustizia” that aims to implement a system to support the District Attorney's activity;
- the Itaca project of the “Corte Suprema di Cassazione” that aims to define a general knowledge base in the criminal field;
- the P.M Daedalus support system for the District Attorney, developed by Carmelo Asaro.

In all of these projects no domain ontology has yet been defined. Using such an ontology could make it possible:

- to achieve a homogeneous conceptual structure in the various projects;
- to add domain knowledge to the support tools.

Moreover, the domain conceptualization can be used to

- manage documents by means of metadata;
- identify and suggest a crime hypothesis to the judge, for example, by scanning documents by means of shallow parser;
- mark semantically the criminal laws by using the XML language.

The first step in defining the ontology, is focused on outlining an abstract crime concept. The various crime figures foreseen in the penal code inherit this basic conceptualization.

## 1 Crime Conceptualization

The criminal law is that part of the Law which lays down the crimes and their penalties. From the legal point of view, a crime is every human fact/behavior for which the law provides a penalty: the sanctions and the safety measures. We can sketch the layers of the ontology as depicted in Figure 1

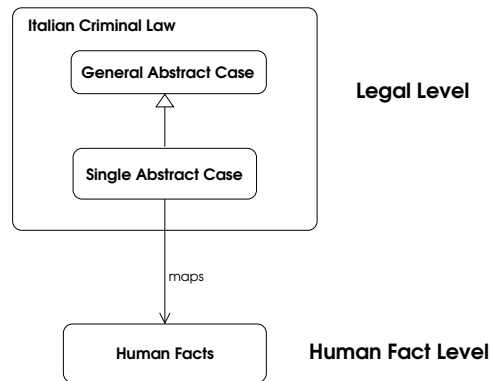


Figure 1: Layers

### 1.1 Crime in Italian Criminal Law

Crime characterization is laid down by Articles from 42 to 49 of the Penal Code. Within these articles the aprioristic crime assumptions are the lack

of crime legal excuses (f.i. state of necessity) and the existence of *suitas*. Crime legal excuses are those situations provided by the law that exclude the application of criminal norms, for instance self defence.

The *suitas* is the offender's awareness of his behavior. Art. 42 subsection 1 states that "Nobody can be punished for an action or omission foreseen by the law as crime if he/she has not committed it with awareness and will". The article underlines that criminal behavior belongs to the "domain of the will" and differs from a natural event.

Once ascertained that no crime legal excuse or justification cause exists and that the *suitas* emerges, we have to analyze the crime conceptual structure. The structural elements of crime are offender, behavior, event, circumstances and punishment.

The offender is the person acting in a way corresponding to an abstract crime case. The behavior is composed by a material element, that is:

- an action (the movement of the body fit to offend the interest protected by norm or the interest pursued by the legislator) or an omission ("*non facere quod debetur*");
- the concept of subjective criminal liability (malice or negligence) and objective criminal liability.

The behavior can be complete or incomplete. We have the first when the fact realized by the author corresponds - in everything - to the legislative forecast. Instead, we have the second when the behavior does not correspond to the legislative forecast. In this case the human fact or behavior could be classified by criminal law as an attempt if the action, although incomplete in comparison to the normative forecast, is suitable and direct univocally to the realization of the crime.

The event is the result of the criminal behavior and consists of the offence to the interest protected by the law. Between the event and the criminal behavior there must be a causation relationship.

The punishment is the sanction or penalty that criminal law provides for a particular crime (*nulla poena sine lege*).

Punishments can be principal or additional. Principal punishments are detentive or monetary. Detentive punishments are arrest for infringements, life imprisonment or imprisonment for crimes. Monetary punishments are fines called *ammenda* for infringements, *multa* for crimes. We can also distinguish: single punishment (only monetary or only detentive), joint punishment (monetary and detentive) or alternative punishment (monetary or detentive).

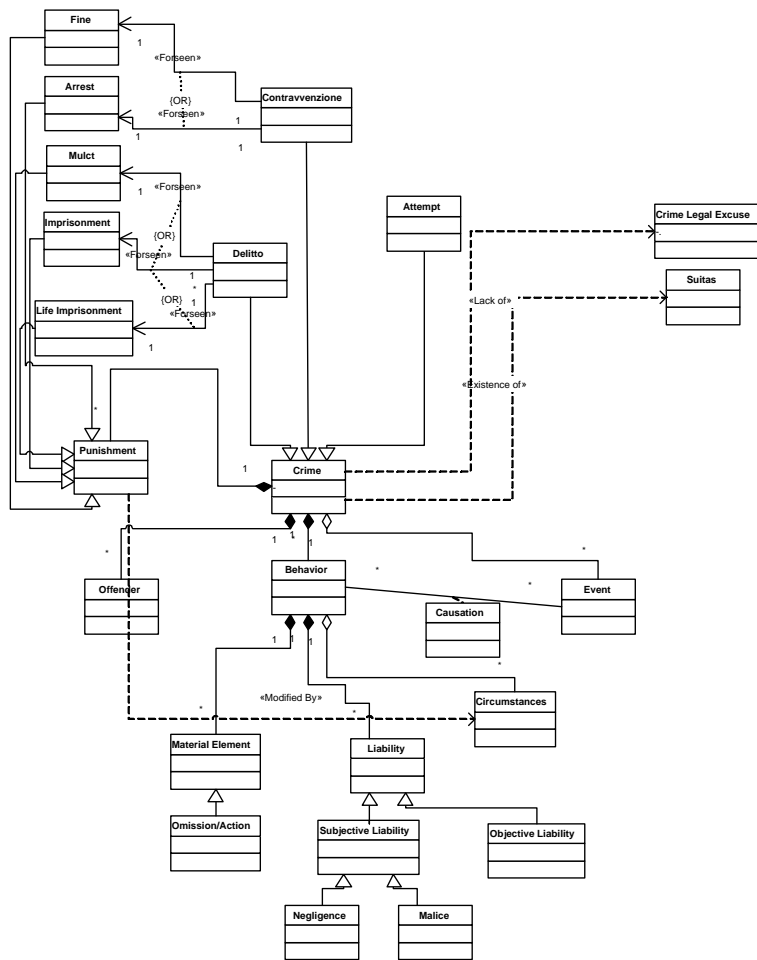


Figure 2: Crime Ontology

Together with punishment and behavior another element must be considered: circumstances. Circumstances are factors and situations, that graduate the crime disvalue, affecting it in an attenuating or aggravating sense. The attenuating ones decrease the punishment inflicted for the basic crime, while the aggravating circumstances increase the punishment.

The definition of the crime abstract concept enable identifying some constants, so the various crime typologies inherit this conceptual structure.

The elements of this structure match the human facts that can be part of a crime and diagnose their penal relevance. This mapping between human facts and the abstract crime structure can lead to different conclusions

- the crime subsit, i.e human facts conform to the norm (conforming fact);
- the fact is not a crime, i.e. the facts do not conform to the norm or a legal excuse exclude its application;
- the offender did not commit the fact, i.e the fact couldn't be ascribed to offender;

## 1.2 Crime Modelling

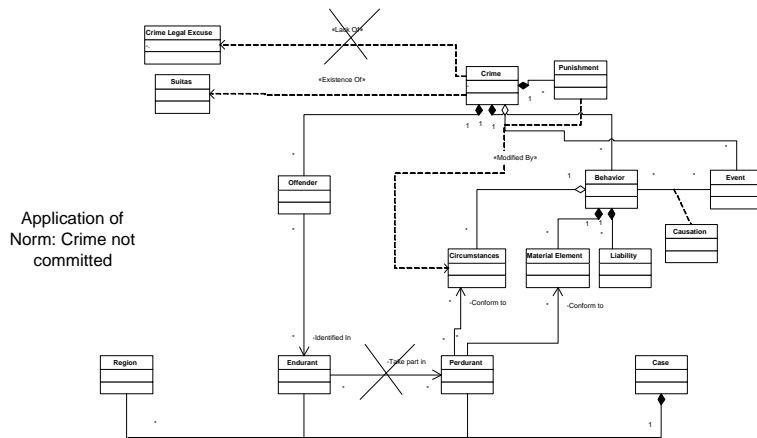
In this very first phase, we use an UML (Unified Modelling Language) class diagram to formalize the ontological concept of crime. This kind of representation enable to graphically visualize the conceptualization so that different skilled participants (legal experts and engineers) could work together. In the figure we notice:

- the crime is composed of a offender, a behavior, penalty and optionally by an event and coercions;
- some of these classes are further expanded to fit the previous description.

The crime conceptualization on the legal level map the human facts level as in the following schema.

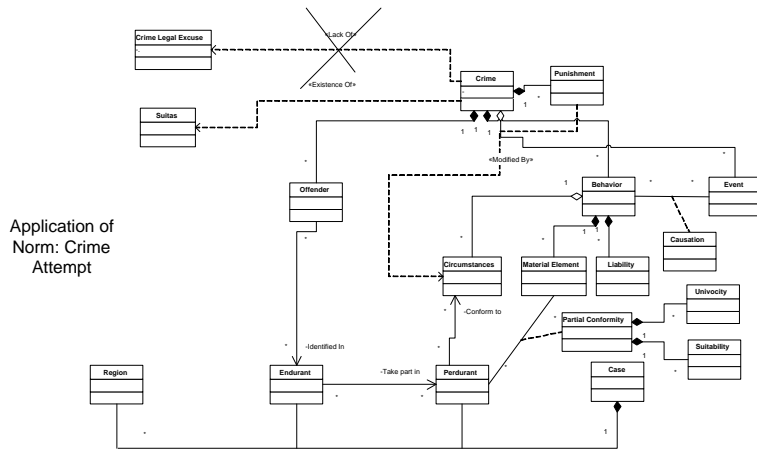
## 2 Future work

The next steps in our project will be



Application of  
Norm: Crime not  
committed

Figure 3: Crime not committed



Application of  
Norm: Crime  
Attempt

Figure 4: Crime Attempt

- abstract crime class specialization for specific crimes in order to verify the general validity of the conceptualization as well to expand the domain ontology.
- the ontology formalization as a logical theory by using Dolce as foundational ontology [1].

## References

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