DETECt
Detecting Transcultural Identity in European Popular Crime Narratives

Deliverable number: **D2.2**

Deliverable title: **An Ontological Approach to the Study of European Popular Culture**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 770151

WP number and title: WP 2 – Setting the Frame. A New Methodology for the Study of Transnational Popular Culture

Task number and title: Task 2.1 - Tracking down Changing Identities in Transnational European Crime Narratives

Lead beneficiary: UNIBO

Type: Report

Dissemination level: Public

Due date: Month 12

Actual date of delivery: May 21, 2019

Author: Monica Dall'Asta (University of Bologna)

Contributors: Ilaria Bartolini (University of Bologna), Thomas Morsch (Freie Universitat Berlin), Federico Pagello (University of Bologna), Ana Schultze (Katholieke Universiteit Leuven)

Reviewers: Stefan Gradmann (Katholieke Universiteit Leuven), Fred Truyen (Katholieke Universiteit Leuven), Antonio del Vecchio (University of Bologna)

Table of contents

Executive summary

Objectives

This document summarizes the work conducted by DETECt researchers to design an ontology of European crime narratives, as a methodological contribution to the research on the representation of transcultural identity in European popular culture. The report details how the management of the multiple challenges involved in a complex Digital Humanities project based on the collaboration among numerous different disciplines, can be facilitated by the adoption of knowledge mapping techniques. Building on the assumption that the development of the Semantic Web has created unique conditions for both the expression and the renewal of specifically humanistic skills, the project aims to propose a replicable model for the integration of research and educational activities in a transcultural/transnational dimension.

Background and position of this deliverable in the project

This document is the second report of the work carried out in the frame of Work Package 2, *Setting the frame: A New Methodology for the Study of Transnational Popular Culture*. It follows deliverable 2.1, *Sorting out the corpus of European popular culture* and was prepared in conjunction with deliverable 3.1 *Human-Machine Analysis as a Tool to Study European Transcultural Identity*. Together, the three documents detail the work done during the preparatory phase of the research to set up a viable Digital Humanities methodology for the study of European popular culture. Deliverable D2.1 illustrates the challenges of creating a representative corpus of contemporary European crime narratives and explains the selection criteria adopted by DETECt researchers as a pragmatic solution to the problem of identifying a set of relevant titles from the massive inventory of this popular genre. Deliverable D2.2 describes the complex process of mapping the different semantic, disciplinary and transdisciplinary areas conjured up by the notion of ''European popular crime narratives'', so as to provide consisting guidelines for the design of both the data structure and the information architecture of DETECt digital outputs. Finally, Deliverable D3.1 focuses on the technological solutions devised to implement DETECt portal on the base of the guidelines elaborated in D2.2.

Structure of the deliverable

Paragraph 1 presents the challenges that are inherent to the study of the European narrative crime genre, conceived as a transcultural, transnational, transdisciplinary and transmedial phenomenon, and introduces the concept of design as the primary tool for managing the complexities of European research, on both a semantic and an organizational level. Two problems are highlighted in particular: 1) the exorbitant volume of contemporary crime narrative production, which implies reframing the relation between quantitative and qualitative criteria in the processes of corpus creation and corpus analysis; 2) the extraordinarily wide spectrum of transdisciplinary knowledge conjured up by crime fiction studies, and its relations with the different kinds of transdisciplinary expertise represented in the DETECt. This complexity is seen as a most fertile terrain for a cross-pollination of experiences across different fields of knowledge, and especially between hard and soft sciences. DETECt aims to contribute to innovating the qualitative methods of humanistic studies through a rich, consistent dialogue with the quantitative methods of Information Science.

Paragraph 2 offers a short critical account of the history of the word 'ontology', starting with the thinkers of ancient Greece and ending with an illustration of the meanings that the term has most recently assumed in the field of Information Science. The difference between 'ontology as philosophy' and 'ontology as technology' (ontology_t) is introduced and discussed, alongside with the crucial notions of *abstracta* vs *concreta*, and 'realism' vs 'nominalism'. A discussion of the impracticalities of nominalist-based ontologies leads to the adoption of a realist stance, based on the identification of an indefinite number of semantic 'universals'. Similarly, a practical consideration of the project's priorities leads to choosing a 'lightweight' approach to the design of DETECt ontology. In place of an ontology_t, DETECt semantic domain has consequently been modeled in the form of a Knowledge or Concept Map.

Paragraph 3 presents a few advantages of DETECt's ontological approach for the study of European popular culture, particularly in terms of a better understanding of the complex structure of its semantic domain. Among the major benefits, it is worth recalling: the opportunity to provide researchers with a reference representation of the structure of information; the opportunity to enable reuse of domain knowledge; the opportunity to improve flexibility about domain assumptions, through the adoption of a method based on making domain assumptions explicit through a declarative language; the opportunity to translate domain knowledge into operational knowledge; the opportunity to analyze and transform domain knowledge.

Paragraph 4 is devoted to illustrating the DETECt Concept Map. Paragraph 4.1 explains the semantic modeling of the project's Work Package rationale into the five transdisciplinary research areas that are involved in the study of the representation of transcultural identity in European contemporary popular crime narratives. It also discusses the consequences of the adoption of a realist approach in the map's design, in particular concerning the spatial co-existence within the domain of both *concreta* (corresponding to sets of real entities, like for example the crime narratives themselves, or the people behind them) and *abstracta* universals (corresponding to concepts, or sets of related concepts, drawn from the different disciplinary domains and sub-domains that contribute to the knowledge about contemporary European crime narratives). This layered arrangement represents one of the most stimulating aspects of DETECt Concept Map and a key element in its ability to create *de novo* affordances that not only allow a more effective pragmatic management of the project, but also facilitate the discovery of new information and research questions.

Paragraph 4.2 goes into each research area in more detail, explaining the double nature of each of the map's branches. It illustrates how each branch corresponds at once to a particular arrangement of concrete entities—the types of research objects that define the domain: novels, films, TV dramas, authors, producers, audiences, geographic places, and so on—and a particular distribution of domain knowledge—the multiple disciplines that have developed a significant body of knowledge about those particular objects. After describing the different subdomains (People/Diversity, Space and place, History and politics, Production and distribution, Promotion and reception,) and their connections with the disciplinary competences represented in DETECt consortium, the problem of how to specifically 'model Europe' across DETECt semantic domain is briefly discussed. European identity is conceived as a multifaceted value emerging at the intersection of the extremely diverse bodies of knowledge and cultural experiences produced across these five areas. At the same time, the modeling of this branch cuts transversally through all the others, wiring all the different transdisciplinary subdomains into a coherent topic model that can assist the study of a complex narrative genre such as the European crime genre.

Finally, Paragraph 4.3 details a few more pragmatic uses of DETECt Concept Map. Among them, the following are listed and briefly discussed. 4.3.1 Project management: It has assisted the specification and organization of the research activities and workflow, offering a shared visual representation of the project's research interests. 4.3.2 Terminology: It has provided a semantic reference frame for structuring the information in the project's database, offering a base for the

development of different topical Thesauri or Controlled Vocabularies. 4.3.3 Navigation. It has offered a visual metaphor for modeling DETECt Web portal's digital interface. 4.3.4 Digital Pedagogy: It provides a methodological inspiration for the design of DETECt learning materials. 4.3.5 Linked Data: It provides a conceptual model that could be further explored through a Linked Data approach.

1. The Humanities, Cultural Studies and the Challenges of Complexity

Like any other field of contemporary scholarly research, the Humanities in general, and Cultural Studies in particular, are today confronted with the challenges of complexity at an unprecedented scale. What has been described as an 'astonishing growth' of academic publications worldwide (Tractenberg 2013) is only paralleled by a similar proliferation of browsable online databases, digital archives, collections, catalogues, and so on, which give access to an immense and continuously increasing volume of virtually interesting research material, stored in the form of information bytes.

As we discussed in Deliverable 2.1, *Sorting out the archive for the study of European popular culture*, the problem of how to cope with such an unseizable volume of virtually relevant sources of evidence is all the more sensible in the case of a project like DETECt, which deals with one of the most prolific narrative genres of contemporary media production—that is, the *European crime narrative genre*. Not only an exhaustive catalogue of this production could easily count—especially when considered in all of its transnational scope—in thousands of thousands, and even—in historical perspective—millions of items, but the transdisciplinary scope of the studies it has inspired has produced an extraordinary wealth of research in so many different domains of knowledge that to envision a synthesis might seem impossible. These difficult challenges make DETECt an ideal laboratory for experimenting new methods to manage complexity in a transcultural/transnational research environment. A major goal of this methodological experimentation is to respond to the problem of how to generate effective syntheses of portions and/or aspects of a given knowledge domain in a context of information overload. To this purpose, the ontological approach chosen by DETECt focuses on the application of knowledge mapping techniques to encourage the formulation of partial knowledge syntheses within a 'realist', and

even 'pragmatic' theoretical framework (Okada, Buckingam Shum and Sherbone 2008a, Pawson 2006).

Already in 1959, in his famous lecture at the opening of the academic year at the University of Cambridge, Charles P. Snow had warned about the hindrance to real progress that the absence of dialogue between the sciences and the humanities represents: 'At one pole we have the literary intellectuals, at the other the scientists, and as the most representative, the physical scientists. Between the two a gulf of mutual incomprehension'. Sixty years later, what he called 'a necessity in the most abstract intellectual sense, as well as in the most practical'—bridging the disciplinary gap between the so-called 'two cultures'—has become the major motivation for the development of what we now call Digital Humanities.

There is a tendency today to believe that the cognitive, heuristic and pragmatic problems of research in complex domains can be solved by automatically applying quantitative methods, using algorithms to detect information patterns in large cultural corpora, viewed as either 'small' or 'big data'. But the simple application of calculation tools to the measurement of cultural production is no guarantee of any automatic knowledge generation. On the contrary, for new technologies to be able to express their real potential as thought-provoking analytical tools it is crucial that their possibilities are always evaluated in relation to a project's research questions, in such a way as to establish their specific function within a larger knowledge framework. A well-established methodological assumption of Digital Humanities is that 'the design of arguments is a fundamental feature of research' (Burdick et al. 2012):

> The suite of expressive forms now encompasses the use of sound, motion graphics, animation, screen capture, video, audio, and the appropriation and remixing of code that underlies game engines. This expanded range of communicative tools requires those who are engaged in Digital Humanities work to familiarize themselves with issues, discussions and debates in design fields, especially communication and interaction design. . . . Digital design expresses concepts by means of the multitude of ways in which it layers media, structures information, and articulates navigational strategies.

The role of design is crucial in order to integrate and make sense of the results of quantitative analysis within the complex knowledge structure of contemporary culture. Without the guidance of preliminary choices based on qualitative evaluation, quantitative studies can do very little to enrich the learning and understanding of any given knowledge domain.

In what follows, we aim to demonstrate that a methodology based on the ontological modelling of the semantic domain in the form of a Concept Map can assist both the design and the management of complex Digital Humanities projects, by providing a shared reference semantic framework for making sense of individual experiments and contributions to the benefit of collaborative knowledge generation, elaboration, and dissemination (Novak and Cañas 2008).

Complexity management is a critical issue for DETECt on at least three levels: 1) the quantitative extension of the field under investigation, which, as already mentioned, poses specific challenges in terms of corpus selection; 2) the integration of multiple methodologies and scholarly traditions, needed to provide the multidisciplinary competences required by the analysis of such an extensive and variegated field of contemporary cultural production as the crime genre; 3) the transnational dimension of European research, which encourages the adoption of specific strategies to promote coordination in distributed collaborative environments.

As the first multidisciplinary project dealing with the study of popular culture in Europe, DETECt is highly aware of its position and responsibilities in front of these challenges. We want to use the unique opportunity offered by the transnational/multi-disciplinary research framework provided by the Horizon 2020 program to test a new 'integrated'approach to the study of popular culture in the era of complexity, based on the idea that—far from being just an obsolete residue of an old world on its way to disappear, as ventured in an ill-founded yet extensive recent campaign (Cooper and Marx 2013)—specifically humanistic skills are as necessary as ever for a meaningful apprehension of the informational as well as communicatory affordances opened up by the new technologies.

In its imbrication of non-computed textual analysis and computed analysis of measurable data, as well as methodological and educational concerns, DETECt conceives of itself as an experiment in complexity management, conducted by an 'active community of practice' (Lave and Wenger 1991) through the application of the semantic skills provided by different domains of humanistic culture to the needs of both transnational/transcultural research and information architectural design. Particularly after the advent of the 'Semantic Web' (Berners-Lee 2000) and its improved technologies to translate natural language into machine-readable data, traditional humanistic skills such as associating words within and across domains of human knowledge, analyzing their meaning, searching for definitions, or creating new ones, and so on, have much to contribute to the progress of European culture and society, and well beyond the scope of the traditional fields of the Humanities.

The methodological solution adopted by DETECt to respond to all of these challenges is indicated in the title of this deliverable under the headline of 'an ontological approach'. In the context of this research the word 'ontology' is assumed, very precisely, as the cultural interface between humanistic knowledge and information technologies. By adopting such ontological perspective as a method to deal with the complexity of contemporary (trans)cultural studies, DETECt aims to offer a model that enhances the use as well as the re-use value of humanistic knowledge in today's societies.

2. What Is (an) Ontology?

The word 'ontology' traditionally refers to a field of philosophical inquiry that goes back to the thinkers of Ancient Greece. Even if the word itself was coined only in the 17th century (Deeley 2010)1 the types of interrogation that it defines are as old as the philosophies of Parmenides, Plato and Aristotle. Ontology deals with the nature of Being and Beings, which immediately has to do with the practice of giving names to entities. Ontology is also about relations. It involves establishing relations between things, and between things and their names, with in turn implies clarifying the relation between unity and multiplicity, between the individual entity and any eventual more complex *reality* or *concept* beyond any given single individual entity. The nature of this problematic 'area' beyond single individuals is being debated for centuries. While the origins of the ontological discourse are deeply imbricated with the history of theology, as in the controversies about the exact nature of the relation between God and the human beings that flourished during the Middle Ages, the logical problems that it poses are still currently debated in as many different scientific disciplines as Artificial Intelligence, Systems Engineers, Analytic Philosophy, Taxonomy and Terminology Studies, Linguistics, Lexicography, Anthropology, Social Psychology, Information Architecture, Management and Organization Studies and more.

In computer science, 'ontology' is the name given to a formal representation of the knowledge within a given domain, involving explicit definitions of a set of concepts within the domain and the relationships between those concepts. Ontologies are used to reason about the properties of such domain and may be used to describe it. (Man 2013). As Thomas Gruber explained in 1993 in introducing the concept, they are 'formal, explicit specification of shared conceptualizations'. They provide the reference vocabulary that is needed to model a specific semantic domain, that is, to identify the types of entities (objects or concept) that are relevant to the knowledge expressed in that domain.

1 The term first appeared in 1663 in a work by Gideon Harvey, 'where it is proposed as the "most proper designation" for what Aristotle called "First Philosophy" and the Latins "Metaphysics", to wit "the science and study of being; that branch of metaphysics concerned with the nature or essence of being or existence"' (Deely 2010).

Quite interestingly, the development of the Semantic Web have given new currency to the problems discussed by Aristotle in his Category Theory. As Poli and Obrst (2010) explain:

> The philosophical perspective of ontology focuses on categorial analysis, i.e., what are the entities of the world and what are the categories of entities? Prima facie, the intention of categorial analysis is to inventory reality. The computer science perspective of ontology, i.e., ontology as technology, focuses on those same questions but the intention is distinct: to create engineering models of reality, artifacts which can be used by software, and perhaps directly interpreted and reasoned over by special software called inference engines, to imbue software with human level semantics.

While posing similar logical dilemmas, these two different kinds of ontologies differ substantially as far as their goals are concerned. Unlike philosophical ontologies, which typically aim at establishing some sort of truth or general logical foundations, technological ontologies have purely practical goals, which refer to their use-value as tools to structure, manage and navigate complex networks of semantic information. The practical orientation of technological ontologies (which Poli and Orbst call ontology_t or 'Little o', as opposed to philosophical categorial analysis, or ontology_c, 'Big O' ontology) also accounts for their intrinsic multiplicity. This aspect came on the forefront in 1993 when Thomas Gruber first introduced the notion of 'portable ontologies':

> An ontology is an explicit specification of a conceptualization. The term is borrowed from philosophy, where an ontology is a systematic account of Existence. For knowledge-based systems, what 'exists' is exactly that which can be represented. When the knowledge of a domain is represented in a declarative formalism, the set of objects that can be represented is called the universe of discourse. This set of objects, and the describable relationships among them, are reflected in the representational vocabulary with which a knowledge-based program represents knowledge. Thus, we can describe the ontology of a program by defining a set of representational terms. In such an ontology, definitions associate the names of entities in the universe of discourse (e.g., classes, relations, functions, or other objects) with human-readable text describing what the names are meant to denote, and formal axioms that constrain the interpretation and well-formed use of these terms (Gruber 1993).

The ideal of a general ontology conceived as a comprehensive representation of the whole of human knowledge has haunted research in analytical philosophy at least since the publication of Carnap's *The Logical Structure of the World* in 1928, in which the American author offered 'a methodology for translating all of science into one single ontology, based on a doctrine called 'resemblance nominalism'(Smith and Ceusters 2010). A brief reminder of the issues at stake in the dispute between, respectively, 'nominalist' and 'realist' positions can be useful for a better historical understanding of the role played by the analytical school in the development of the logical tools of the development of Computer Science.

No doubt as scholars in Cultural Studies we have learnt more about this dispute from the pages of one of the most compelling works in our corpus of European crime narratives—Umberto Eco's *The Name of the Rose*—than from the pages of such influential logicians as Carnap, Quine and Sellars. Eco's novel is notoriously set in the 14th century, just at the height of the Scholastic debate about the so-called 'problem of universals'. The dispute is evoked through the figure of William of Baskerville, a monk and a stand-by for the historical figure of William of Ockham, considered by Eco to be a forerunner of modern semiotics (just like, in another sense, Sherlock Holmes, clearly the initial inspiration for his hero, Eco 1988). Despite so many attempts made throughout the centuries to reconcile the conflict between nominalist and realist stances over the issue evoked in the novel's title—that is, whether general, universal categories (the general concept expressed in the name 'rose') can be said to exist in reality in the same way as particulars beings do (a particular rose in a particular time and place)— similar problems are today still central to current ontological studies, with interesting consequences in terms of different philosophies of information technologies.

While the developments of Computer Science have occurred within a rigorous nominalist logical framework, such as that provided by the American analytical school of Quine, Carnap and others, recent developments in the direction of Semantic Web technologies have revived the realist approach to the meanings and uses of ontological conceptualizations. For example, in ontology_t, that is,

> in the related fields of information science, knowledge representation, and artificial intelligence, there is a shift in focus from the reality itself (and the way it is conceptualized, or represented), to the specification of its representations. According to this perspective . . . two concepts are alike when their specifications match, and different when they do not. In case there is a question of degree of matching/resemblance, usually

> the deep problem is covered up with the involvement of an 'expert' who is going to carry the weight of making an 'expert' decision. Of course, systematizing, formalizing, and eventually implementing interoperability processes is something we cannot live without. Nevertheless, while essential at this level, it leaves the deep semantic comparison to be decided upon at a higher level (Kavouras and Kokla 2008).

Proponents of such a higher ontological level of integration of knowledge bases are numerous today especially in the realist camp. Controversies between the two camps can be highly polemical. The issue at stake is the role that universals should or should not have in the development of ontologies. A recent example of a realist approach which is highly polemical toward the nominalist inspiration that has guided the logical foundation of contemporary informatics is offered by Smith and Ceusters (2010):

> In an independent development in the late 1970s the term 'universal' began to be used by philosophers as part of a general rediscovery of the importance of traditional metaphysical thinking, and especially of one or other version of metaphysical realism, for an understanding of scientific laws. This rediscovery occurred after a period of dominance of nominalism especially among philosophers active in the United States who were taking advantage of the possibilities created by the new tool of first-order predicate logic (FOL) for the formulation of philosophical arguments.
>
> Simply put, the formulae of FOL consist of four kinds of expressions: logical constants, such as 'and' and 'not'; quantifiers such as 'all' and 'some'; constant and variable terms such as '*a*', '*b*', '*x*', '*y*'; and predicates such as 'F' and 'R'. Formulae such as 'F(*a*)' or 'R(*a*, *b*)' are then used to regiment natural language assertions such as, respectively, 'Socrates is a man' and 'Socrates is married to Xanthippe', where '*a*' stands in for 'Socrates', '*b*' for 'Xanthippe', 'F' for 'is a man' and 'R' for 'is married to'.
>
> Fatefully, Quine and some of his contemporaries succeeded in establishing a widespread presumption according to which the use of FOL as a tool of philosophy must go hand in hand with the acceptance of a rather narrow (and nominalist) view as concerns the range of entities to which constituent *terms* of FOL are allowed to refer. Specifically, the view came to be adopted according to which all terms in FOL must refer exclusively to individual objects (particles, molecules, cells, organisms, planets and so forth). The result – which

> we shall henceforth call *received FOL* – reflects, as we shall see, a genuine restriction on the available expressive resources of first-order logic.

As we can see, in ontology the debate between realists and nominalists is mainly concerned with the issue of formalization. Realists reproach nominalists to be responsible for an excessive abstraction of their formal languages, which becomes impractical when the purpose of ontological modeling is not to define the logical elements and operators of so-called Formal ontologies or Upper-level Ontologies, but, more prosaically, to assist domain experts in the modeling of regional ontologies representing the knowledge of a specific disciplinary field. They also contend that the nominalist approach is unable to contribute any solution to the problem of how to integrate different regional or sub-regional ontologies. In the realist conceptual framework, the problem of integration is solved by assuming universal as interpretants in a process of translation between different formal as well as non-formal languages. In other words, the realist position does not renounce to pursuing the ideal of a unified universal knowledge but aims to contribute to this goal by adopting a 'federative' approach based on translation, rather than aiming for *the* ultimate ontology through the application of 'logical formulas […] practically impenetrable to all but a very small minority of specialists in mathematical logic.'

> As a consequence, a realist methodology for ontology development
>
> requires that discipline-specific reference ontologies be created manually by experts in the corresponding disciplines, persons who already know what it is in reality to which the terms in their discipline refer. The first round in the iterative process of building a discipline-specific ontology will require the creation by such persons of a draft list of the general terms that can be used within the discipline in positive assertions to refer—on initial inspection—to types or universals.

What Smith and Ceusters call 'reference ontology' then starts with producing a list of explicit definitions of the types or universals involved in a specific knowledge domain:

> *Reference ontology principle*: A reference ontology is a regimentation of the terminological content of the settled portions of a given scientific discipline. It includes general terms used by scientists working in that discipline, which are assumed by the developers of the ontology to refer to corresponding types or universals in reality. It also includes assertions of certain relations between instances of the corresponding types.

While this methodology was developed to deal with a much different body of knowledge compared to Cultural Studies, at once more materially and rigorously scientifically rooted, such as Bio-medical Sciences, it provides an interesting framework to start thinking of humanistic knowledge in ontological terms. It is important to note that in none of its parts the ontological approach exposed in this document is meant to provide a faithful and exhaustive representation of the reality described by the research (in our case, the crime genre as a transmedial as well as transcultural phenomenon involving specific forms of production, distribution, promotion, reception, and representation) but rather a rendition of the *abstracta* used to represent reality in both the *catalogues* and the *theories* that constitute the knowledge of this particular domain.

In so doing, DETECt wants to test what the outcomes of the adoption of an ontological-realist approach to knowledge management can be within the complex semantic as well as pragmatic environment of a Horizon 2020 project. We do not have the ambition to come up with a definitive systematization of our knowledge domain; more pragmatically, we want to show how the assumption of an ontological orientation can help the Humanities in general, and Cultural Studies in particular, to innovate their methods and better face the challenges of an increasingly complex transcultural reality, while at the same time making the knowledge bases of their different disciplinary domains more accessible, explorable, re-usable and implementable.

The development of an ontology considered as an engineered artifact (ontology_t as an application ontology) is currently beyond the scope of this project, which is primarily concerned with the study of the ways in which European identity expresses itself through the modes of production, distribution, reception and representation of popular contemporary crime narratives. The modeling methodology used for this exercise is based on an informal notion of concept, or knowledge mapping, resulting in the design of a visual artifact called DETECt Concept Map.

While the development of an application ontology is not presently a goal of this project, this graphic representation offers a complete semantic model that could easily be translated into a metadata data model such as, for example, the Resource Description Framework (RFT), the specification standard adopted within the Ontology Web Language to represent 'rich and complex knowledge about things, groups of things, and relations between things'.2 DETECt Concept Map

2 https://www.w3.org/OWL/

both effectively identifies the main concepts of DETECt knowledge domain as nodes of a semantic network, and explicitly characterizes the relations between them by describing them in propositional form, which can be expressed in RDF as ternary relationships between a subject, a predicate and an object. For example, in a triple structure, the univocal identification of each of the following three concepts is allowed by the specification of the relations they maintain with one other: Sir Arthur Conan Doyle (subject) is the author of (predicate) The adventures of Sherlock Holmes (object). The Web Ontology Language (OWL) standard aims to bring the reasoning power of logic to the Semantic Web to express concepts such as entities (basic statements) and axioms (elements that refer to real-world objects) data rules such as cardinality and classes. In this way, OWL allows for a better automatic machine processing of content in a manner that is similar to human reasoning.

A more detailed explanation of a possible strategy to translate DETECt Concept Map into an ontology is offered at the end of this document, in 4.5.3, as an indication for a future project in Linked Data/Wikidata. At present, the most relevant contribution of concept mapping in the frame of this project is the innovative approach that it offers to the problem of how to manage the semantic challenges of European research, so as to gain scholarly consensus about the terminology used in a multilingual, transcultural as well as transdisciplinary research environment. With its multilingual team of scholars acquainted with literatures in several European languages, the DETECt consortium forms an ideal incubator for this experimentation in semantic standardization and interoperability among different knowledge bases. For example, how would an untranslatable concept like 'Italian giallo' map to similarly untranslatable concepts in other languages, such as 'polar', 'krimi', and so on? As explained in 4.5.4, the work of defining these concepts can form an interesting part of DETECt research in the frame of the activities of DETECt Learning Community. The MOODLE glossary module can be used to define the concepts (by browsing existing multilingual dictionaries and scholarly resources) to go toward Linked Data and OWL. It can be useful to remind here that this project has assumed English as its vehicular language, but is committed to promote multilingual awareness in both research and education. While we will basically work on the semantics of English language, specific effort will be put into

'importing' into our English vocabulary terms from other languages and define them so as to enhance their transcultural value—e.g. again the case of 'giallo'.

The next paragraph sketches the general principles that have guided the partitioning and semantic specification/characterization of DETECt knowledge domain. The process of manually designing the DETECt ontology in the shape of a Concept Map has proved immensely useful in several ways that are discussed more extensively below. In particular, the semantic modeling of the domain has served the purposes of elaborating a consistent semantics for structuring the architecture of DETECt Repository, Learning Community, Atlas and MOOC. More generally this visual artifact has proved useful to provide researchers with a shared representation of the complex relations among the knowledge categories (classes, concepts, types) that are more or less explicitly assumed as universals in the scholarly, critical and theoretical discourses that shape the domain.

3. Advantages of an Ontological Approach to the Study of European Popular Culture for a Complex Understanding of DETECt Semantic Domain

After roughly defining what an ontology is, particularly in the frame of DETECt, we need to address the question of what practical functions it might serve, and what advantages it might provide for the management of complexity in our transcultural, transdisciplinary, transnational, and transmedial field of investigation. In a seminal paper, Noy and MacGuinness (2010) distinguished among five different motivations for creating an ontology_t:

> *Sharing common understanding of the structure of information among people or software agents* is one of the more common goals in developing ontologies (Musen 1992; Gruber 1993). For example, suppose several different Web sites contain medical information or provide medical e-commerce services. If these Web sites share and publish the same underlying ontology of the terms they all use, then computer agents can extract and aggregate information from these different sites. The agents can use this aggregated information to answer user queries or as input data to other applications.
>
> *Enabling reuse of domain knowledge* was one of the driving forces behind the recent surge in ontology research. For example, models for many different domains need to represent the notion of time. This representation includes the notions of time intervals, points in time, relative measures of time, and so on. If one group of researchers develops such an ontology in detail, others can simply reuse it for their domains. Additionally, if we need to build a large ontology, we can integrate several existing ontologies describing portions of the large domain. We can also reuse a general ontology, such as the UNSPSC ontology, and extend it to describe our domain of interest.
>
> *Making explicit domain assumptions* underlying an implementation makes it possible to change these assumptions easily if our knowledge about the domain changes. Hard-coding assumptions about the world in programming-language code makes these assumptions not

only hard to find and understand but also hard to change, in particular for someone without programming expertise. In addition, explicit specifications of domain knowledge are useful for new users who must learn what terms in the domain mean.

Separating the domain knowledge from the operational knowledge is another common use of ontologies. We can describe a task of configuring a product from its components according to a required specification and implement a program that does this configuration independent of the products and components themselves. We can then develop an ontology of PC-components and characteristics and apply the algorithm to configure made-to-order PCs. We can also use the same algorithm to configure elevators if we 'feed' an elevator component ontology to it.

Analyzing domain knowledge is possible once a declarative specification of the terms is available. Formal analysis of terms is extremely valuable when both attempting to reuse existing ontologies and extending them.

The multidisciplinary expertise involved in the particular transmedial approach chosen by DETECt, not to mention the multilingual cultural traditions involved in the different transnational fields of European Studies, require a supplementary effort to build an explicit reference framework as a tool for collaborative planning, knowledge transfer and knowledge generation across a diverse community of researchers conceived as an 'active community of practice' (Lave and Wenger 1991). Approaching DETECt semantic domain from an ontological angle means to look for an effective strategy to represent the complexities involved in a transdisciplinary/transnational project such as this one on at least two different levels: 1) the organization of the semantic domain covered by the research project; and 2) the characterization of each phase of the research project in relation to the overall semantic structure of the domain.

With respect to the latter aspect, it is interesting to observe that the use of ontologies has been widely discussed in the field of Management and Organization Studies. (Sheeba and Bernard 2012; Nousala et al. 2005; O'Donnel, Danserau and Hall 2005; Vestal 2005). As Allert, Markkanen and Richter (2006) argue, the development of an explicit ontology 'is a prerequisite for communication and collaboration within a community'. Ontologies assist single individuals in making sense of the position they occupy within a complex organization design, provide the basic vocabulary for interaction between individuals with different cultural/disciplinary backgrounds and promote collaborative knowledge generation by offering a shared representation that can be

continuously enriched and revised. Resulting from a 'cooperative process in order to gain a consensual representation of the collective knowledge on the domain', explicit ontologies can be powerful allies in the pragmatic management of complex projects. While the standard management rationale of Horizon2020 projects—and particularly the partitioning of the workflow in Work Packages and Tasks—already provides an initial ontological structure for any project in the Horizon 2020 program, we believe that the complex transcultural challenges involved in collaborative European research require the adoption of more subtle strategies of knowledge management. This is of particular concern for a project such as DETECt, which aims at innovating the methods of Cultural Studies through a meaningful application of digital technologies. An ontological orientation seems to be best suited to address these concerns, by helping shape the domain knowledge according to a logical structure that can support data modeling and the design of information architectures. The ontological approach chosen by DETECt is part of an effort in this direction.

But what are the steps to generate an ontology, meant as a 'socially shared artefact' (Allert, Markkanen and Richter 2006) providing 'a common vocabulary for community members to interlink, combine, and communicate knowledge shaped through practice and interaction, binding the knowledge processes of creating, importing, capturing, retrieving, and using knowledge?' Increasingly, studies about the development of ontologies in complex organizational contexts have stressed the need to overcome the impediments experienced by domain experts in front of the formal languages of ontology engineering.

> Existing ontology engineering environments and methodologies have been designed and implemented for the knowledge engineer, concentrating mostly on the ontology development process. This leads communities of knowledge workers to develop semantically-poor thesauruses for their domains, or even abandoning the trial for semantically annotating their resources, since in most of the cases they are not willing to pay the costs implied by employing knowledge engineering resource. . . .
>
> Knowledge engineers deal with these artifacts at the symbol level, mediating between domain conceptualisations and their formal representations, which cannot be further manipulated or even (in some cases) be inspected by domain experts. This leads to a machine-oriented, knowledge engineer-centered ontology engineering approach. It relies heavily on de-contextualized principles of engineering ontologies, with formal means for capturing subtle domain aspects, but does not deal with the way people develop their

> conceptualizations in the context of their day-to-day activities, individually or conversationally with colleagues (Kotis, Vauros and Padilla Alonso 2004).

According to Kotis, Vauros and Padilla Alonso, a human-centered methodology for the development of ontologies in organizational contexts that require the management (collection, processing, generation) of complex semantic information should always start with a phase of informal modeling. Inscribing itself in the growing thread of ontological studies that emphasize the need to promote a 'lightweight' approach to semantic modeling through natural language, their method 'for the development and evaluation of living ontologies in the context of communities of knowledge workers' addresses the following recommendations to ontology engineers:

> 1) Allow an eclectic way to the development of ontologies. Members of communities must be allowed to follow any approach or combination of approaches for the development of ontologies, which better fits their practice, their working norms and constraints: They may improvise by integrating concepts in a conceptual system, provide concepts with informal definitions attaching information items to them, compare, merge and refine/generalize existing ontologies.
>
> 2) Emphasize on the need for a natural and consistent way to interact with conceptualizations. As already pointed, the major issue for human-centered ontology engineering is that people must interact with their conceptualizations at a level of detail that is more convenient for them. Therefore, low level implementation details of formal ontologies must be hidden from workers who do not understand knowledge representation formalisms' terminology. People must be given the power to express subtle ontological distinctions in a way that is natural to them but satisfies the formal constraints of the specifications too.
>
> 3) Provide the means for exchanging, using and evaluating ontologies conversationally. As already pointed, shaping information synergistically is necessary, since knowledge is distributed among workers. To support conversations between individuals, a methodology must enable further criticism of the developed artifacts, encourage feedback from community members, putting ontologies in the context of knowledge workers' experiences and practice.

4) Consider mapping of concepts' definitions to other ontologies and/or lexical resources. The aim is to uncover the human intended semantics of the specifications for clarification and communication purposes. This supports the bridging of different perspectives about the domain and provides a critical feedback on the preciseness of specifications. Concepts' meaning mapping is important for the development of commonly agreed conceptualizations, especially in communities where people from different disciplines use the same term with different meanings or use different terms for the same concept.

4. Explaining DETECt Concept Map

Before we can finally turn to describing how this process has deployed to generate a visual representation of DETECt semantic domain in the form of a Concept Map, it is important to clarify one of the basic assumptions of our ontological methodology. As mentioned above, we have subscribed to the realist approach in basically distinguishing between two primitive types of entities: *concrete particulars* and *types* or *universals* meant as roughly corresponding to the more common notions of *instances* and *classes* or *items* and *categories* used in both programming languages and classification systems. While the existence in nature of particulars (we can think for example of the single items in a collection of noir novels, or the single individuals responsible for the production of a crime film, and so on) imposes itself without the need of any further demonstration, the existence of abstract concepts, classes or categories as *real* entities has been, as we have seen, much debated for centuries.

We then need to clarify in what sense we are maintaining that general terms—like, for example, *Europe*—do have some kind of concrete existence. To do so, we can start with distinguishing between terms that refer to specific collections of particulars, such as for example, 'the population of Europe', and terms that refer to less obvious structures of reality which find some kind of systematic, theoretical treatment in cultural texts, such as the explicit and/or implicit theories that are commonly used to describe and investigate a particular knowledge domain. In this framework, *Europe* refers to a complex interweaving of geographical, historical, juridical, political, social, economic and (trans)cultural realities that constitute as many objects of study in a vast array of disciplines, which in time have elaborated a number of useful concepts to frame the underlying complexities implied in the experience of reality. Without espousing an extreme conceptualist credo, according to which concepts—including theoretical concepts—would be as powerful as to *create* reality, we contend that abstract conceptualizations are part and parcel of the domain they aim to describe, insofar as they provide the means for a consensual, collaborative apprehension of the semantic domain. In this way, the conceptual modeling of the domain offers the conditions for the generation of a whole new array of knowledge affordances.

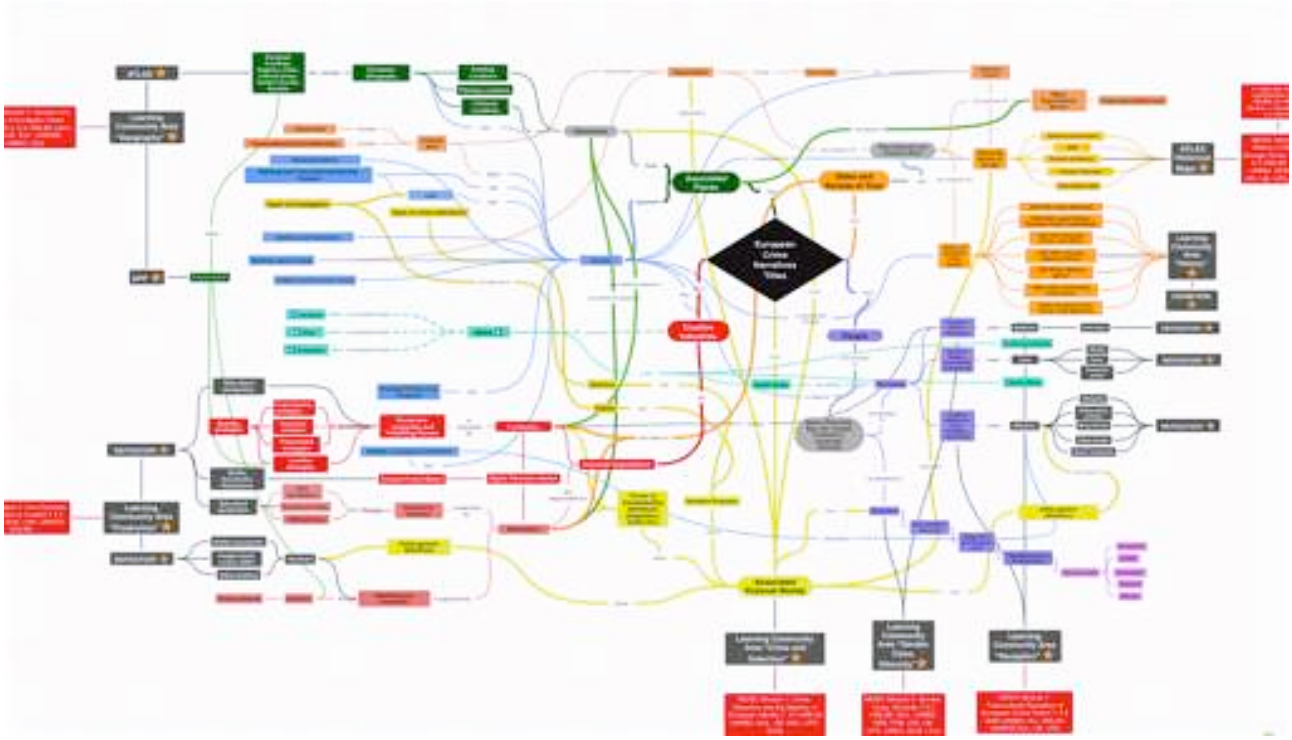

Table 1. DETECt Concept Map. The maps is available in higher resolution at the following address: https://www.detect-project.eu/repository/index.php/s/tRotRa7eNTKCcbm/preview

4.1 From the Work Package Rationale to DETECt Concept Map

The first operation in the process of designing DETECt ontology consisted in considering how to translate the project's Work Package rationale into an early-stage topic map, representing the broad semantic areas the project wishes to explore to make sense of transcultural identity in contemporary European crime narratives. This step resulted into a kind of hexagonal structure, with three of the six angles corresponding to topics applicable to the field of *Representation studies* in WP6 (*Crime and detection*, *History of Europe* and *Diversity*), two angles neatly corresponding to, respectively, *Production and distribution studies* in WP4 and *Promotion and reception studies* in WP5, and finally one angle just placed at the junction of WP4 (Production) and WP6 (Representation), corresponding to the study of the economic/semantic implications of the narrative use of *Space and place*. In terms of project management, this distribution of research topics is consistent with the distribution of the research efforts in the WP rationale, since while not all the partners are implicated in the study of production or reception, all teams are supposed to contribute to the study of representation.

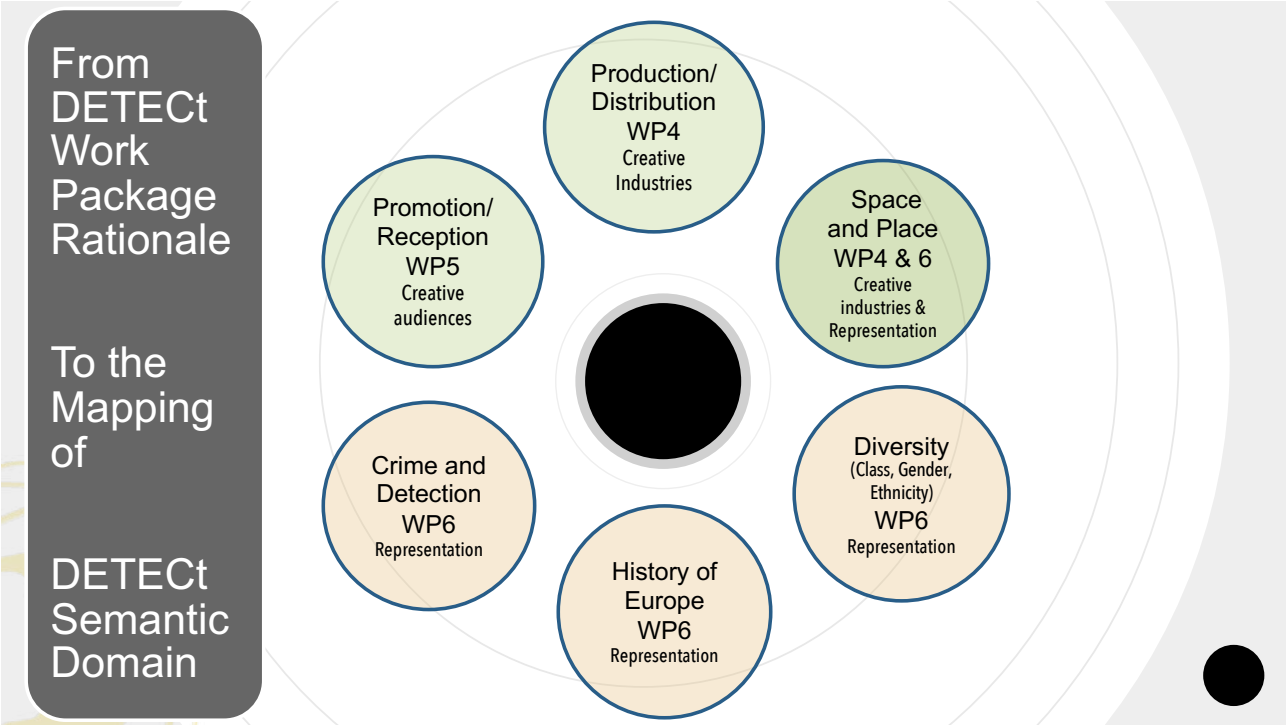

Table 2. Early-stage topic map derived from DETECt Work Package rationale.

Next, we proceeded by considering the relation between the broad disciplinary fields identified in our early-stage topic map and the properties of our research object. In other words, we wanted to characterize the relation between the corpus of crime narratives the project is supposed to study and the disciplinary knowledges represented in DETECt consortium. Deciding on the quality and quantity of the narrative works deemed to embody a representative sample of the European crime genre has involved a thorough discussion, the results of which are documented in Deliverable 2.1. In that report we described a methodology for corpus generation in three steps that resulted in the selection of two different corpora: a smaller corpus formed by all the titles analyzed with traditional qualitative methods, and a larger 'intermediate' corpus providing the title list for selecting sub-corpora to be analyzed with the help of digital tools. Therefore, what we have identified as DETECt Intermediate Corpus is in fact a title list on a spreadsheet.

Situating the notion of DETECt corpus exactly at the core of our early-stage topic map—which amounts to saying: situating a collection of *concreta* at the intersection of a series of *abstracta*—afforded the discovery of new semantic relations as well as new research questions. For example, interrogating the relation between our corpus and the rich interrelated semantic sub-fields of *Representation studies* (*Crime and detection*, *History and politics*, *Diversity*, *Space and place*) we came to realize that each title in the corpus could additionally be identified through the semantic peculiarities of its associated *Fictional world*, which (especially in consideration of the varied disciplinary expertise represented in the consortium) can most fruitfully be investigated through the methods of *Narratology* (Genette 1980; Pavel 1989; Meister, Kindts and Schernus 2005). This brought to both a clarification and a higher organization of the semantic field.

Table 3. Medium-stage Topic Map

The superimposition in Table 3 between *Crime narrative titles* and *Fictional worlds* is meant to graphically represent that the two sets can be conceived of as substantially co-extensive. In other words, the initial set of concrete particulars corresponding to the titles of European crime narratives collected in DETECt Intermediate Corpus can be thought of as basically duplicating itself into a mirror set consisting in the names (usually the very same titles, or parts of the titles) that natural speakers use to identify the fictional content associated to those titles (for example 'Inspector Montalbano' to either refer to an episode of the Tv series, the series itself, or the main character and his narrative world). Different yet related titles can point to separate narrative plots that still relate to one another because they are staged on the backdrop of the same fictional world—as happens by default in the case of serial narratives. In this way, the model allows to distinguish, and present as separate concepts, the two distinct ways in which titles are commonly used in everyday reality, that is, either as identifiers to sort out records in catalogues (for example when browsing contents on VOD streaming services) or as keywords through which to univocally identify the different fictional worlds represented in the narratives in social conversations. In the first case, the title is itself an object that exists in the quite concrete form of a title in catalogues,

archives, databases; in the second it seems to point instead to a kind of sensible/supersensible abstraction consisting in the socially shared conceptualization of the fictional worlds evoked in crime novels, films and Tv dramas. This duplicity will emerge again in the course of the following discussion and constitutes one of the most thought-provoking contribution of DETECt ontological approach to the understanding of the semantic complexities of its domain. An additional benefit of such a mapping across the concrete/abstract distinction is a better understanding of the crucial position that Representation studies occupy in this project, which both responds to the Call's request to investigate the expression of European identity in contemporary cultural production and is founded in the project's assumption that the study of representation can only be fruitfully pursued in association with the study of production as well as market and consumption factors as major structural elements that shape the forms of representation itself.

4.2 Mapping DETECt Semantic Domain

4.2.1 Exploring the *Fictional Worlds* Subset

Next we moved on to determining which types of properties could be predicated of the corpus titles. For the *Fictional worlds* subset, we realized that these properties can be conceived as coinciding with the narrative strategies by which a creative work of literature, film and/or television is able to establish a recognizable, more or less original, imaginary world as a fictional backdrop to the plot. This initial partitioning of the semantic domain immediately highlights the relevance of *Narratology* as a disciplinary sub-domain for the study of the narrative strategies of European crime fiction. It also exemplifies how the adoption of knowledge mapping techniques improves the ability to retrieve relevant concepts and theories elaborated within specific disciplinary fields. Even exceptionally abstract concepts, like for example *Seriality* or *Transtextuality* (Genette 1992; Mittell 2015; Kelleter 2017) which point to an important body of knowledge for the study of narrative fictional worlds, should actually be regarded as having some kind of material existence in the impressive amount of critical and scholarly literature produced on these topics within the agreed-upon sphere of the narratological discipline (for a theoretical treatment of these notions, see Deliverable 2.1).

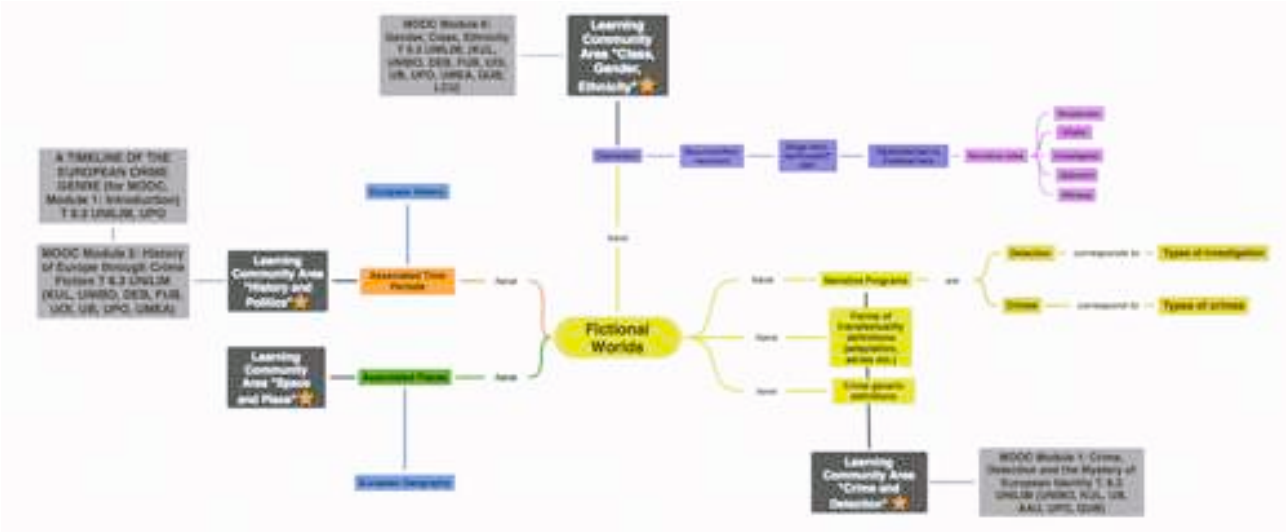

Table 4. Simplified visualization of the *Fictional worlds* branch in DETECt Concept Map, illustrating the main semantic regions identified by means of narratological concepts, the relations between such concepts, and between them and the project's expected outputs. This image is available in higher resolution at the following address:
https://www.detect-project.eu/repository/index.php/s/mdGTdcPFgs6PQj5/preview

4.2.2 Exploring the *People/Diversity* Subdomain

We then reasoned that each title in the corpus could obviously be identified also through the personal names that are variously associated to them, that is, through the names of the creative crews who have physically put the works into existence: novelists, screenwriters, directors, producers, actors; the names, pseudonyms or identifiers of those who have contributed to their circulation and cultural/transcultural appreciation: critics, bloggers, fans; and finally, the names of the characters in the narratives. In considering the *People* sub-domain we then came to realize that a distinction was needed between *Real people*—including both *Creators* and *Creative audiences*—and *Characters*.

Once again, it is worth emphasizing that this mixing of concrete and abstract entities is a pre-condition for the development of DETECt ontology, based on the realist premise that even virtual entities such as characters and fictional worlds can be said to have a kind of concrete existence in the social experience of the industrial artifacts of contemporary popular culture. In fact, this duplicity allows the model to suggest new research questions and innovative ways to look at Cultural studies. For example, while the *Real people* sub-domain is obviously especially relevant for the disciplinary areas of *Social Sciences*, *Ethnography* and *Reception studies* (we

would like for example to learn more about the gender rates of professional activity for this sector of cultural production), the *Characters* sub-domain is again more obviously approachable through the disciplinary tools of Narratology. Yet the fact that all personal names share the same identifiers—e.g. age, sex, gender, nationality and so on—is a useful reminder that fictional narratives can relate to reality in many different ways, on a scale that ranges from an extreme effort to attain the highest possible degree of mimetic resemblance (and this is particularly true for a genre like crime, which often espouses an explicitly realist or hyperrealist stance) to presenting the audiences with powerful patterns of stereotyping and identification models. While the more formal aspects of the characters' physiognomy and performance as well as any inter- or trans-textual play possibly undertaken by any given work with the traditional stock of generic conventions constitute an obvious object for narratological investigation, whether the characters of European crime narratives can be found to say something about their European audiences, affect their beliefs and behaviors and the like are typical questions for socio-ethnographic research.

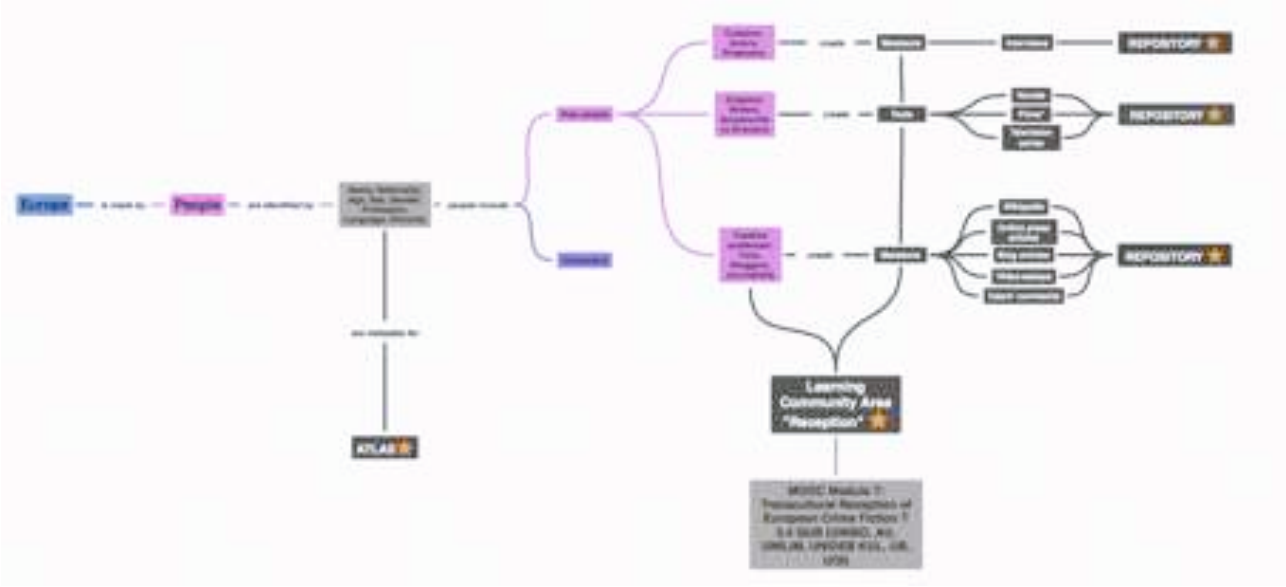

Table 5. Simplified visualization of the *People* branch in DETECt Concept Map, illustrating the main semantic regions identified by means of narratological and socio-ethnographic concepts, the relations between such concepts, and between them and the project's expected outputs. The image is available in higher resolution at the following address: https://www.detect-project.eu/repository/index.php/s/HxSMFTbt2fxw2G2/preview

4.2.3 Exploring the *Space and Place* Subdomain

In the third place, we agreed that a research about European identity as expressed in contemporary crime narratives could not avoid considering the way in which space is represented in these works of fiction. As a result of this idea, the superset of crime narratives titles was associated to a set of *Geonames* meant to map the places that are 1) the narrative (real and/or fictional) locations in which the fictions are set (*Places of location*), and 2) the European cities in which production is undertaken (*Places of production*). The interweaving of a concrete and an abstract dimension is particularly sensible here, not only because several fictional places evoked in the corpus do not actually exist on the European map, but also because, more significantly, in the attempt to provide works with a universal appeal, the real places used as a fictional backdrop for the narratives are often profoundly re-imagined and transfigured by the authors, sometimes resulting in compelling allegories of our contemporary 'glocalised' world. In this way, the *Space and places* subdomain imports into DETECt ontology significant portions of the *Geography* knowledge domain (Kavouras and Kokla 2007), inheriting strategic concepts like *Cities*, *Borders*, *East-European countries*, and so on (Couclelis 2013). This reflects DETECt commitment to experimenting methods for visualizing the genre's distribution across the continent, by interrogating a variety of semantic parameters.

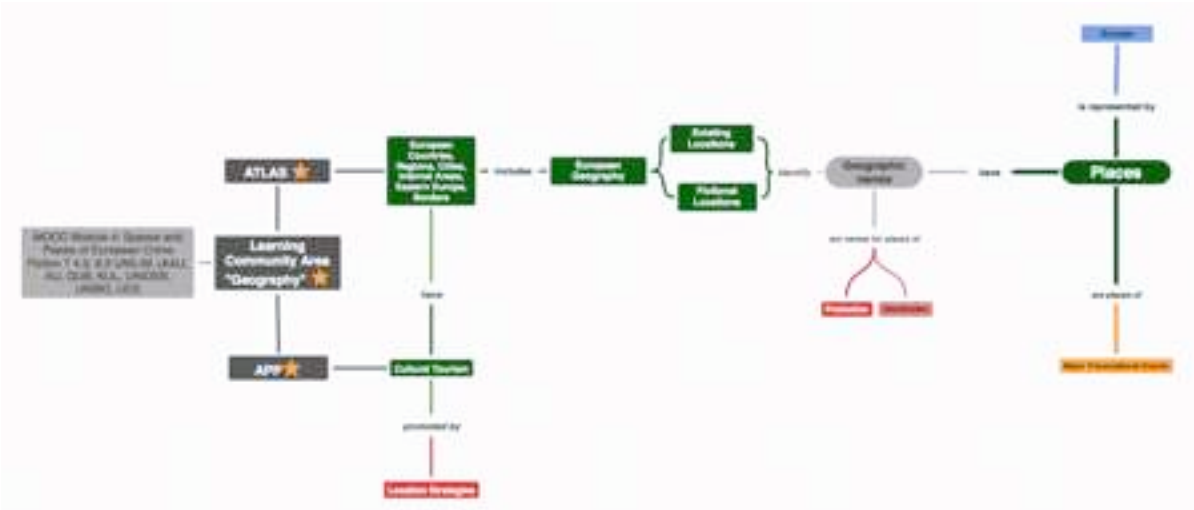

Table 6. Simplified visualization of the *Places* branch in DETECt Concept Map, illustrating the main semantic regions identified by means geographic concepts, the relations between such concepts, and between them and the project's expected outputs. The image is available in higher resolution at the following address: https://www.detect-project.eu/repository/index.php/s/3oX43TB6pacZaNG/preview

4.2.4 Exploring the *History and Politics* Subdomain

In the fourth place, we also agreed that researching European identity could not be done without also taking European history and politics into account. On the one hand, the superset of European crime narratives titles has to be seen as having a historical existence itself: the project's time-span ranges from 1989 to the present. During this period, many important transformations occurred in the sphere of cultural production, such as the appearance of new transnational patterns of production, distribution and consumption as effects of both the introduction of new technologies and the increasing transnationalisation of the cultural markets. The *History* subdomain involves the different disciplinary knowledges that can help devising a periodization of the European crime genre as a transmedial genre, generated at the intersection of literature, film and television. The *Histories of literature*, *film*, and *television* (e.g., among many others: Moretti 1997; Elsaesser 2005; Johnson and Fickers 2013) as well as the strategic fields of *Crime fiction studies* (e.g. Todorov 1977; Knight 2010, Lits 2011) and *Comparative literature* (e.g. Dziub and Toudoire-Surlapierre, 2019) provide the knowledge to evaluate the more recent developments within the larger framework of the genre's production in Europe through a couple of centuries. As many studies have by now fully revealed, the origins of crime fiction are no longer a compelling subject matter for just Anglo-American studies. Rather, there is today a wealth of new research and documentary evidence that speaks of an original, if certainly not autonomous, European history of the genre, one that is certainly worth to be better known. Furthermore, a few significant developments in contemporary production (such as an increased emphasis on 'local colour' and the adoption of long-form models of seriality) strongly encourage drawing parallels with the European crime fiction of both the early and the classical era. On the other hand, the familiar clash of *abstracta* and *concreta* reappears in the form of the factual-yet-imaginary historical and political events that are so often staged in European crime narratives, as significant components of their fictional worlds. The *History and politics* subdomain, then, conjures up in its entirety the broad disciplinary area of *European History*, providing knowledge about the historical events that are depicted or referred to in the narratives. We thus subscribe to the view, already expressed by several scholars (Forshaw 2018), that an especially relevant character of European crime narratives is to be found in the specific commitment they show for investigating, disclosing and interrogating some of the most troubled historical and political memories of European history. DETECt will explore the relevance of this nexus for the representation of European identity in an edited collection summarizing the results of the work conducted in this area.

4.2.5 Exploring the *Creative Industries* Subdomain

Last, but not least, we considered that each of the titles in our corpus had to be seen as associated to one or more *Creative industries*.3 The relevance of both the executive and financial aspects of cultural production/distribution for the analysis of cultural representation is one of the assumptions that this project has made since the initial proposal. Defining both *Translation* and *Co-production* as *Mobility factors* we want to highlight the role played by specific industrial and institutional policies in shaping the representation of identities in the products of European popular culture. This subdomain involves concepts drawn by the growing disciplinary areas of *Production* and *Distribution* studies (Mayer, Banks, and Caldwell 2009; Bondebjerg, Novrup Redvall, Helles, Lai, Søndergaard, and Astrupgaard 2017) and contributions from the area of *Media policy* studies (Simpson, Puppis, Bulck 2016; Haenens, Trappel and Sousa 2018). It also represents DETECt's commitment to interacting with relevant stakeholders of the industrial sector, learning from their experience the best practices to promote the creation of transcultural content as well as the practical and/or juridical obstacles that hinder a wider transnational circulation of cultural products within the European single market.

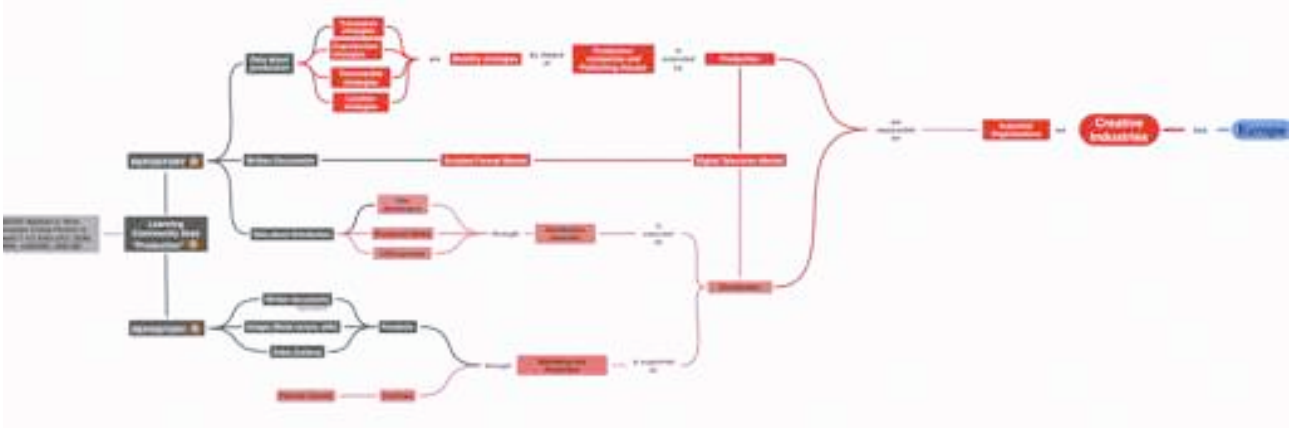

Table 7. Simplified visualization of the *Creative industries* branch in DETECt Concept Map, illustrating the main semantic regions identified by means of concepts drawn by the area of production and distribution studies, the relations between such concepts, and between them

3 https://ec.europa.eu/culture/policy/cultural-creative-industries_en

and the project's expected outputs. This images is available in higher resolution at the following address: https://www.detect-project.eu/repository/index.php/s/29RADrRKK4mki6L/preview.

4.2.6 Modeling Europe in DETECt Concept Map

As we have seen, the modeling process results in distinguishing five major subdomains, that is: *Fictional worlds* (mapping through all the other subdomains, and particularly through the *Crime and detection* area), *Creative industries* (also mapping through the *Production and distribution* area), *History and politics*, *Space and place*, *People* (this latter mapping through the *Promotion and reception* and *Diversity* areas). These different topics represent the disciplinary areas in which DETECt aims to contribute innovative scholarship and methodology. All subdomains have specific relationships both between them and with the different outputs and activities foreseen in the project. More importantly, they display specific connections with a further, arguably crucial semantic area that is supposed to represent the unifying focus of the whole research: *Europe*. In this framework, European identity is conceived of as a multifaceted value emerging at the intersection of an extremely diverse body of knowledges and cultural experiences emerging across all these five areas. At the same time, the *Europe* branch cuts transversally through all the others, wiring together all the different transdisciplinary subdomains into a coherent topic model, which can assist researchers in the study of a complex transcultural phenomenon such as the contemporary European crime genre.

Determining the types of relation that allow the association of each of DETECt semantic areas with *Europe* is probably the most delicate step to undertake in terms of establishing this project's own research policy. Of course, there is nothing 'neutral' or 'innocent' in establishing an ontology; every semantic choice points out, not only to the strengths and limitations of our body of knowledge, but also to a number of underlying cultural and political values that the declarative, axiomatic style of the ontological discourse forces to turn into explicit assumptions. For example, while determining the association of *Europe* with—respectively—*History and politics* and *Space and place* can be easily done by stating for Europe the property *to have* both a history and a geography, to suggest that the relation of Europe with the *Creative industries* is to be seen in terms of how Europe *promotes* the production and circulation of European popular culture signals a clear positioning, namely the project's commitment to contribute useful insights in the complex strategies of contemporary cultural production, so as to offer informed recommendations to the policymakers.

Similarly, stating that *Europe* should not be seen as simply *having People*, but rather as *being made by People* has implications which, in this particular moment of our common political history, transcend a purely rhetorical strategy and point out directly to this project's commitment to experimenting innovative research and learning methodologies to foster transcultural integration. Finally, the *Crime and detection* subdomain, in particular, relate to Europe through one of the most troubling facets of our contemporary reality, namely the way in which the representation of criminal vs policing activities can say something about the perception of both individual and collective a safety on the European territory (Gregoriou 2015; Cavender and Jurik, 2016). Contemporary European crime narratives offer a wide, and often quite traumatic catalogue of figures and situations that are meant to represent—if not reality—at least some kind of collective fear toward the challenges of present times, with important consequences in terms of identity perception, expression and representation.

We can think of two ways in which such representations can typically occur in contemporary European crime narratives. In the first case, contemporary fears and troubling social issues are mainly expressed through a purely illustrative depiction of certain recurrent types of crimes, such as the ubiquitous evocation, and sometimes graphic representation in the production of the last couple of decades of rape and femicide, but one can additionally think of the frequent treatment of other exceptionally sensible topics such as mafia, political corruption, drug smuggling, immigration, pedophilia, and so on. In other cases, the treatment of the same topics does not respond to purely illustrative intentions, but rather aims to convey original, well-informed interpretations of highly controversial moments in the political history of a region, a country, or even a transnational territory. This differentiation has to be done in order to highlight the unusual prevalence in this field of narrative production of explicitly critical stances toward aspects of present-day European societies, expressed by the authors in allegorical form, with the assistance of a highly conventional narrative structure. This again can be taken as a distinctive trait of the European crime genre's overall identity, one that cannot be found as easily in other popular narrative genres. The modeling of the semantic domain thus invites a tasteful consideration of the genre's contemporary creators in line with the 'authorial' approach that is more typically attached to other forms of more 'legitimate' cultural production. The study of these voices can offer acute insights in the problems of contemporary European societies as well as clues to better understand the reasons behind the increasing social disaffection to European values.

Table 8. Simplified visualization of the *Europe* branch in DETECt Concept Map. This images is available in higher resolution at the following address: https://www.detect-project.eu/repository/index.php/s/PCMCy8FYLCMTaja/preview

4.3 Uses of DETECt Concept Map

The partitioning of DETECt semantic domain illustrated above provides the consortium with a mapping of the different types of 'concepts'—or universals—and the different types of relations between the concepts that are more relevant for the project's research interests. There are at least five practical uses that can be thought of for this model, based on the elaboration of its affordances, all of which can prove greatly beneficial to improving integration between the different parts and aspects of this complex project.

4.3.1 Project Management

Something that proved extremely effective during the design process was the opportunity afforded by the graphic representation of DETECt semantic domain to map the different project's activities and outputs on the model itself. This allowed the model to display information about the specific competences and knowledges requested for accomplishing the different activities, the deadlines and the time-frames, offering a clearer vision of the specific contribution provided by each single piece to the project as a whole. For example, once defined that the *History* subdomain had to deal with defining both internal and external periodization markers, it became obvious to display in this region of the map the periodization tags proposed for DETECt exhibition in Paris, on early and classical European crime narratives. In this way, a spatialized representation of the project's ontology functions as both a visual and a conceptual interface between the different disciplines, or as a flexible memorization tool that researchers can use for disclosing new semantic relations within the overall design, adding new specifications and research questions, and reciprocally situating their own research in relation to each other's work, based on the work in progress. The management and co-construction of collaborative research in a transnational environment can greatly benefit from the adoption of knowledge mapping methodologies, as tools to organize the work, plan and monitor the activities. Even more importantly, the reciprocal connections/positions of the names on the map represent what Tony Buzan (1996) called 'radiant thinking', thus suggesting new problems and opening up new hypotheses that had not been considered before. An example of this in provided in the next section.

Furthermore, DETECt Concept Map provided a clear semantic orientation to the design of DETECt learning activities and materials. The modules of both DETECt Learning Community and

DETECt MOOC are precisely tailored on the Research Areas delineated above, that is, *History and politics*, *Space and place*, *Production and distribution*, *Promotion and reception*, *Representation/Diversity*. This mirroring between the organization of research and the organization of the learning contents is meant to facilitate the process of knowledge transfer from research to learning as well as to encourage the integration of the learners' own knowledge in the project's research results.

Quite interestingly, this partitioning can be seen to correspond to different types of mapping methods. In her *Atlas of Knowledge*, Katy Börner (2015) has distinguished five types of mapping methodologies for answering five different questions that match quite ideally with the interests covered by DETECt Research Areas. It appears that each Research Area can be matched to a specific mapping methodology, which suggest that a similar partitioning is also assumed for the organization of DETECt Atlas. In short, based on Börner's taxonomy,

- the *History and politics* area can be matched with maps designed for *Temporal Studies*, answering 'when' questions and generated by using 'time-stamps' as metadata;
- the *Space and place* area can be associated with maps designed for *Geospatial Studies*, answering 'where' questions and involving the treatment of geolocation metadata;
- the *Representation* areas can be associated to maps designed for *Topical Studies*, answering 'what' questions and generated through different methods, including qualitative and quantitative textual and topical analysis;
- *the Production and distribution* and *Promotion and reception* areas can be associated to maps designed for both *Network Studies*, answering 'with whom' questions through Network Analysis, and *Statistical Studies*, answering questions about difference, averages, ratios, distribution, and so, and generated by elaborating numerical information.

4.3.2 Terminology

It may be worth to start this paragraph by recalling that the universals mapped in the ontology translate into lists of either *concreta* or *abstracta*. For example, the superset of *European crime narratives* is constituted by a collection of items that exist in reality in the form of books, films, television shows or streamed content, that is, textual and/or trans-textual entities that are socially identified through their titles. The same is true for the *People* subset, which also includes the personal identifiers of concrete people (for example, for authors, the dates of their works),

or, by similitude, imaginary characters. Interestingly enough, each set of identifiers corresponds to a value in the database architecture, which allows the implementation of procedures for the automatic retrieval of information in a given dataset. In other words, *concreta* point to the type of structured information that can be harvested from bibliographic or filmographic databases, while the same is not necessarily true for abstract names, like for example *Seriality* or *Transtextuality*, which belong to the scientific terminology used in specific knowledge domains. These abstract names can be seen as subsets as well, that is, as labels for portions of the semantic space that could never be mapped through automatic processing techniques, for an effective tailoring of the disciplinary tools on the needs of a specific research project depends necessarily on prioritizing synthesis over exhaustivity. A better method to grasp the complex meanings of abstract concepts is through a selective, qualitative exploration and evaluation of the conceptual taxonomies developed in the different disciplinary areas attached to our research object. In other words, each of the *abstracta* in DETECt Concept Map could be 'exploded' into a glossary or a 'controlled vocabulary' of linked terms and concepts, resulting in an enriched experience and understanding of the semantic domain. An early application of this procedure resulted in the generation of a controlled vocabulary for terms to be used as metadata for structuring the information collected in the database. The procedure was first tested to identify a list of properties or tags to describe the gender identities of the characters represented in crime fictional worlds.

We started by following Noys' recommendation of always considering reuse when developing an ontology; therefore, we first searched for guidelines in the Person Core Vocabulary 2012, edited by Phil Archer and Andrea Perego for the European Commission.4 This vocabulary 'provides a minimum set of classes and properties for describing a natural person, i.e. the individual as opposed to any role they may play in society or the relationships they have to other people, organisations and property; all of which contribute significantly to the broader concept of identity'. For *Property: Gender*, the following recommendations are given:

> The gender of an individual should be recorded using a controlled vocabulary that is appropriate for the specific context. In some cases, the chromosomal or physical state of

4 This specification has been created as part of Action 1.1 [A1.1] of the Interoperability solutions for European public administrations (ISA) programme of the European Commission (EC). This programme funds initiatives to foster the efficient and effective cross-border electronic interactions between European public administrations. https://joinup.ec.europa.eu/sites/default/files/distribution/2013-10/Core_Vocabularies-Business_Location_Person-Specification-v1.00.pdf

an individual will be more important than the gender that they express, in others the reverse will be true. What is always important is that the controlled vocabulary used to describe an individual's gender is stated explicitly.

The document goes on listing 'four examples of controlled vocabularies that can be used to describe a person's gender'. Unfortunately, a qualitative evaluation of all four suggested vocabularies gave discouraging results, showing the blindness of current description standards to the rich diversity that characterizes both the expression of gender/sexual identity/positioning in contemporary European societies, and the specific forms of its representation in works of crime narratives.

ISO/IEC 5218:2004 [ISO5218]
0 not known
1 male
2 female
9 not applicable

Eurostat SCL - Sex [SCLS]
F female
M male
OTH other
UNK unknown
NAP not applicable

HL7
F Female
M Male
UN Undifferentiated (the gender of a person could not be uniquely defined as male or female, such as hermaphrodite)

SDMX
F Female
M Male
U Not specified or unknown N Not applicable
T Total

All the examples above account for just two, or, at most, three specifications when they also

include a 'third' neutral position. They appear therefore totally unaware of the exceptionally copious debate that has flourished since several decades now in both feminist and trans-feminist studies about the complex topic of gender identity (Joan Scott 1986; Butler 1990) and how to address the high variability of gender positionings, both in the experience of real people (like writers, directors, actors of crime narratives and so on) and in the increasingly diverse ways in which fictional characters are represented in creative works.

There is today wide agreement among both activists and scholars that a non-binary treatment of gender identity ought to take into consideration at least three different classes or categories of concepts, namely sex, gender and sexual orientation (Valdes 1995). Similar concerns are raised by the Ad Hoc Task Group on Gender in Name Authority Records of the Library of Congress, in an official document released in October 2016 summarizing the 'best practices for recording information about gender for persons who do not identify with binary gender terminology'.5

To overcome the conceptual bias attached to a binary model of gender and promote gender-neutral policies in every field of culture and society, in 2016 the European Institute for Gender Equality published an online Gender Equality Glossary and Thesaurus featuring over 400 words focusing on the area of gender equality, with their definitions and linked reference sources for each definition. The thesaurus is meant 'to foster a common understanding of gender equality terms across the EU and promote gender-fair and inclusive language to improve equality between women and men'.6

An extremely welcome addition to the different European lexicographical initiatives promoted by the EU in the frame of the multilingual online thesaurus EuroVoc, the EIGE glossary represents an important source of definitions for DETECt, and will be taken as a standard reference vocabulary for the gender-related part of its Diversity Controlled Vocabulary. A single integration, with reference to the category of 'asexuality', seems to be needed in order to record the peculiar gender positioning of one of crime fiction's most original character, namely the clerical detective type, epitomized by Gilbert K. Chesterton's Father Brown and his crowed fictional offspring. As a

5 https://www.loc.gov/aba/pcc/documents/Gender_375%20field_RecommendationReport.pdf

6 https://eige.europa.eu/thesaurus/

matter of fact, many authors have insisted that the trait of asexuality characterizes the classical detective type in a distinctive way since at least the appearance of Sherlock Holmes.

A partial remodeling of the terms in the EIGE glossary, involving the creation of compound nouns, and, in one case, a more granular specification of the concept, is suggested by the practical use of this glossary as a tag library for metadata annotation. While, as mentioned, there is today a general agreement that a sensitive treatment of gender differences should take at least three different parameters into account: sex, gender and sexual orientation, to avoid the unnecessary practical complications that the creation of three different lists of terms we decided to collapse Gender and Sexual orientation into a single category, which results in the following vocabulary:

Sex
- Male
- Female
- Intersex
- Male-to-female Transsexual
- Female-to-male Transsexual

Gender/Sexual orientation
- Heterosexual Man
- Heterosexual Woman
- Bisexual Man
- Bisexual Woman
- Homosexual Man (Gay)
- Homosexual Woman (Lesbian)
- Transgender Man
- Transgender Woman
- Genderqueer
- Asexual person

The combination of these two lists of terms should provide a sufficiently large, if not exhaustive, range of options to describe the varied ways in which gender identities and positionings are represented in contemporary European crime narratives.

4.3.3 Navigation

A third possible application of DETECt ontology focuses on the supplementary affordances that the model could provide as an interactive graphic interface to navigate the contents in DETECt portal. The use of spatialized models to navigate complex content is currently a major subject of investigation in the new field of Knowledge Cartography. As defined by Shum and Okada (2008), 'Knowledge Cartography is the discipline of visually mapping the conceptual structure of ideas, such as the connections between issues, concepts, answers, arguments and evidence'. As discussed in section 4.3.2, each of the definitions mapped in DETECt Concept Map can be exploded into controlled vocabularies of related terms, providing keywords for tagging the database contents. This can open further opportunities of 'visual semantic mapping' between the definitions in DETECt Concept Map and the materials collected in the database, as well as suggest original ways to organize and navigate the contents in DETECt Atlas, which correspond to the public section of the project's portal. This operation would imply splitting the map into different 'slices' corresponding to the different hierarchical levels of the conceptual architecture. For example, the Atlas introductory page might include an interactive map visualizing the six main semantic subdomains identified above. The keyword representing the subdomain would lead to a page introducing the corresponding section of the Atlas, including links to, and short descriptions of, maps and graphs related to the research questions associated to that particular subdomain. For example, clicking on *Space and place* would lead to a composite page made of the following possible aggregated contents: 1) an introductory text explaining the relevance of geography for investigating European identity in popular crime narratives; 2) an interactive visual map to allow web users to actively 'navigate' the information in the database (for example, on the level of *concreta*, the cities/borders/regions etc. represented in European crime narratives; on the level of *abstracta*, a list of selected 'controlled' definitions: for *Space and place* these might include notions like 'Nordic noir', 'French polar', 'Tartan noir', and so on); 3) links to a collection of maps related to the study of space and place in European crime narratives; 4) links to other resources and materials; 5) a free-text query field and a list of suggested keywords to navigate the content.

The visual semantic mapping achieved in designing DETECt Concept Map can therefore be seen, as well as exploited, as a visual metaphor for digital navigation. Adopting the visual navigation metaphor can help designing clear, attractive, synthetic and highly informative learning resources, and the navigational tools to explore contents in a spatial way. The goal is to help users understand the semantic structure of complex content by providing the tools to navigate

it like a regular map. The map works as a mediator to help users navigate from semantic concepts to related resources. Here the challenge is to allow an automatic concept-based access to the resources in DETECt portal through navigation mapping tools and visual queries (i.e., by clicking on the map).

4.3.4 Digital Pedagogy

The knowledge mapping techniques discussed in the previous two paragraphs have huge implications for the design of innovative activities aimed to enhance 'meaningful learning' (Novak and Gowan 1986, 7). This line of research is meant to assist, in particular, the design of DETECt Learning Community and DETECt MOOC and builds on the assumption that

> knowledge representation is at the heart of learning. Schemas, which are mental representations, are inputs and outputs of the learning process. They can be used to diagnose and assess current knowledge or skills, and ultimately, to support learning strategies that engage learners directly in knowledge representation activities (Paquette 2010)

Similarly, we second Katy Börner's contention (2015) that 'at a time when data literacy is becoming almost as important as language literacy', educating *about* and *through* maps should be a substantial concern in designing innovative learning materials and activities. Teaching how to handle digital tools to produce a spatialized organization of concepts expressed in natural language can not only improve our students' ability to present traditional humanistic knowledge in forms suited to the contemporary modes of cultural distribution and consumption, but also provide them with the qualified digital skills that are currently requested in many cultural and industrial sectors.

There are several ways in which DETECt ontology can assist teachers/researchers in the creation of attractive, synthetic, and highly informative learning materials and activities.

4.3.4.1 Design of Learning Activities

In the last few years knowledge mapping techniques have been widely experimented in educational projects as tools to support the design of learning activities in Virtual Learning Environments (VLEs) (Tomadaki and Scott 2006; Shum and Okada 2008). As pointed out in Conole (2008a), the current gap 'between the potential of technologies to support learning and the reality of how they are actually used . . . is due to a lack of understanding about how technologies can be used to afford specific learning advantages and to a lack of appropriate guidance at the design stage'. The term 'learning design' stands for

> a methodology that has emerged in recent years as a semi-formal process to support the curriculum design process. The term 'learning design' came into common usage with the development of the IMS Learning Design specification, which sought to provide a means of formally representing (and thus reusing) learning sequences. . . . Learning design has seen increased activity in the past few years, as researchers and developers have moved beyond a focus on creation and presentation of content (and hence associated concern with the management of 'learning objects') to consideration of learning activities.

Two of the most popular software applications used in this field are built around a notion of semantic mapping.

CompendiumLD is a learning software developed by researchers at the Institute of Educational Technology, Open University, UK. It was fully released under LGPL licence on January 2009 and can still be downloaded, even if it has not been updated since 2014. The program is based on an 'argument mapping' methodology inspired to the 'argumentation theory' of Horst Rittel (Walton, Reed, Macagno 2008; Rittel 1984). The interest of this tool is that it works with MOODLE, which, as detailed in D3.1 has been chosen by DETECt as the VLE for building DETECt transnational Learning Community. As described in the Compendium project site,

> CompendiumLD is a software tool for designing learning activities using a flexible visual interface. It is being developed as a tool to support lecturers, teachers and others involved in education to help them articulate their ideas and map out the design or learning sequence. Feedback from users suggests the process of visualizing design makes their design ideas more explicit and highlights issues that they may not have noticed otherwise. It also provides a useful means of representing their designs so that they can be shared with others. CompendiumLD provides a set of icons to represent the components of learning

activities; these icons may be dragged and dropped, then connected to form a map representing a learning activity. The icons for mapping argumentation provided by Compendium are also available and can be used within CompendiumLD maps to map issues with or discussions about particular learning activities. What can I do with CompendiumLD?

- You can use CompendiumLD to work through the design of learning activities, starting from the learning outcomes and all the way through to task timing. CompendiumLD will prompt you to think about assessment, e.g. should it be formative, summative?
- You can create a repository of resources to be used in an activity by attaching media and text files to nodes in the diagram, simply by dragging them onto the design.
- You can annotate an existing design (produced by you or your colleagues) by adding captions to each icon, specifying further details of the activity at that point, or asking questions.
- You can share designs in a variety of ways, from simple diagrammatic jpeg image files through to interactive web friendly versions of learning design maps.
- You can use CompendiumLD maps to demonstrate that you have a thorough, well thought out design.7

Another open source project based on knowledge mapping principles that offers an interesting VLE and tools and templates to design learning activities is The Visual Understanding Environment (VUE), developed since 2005 by the Academic Technology group at Tufts University, Massachusetts. In the description attached to the software's latest version (released in 2015), the project is described as 'focused on creating flexible tools for managing and integrating digital resources in support of teaching, learning and research', by providing 'a flexible visual environment for structuring, presenting, and sharing digital information'. Based on 'a concept and content mapping application', it was developed

> to support teaching, learning and research for anyone who needs to organize, contextualize, and access digital information. Using a simple set of tools and a basic visual grammar consisting of nodes and links, faculty and students can map relationships between concepts, ideas and digital content. Concept mapping is not new to the educational field.

7 http://compendium.open.ac.uk/download/download.htm

> In fact, the benefits of concept mapping as a learning tool have been documented by over 40 years of cognitive science research. VUE provides a concept mapping interface, which can be used as such, or as an interface to organize digital content in non-linear ways.8

The functionalities of these two powerful software applications offer a whole range of new affordances to teachers and educators to design their learning activities and will therefore provide continuing inspiration for solutions to adopt during the implementation of DETECt Learning Community in the MOODLE virtual learning environment. However, the same knowledge mapping principles also apply to the design of specific types of learning exercises, as it is shown below in 4.3.4.3.

4.3.4.2 The MOODLE Glossary Activity Module

Another possible way to integrate the results of DETECt ontological research in the project's educational activities can be pursued by using the MOODLE module called 'Glossary Activity' to create controlled vocabularies for the different Research Areas represented in DETECt Concept Map, as discussed in 4.3.2. This should not be considered as yet another activity to be added on top of all the numerous other activities already planned for this project. Rather, it should be regarded as an indication of how to build on the project's ontological orientation to make sense of all its different, even scattered activities within a larger methodological framework meant to enhance transcultural understanding in a transcultural community of practice and research. Since the MOODLE module for creating glossary entries is based on the idea that proposing definitions for one or more entries can be given to students as a learning assignment, the work for teachers/researchers would simply consist in selecting a number of entries/keywords relevant in their research area and provide definitions for two or three of them as an example. As the MOODLE guide for this module explains,

> the glossary activity module enables participants to create and maintain a list of definitions, like a dictionary, or to collect and organize resources or information. A teacher can allow files to be attached to glossary entries. Attached images are displayed in the entry. . . . If the glossary auto-linking filter is enabled, entries will be automatically linked

8 https://vue.tufts.edu/about/index.cfm

where the concept words and/or phrases appear within the course. . . . Glossaries have many uses, such as:

- A collaborative bank of key terms
- A 'getting to know you space' where new students add their name and personal details
- A 'handy tips' resource of best practice in a practical subject
- A sharing area of useful videos, images or sound files
- A revision resource of facts to remember

It is easy to see how the Glossary module can be used to generate DETECt Controlled Vocabulary through collaborative learning activity, in an original application of the 'learning by doing' principle to the co-construction of the project's semantic domain. The auto-linking function provided by the module is particularly interesting for this purpose, since it allows to interlink the specific glossaries created within each Research Areas into a higher level glossary. In this way, any time a given word appears in any of the learning materials collected in the MOODLE, the associated definition can be retrieved by simply clicking on it.

At the moment, there are already two lists of terms that can be imported in the Glossary module of DETECt Learning Community: the Gender Vocabulary presented in 4.3.2, and the multilingual collection of *Crime Generic Labels* retrieved by DETECt researchers during the initial phase of the project, reported in deliverable D2.1. These two lists offer a quite stimulating material already, which can suggest interesting ideas about how to create innovative learning exercises, for example as detailed in d). The work of finding, collecting and defining terms is obviously to be conceived as a work in progress, conducted by both teachers/researchers and students to collaboratively produce a Controlled Vocabulary of the project's semantic domain. In addition, the work done through the Glossary module could be seen as a preparatory activity for a more ambitious Linked Data project envisioned as a future project in 4.3.5.

4.3.4.3 Concept Mapping Activities

As already mentioned in the above point a), the use of Concept Maps as privileged methodological tools for achieving 'meaningful learning' and improve the students' ability at critical thinking is at the heart of contemporary learning theory (Conole 2008b). DETECt ontological approach can

offer intriguing methodological inspiration for designing learning assignments based on the use of Concept Mapping tools. As expressed in the words of two leading scholars in this innovative field,

> one of the reasons why concept mapping is so powerful for the facilitation of meaningful learning is that it serves as a kind of template to help to organize knowledge and to structure it, even though the structure must be built up piece by piece with small units of interacting concept and propositional frameworks (Novak and Cañas 2008).

A classification of the major concept map types is offered in the introductory chapter of Shum and Okada's *Knowledge Cartography* (2008, 3-6). The authors distinguish seven major types, on a rising scale of complexity:

- *Mind Mapping*, epitomized by Tony Buzan's iMindmap software, requires the user to map keywords, sentences and pictures radiating from a central idea.
- *Concept Mapping*, based on the idea that meaningful learning needs to be scaffolded on what is already known, was developed by Joseph Novak around 1972 as a notation language now available as a free software, the CMap application. It includes semantic relations between the nodes.
- *Argument and Evidence Mapping* was first proposed by J.H. Wigmore in the early 1900s to help in the teaching and analysis of court cases. The objective is to expose the structure of an argument, in particular how evidence is being used, in order to clarify the status of the debate. Still used in legal education today, the idea has been extended, formalized (and reinvented) in many ways but all focused on elements such as Claims, Evidence, Premises and supporting/challenging relations.
- *Issue Mapping* derives from the 'Issue-Based Information System' (IBIS) developed by Horst Rittel in the 1970s to scaffold groups tackling 'wicked' socio-technical problems. IBIS structures deliberation by connecting Issues, Positions and Arguments in consistent ways, which can be rendered as textual outlines and graphical maps.
- *Web Mapping*. Software tools provide a way for users to capture, position, iconify, link and annotate hyperlinks in a visual space as they navigate, creating a richer trail which comes to have more personal meaning than a simple bookmark list.
- *Thinking Maps*, developed by David N. Hyerle, use a set of abstract visual conventions designed to support core cognitive skills. The language consists of eight graphic primitives (expressing basic reasoning about, e.g. causality, sequence, whole-part) are designed to

be combined to express higher order reasoning (e.g. metaphor, induction, systems dynamics).

- *Visual Specification Languages*, at a higher level of formalization, are designed for software interpretation by imposing constraints on how links and often nodes are labelled and combined.

In the last few years numerous commercial providers of Concept Mapping tools have appeared online. Most of them offer free subscription for the basic versions of their applications, so it is very easy for students and web users in general to become familiar with this technology.

The design of DETECt learning activities can greatly benefit from integrating Concept Mapping methods. In particular, software applications that are worth to be tested in DETECt workshops and learning activities are Joseph D. Novak's CMap and the already mentioned Compendium and VUE-Visual Understanding Environment.

4.3.4.4 Wikipedia

The idea to include Wikipedia Studies as a significant component of DETECt learning experimentation was there since the initial phases of the project. Working on, and with Wikipedia for educational purposes—for example to prepare students for a Wikipedia 'edit-a-thon'—means to plan activities focusing on the meanings of words, the different terms used in different languages to signify similar notions, and the different ways in which these terms and concepts have been authoritatively defined in scholarly literature. All this makes Wikipedia an ideal platform for transcultural learning activities, which can be very usefully integrated in our learning experimentation.

Working on/with Wikipedia implies to come up with a list of entries to be analyzed, discussed and possibly revised. It also involves detecting the areas of knowledge that are not covered in the most consulted Encyclopedia of all times. Both these activities can be easily performed in fruitful synergy with the work on DETECt Controlled Vocabulary through the Glossary module of DETECt Learning Community. Work will consist in exploding the nodes of the ontology into short lists of terms, to be collaboratively defined with the students through the Glossary activity module, in preparation to the 'edit-a-thon' that will be organized during the project as

part of Work Package 5. Of course, the number of entries/Glossary items to be possibly considered for revision or inclusion in Wikipedia will necessarily be limited, but we believe that DETECt Concept Map can help select the terms in a meaningful way, that is, in a way that is consistent with the project's general objectives to foster awareness about the transcultural content of European identity.

For example, it will no doubt be useful to explore with the students how the concept of *European crime narratives* is represented in the different Wikipedia pages which deal with the production of European crime novels, films and TV dramas, and research whether and how the connection with Europe, its history, politics, geography, industrial apparatus and (trans)cultural identity is made in the texts. Similarly, it would be interesting to interrogate the semantic contents of the *Crime generic labels* given to these products by either the producers/distributors or the audiences. A collection of such labels in all the different languages represented in the Consortium—including terms such as *Nordic Noir, Mediterranean Noir* or *Tartan Noir*—has already been compiled in the initial stage of the project, as reported in deliverable D2.1. Researching these topics and whether their relation to Europe is, or is not considered in the corresponding Wikipedia pages can be a very fruitful way to promote meaningful learning by means of a Digital Humanities methodology.

4.3.5 Linked Data

Another quite natural development for DETECt ontological research would be to use the Linked Data technologies of the Semantic Web to wire all the knowledge elaborated in the course of the project to any possible type of relevant online data. While this development lies outside the scope of DETECt, it could be focus of a future project specifically devoted to the development of the Semantic Web in the fields of Media and Cultural Studies.

In 2001, the co-founder of the World Wide Web, Tim Berners-Lee, envisioned that 'a new form of Web content that is meaningful to computers will unleash a revolution of new possibilities'. He noticed that data on the Web can become information—and ultimately also knowledge—only on condition that they are presented in a way that is accessible and meaningful for humans. Yet natural language is not automatically readable by computers. The Semantic Web has provided the protocols and technologies to enable computers to understand information expressed in natural language. Key to this crucial goal was defining the rules to structure the

information so that it can be read by a computer. Berners-Lee's basic argument is that structuring information on the Web is a necessary precondition for discovering meaningful content:

> The challenge of the Semantic Web . . . is to provide a language that expresses both data and rules for reasoning about the data and that allows rules from any existing knowledge-representation system to be exported onto the Web.
>
> Adding logic to the Web—the means to use rules to make inferences, choose courses of action and answer questions—is the task before the Semantic Web community at the moment (Berners-Lee, Hendler and Lassila 2001).

Thanks to the Semantic Web,

> data can be retrieved from seemingly unrelated fields automatically, in order to combine them, find relations, and make discoveries. . . . Conventional web sites rely on markup languages for document structure, style sheets for appearance, and scripts for behavior, but the content is [still] human-readable only (Sikos 2015).

Although the issue of unorganized, unstructured content remains an obstacle today, technological visionaries from all fields continue to develop projects and ideas to achieve the idea of a universal Web of Knowledge through the development of the Semantic Web.

In short, logic and structure can be added to the information on the Web through a Linked Data approach, based on four simple principles (Berners-Lee 2000). Firstly, URIs (Uniform Resource Identifiers) are used to unambiguously identify things. Secondly, HTTP URIs identify the Web locations where these things are referred to and can be looked up. Thirdly, information about things is expressed through standard formats such as XML (eXtensible Markup Language) and RDF (Resource Description Framework). Fourthly, the discovery of relevant information is enhanced by including links between the data and the related URIs:

> The Semantic Web, in naming every concept simply by a URI, lets anyone express new concepts that they invent with minimal effort. Its unifying logical language will enable these concepts to be progressively linked into a universal Web. This structure will open up the knowledge and workings of humankind to meaningful analysis by software agents, providing a new class of tools by which we can live, work and learn together (Berners-Lee, Hendler and Lassila 2001).

The status of the Semantic Web is captured in the Linked Open Data Cloud, which shows datasets that have been published in the Linked Data format.[9] As of March 2019, it contained 1,239 datasets with 16,147 links, categorized under 'cross domain', 'geography', 'government', 'life sciences' (at present the largest category) as well as 'linguistics' and 'media'.

Almost twenty years after its original proposal, the Semantic Web is still inspiring innovative thinking to both hard scientists and humanists. Brown and Simpson (2014) argue that 'what humanists ultimately want from the Semantic Web is not only access to all material, and only that material, of interest to a particular inquiry but also the ability to extract from the massive aggregation of separate datasets new leads, connections or insights'.

In practice, to make the links between data on the web relevant for both humans and machines, any resource has to be tagged—or structured—in such a way that the computer is able to know what its contents are. In Linked Data the assertion is made that each particular thing is identified by a property, and a value for said property. For example, the hypothetical URI *https://detect-project-eu/persons#ArthurConanDoyle* (subject) is a *name* (property) which points to *Sir Arthur Conan Doyle* (value). And since Sir Arthur Conan Doyle—the Scottish writer known as the creator of Sherlock Holmes, has his own URI—he can be distinguished from other people with the similar names, like the Irish football player Conan Doyle.

Another way to structure semantic information according to the Linked Data protocols is by creating RDF triples, that is, ternary relationships between a subject, a predicate and an object. In a triple structure, the above example translates into the following: *Sir Arthur Conan Doyle* (subject) *is the author of* (predicate) *The adventures of Sherlock Holmes* (object), where each element of the triple is identified by a URI. In this way, any web users can define any new concept, simply by creating a URI for it somewhere on the web.

subject	**predicate**	**object**
Sir Arthur Conan Doyle	is the author of	The adventures of Sherlock Holmes

[9] https://lod-cloud.net/

https://detect-project.eu/persons#ArthurConanDoyle	detect:author	https://detect-project.eu/books#AdventuresSherlockHolmes

There already exist some Controlled Vocabularies and Ontologies that make use of Linked Data schemes to express semantic relations and organize knowledge in specifically humanistic fields. As mentioned in the World Wide Web Consortium (W3C) portal, 'the role of vocabularies on the Semantic Web are to help data integration when ambiguities may exist on the terms used in the different data sets, or when a bit of extra knowledge may lead to the discovery of new relationships'.[10]

For example, the Getty Vocabularies are constructed to encourage their use in Linked Data; they include the Art & Architecture Thesaurus, the Cultural Objects Name Authority, the Thesaurus of Geographic Names and the Union List of Artist Names.[11] Organizations like museums and libraries can use these vocabularies to apply standardized structures to their metadata, so they can be queried and interlinked with different tools and resources.

The Dublin Core Schema is a small selection of originally fifteen metadata terms that can describe digital resources as well as physical resources such as books (title, creator, subject, description, publisher, etc.). Dublin Core Is used as a common basis for many other metadata schemas such as the Europeana EDM.

Another example is the CIDOC Conceptual Reference Model, which consists in an ontology for documenting cultural heritage information. The vocabulary provides the mediation for describing explicit and implicit concepts and relations, in order to promote a shared understanding and a common language among domain specialists. 'It can provide the "semantic glue". . . between different sources of cultural heritage information, such as that published by museums, libraries and archives.' Concretely, this is expressed in a list of classes and properties. Relevant to the domain of European popular culture are the classes E5:event, E21:person, E27:site, E31:document and properties such as P11:has participant, P15:was influenced by, P69:is associated with, and so on.

10 https://www.w3.org/standards/semanticweb/ontology
11 http://www.getty.edu/research/tools/vocabularies/lod/

These existing vocabularies could be used to structure the knowledge produced by DETECt and make it more accessible to Web users everywhere in the world. Matching the terms in DETECt vocabulary with the corresponding entries in one of the above sources would automatically interlink DETECt knowledge domain with other similar data, enhancing the discoverability and accessibility of the project's outcomes. In addition, linking DETECt data and other data would enable users to ask questions that can be answered in an entirely new, automated way. Since the Semantic Web makes the links between things commonly understandable by both humans and software, domain assumptions can be made explicit through queries. Examples of how implicit knowledge can be made explicit through queries include the following:

- List all female authors who wrote a crime fiction novel between 1989 and 2019.
- Present a graph of the box office results of all the crime films produced in the United Kingdom, France and Germany.
- Which are the European cities most frequently chosen as locations for producing crime television dramas?

This kind of implicit reasoning is now already partly possible in semantic environments such as Wikipedia and DBPedia, but both these resources are still far from offering an adequate rendition of European popular culture.

Based on the Concept Map described above, DETECt will review the entities in Wikidata 12, to see where contributions can be made. Wikidata offers already many references to concepts and entities from the crime fiction domain, with the added advantage of a multilingual collaborative environment. It is also the result of a public effort and offers a greater flexibility when compared with e.g. Getty thesauri like AAT and ULAN.

Some examples:

- Arthur Conan Doyle: https://www.wikidata.org/wiki/Q35610
- Film Noir: https://www.wikidata.org/wiki/Q185867

12 Partner KUL has good experience in developing thesaurus content on Wikidata in collaboration with Europeana: https://www.wikidata.org/wiki/Wikidata:Europeana_migration_vocabulary. This is a good example on what could be contributed from the DETECt project for the concept of Crime Fiction

The design of a Linked Data project focused on DETECt semantic domain would require the involvement of a panel of experts to discuss the specific challenges of developing a metadata schema for the domain of European popular culture. The task of this panel would be to decide on which properties and classes are to be considered when describing the identity of a product of European popular culture. This would allow to publish DETECt datasets in RDF and to model DETECt Controlled Vocabulary as Linked Data.

Conclusion

DETECt is the lens through which we see some of the challenges that are presently faced by digital scholarship in the Humanities. The ontological approach we have presented in these pages consists in a methodology to assist the management of semantic complexity in a transcultural, transdisciplinary, transnational research environment. DETECt Concept Map has been proposed as a tool to help researchers in several different areas, from project management to the development of a shared terminology, the design of the project's online portal and the design of learning activities. This visual artifact offers an explicit representation of DETECt semantic domain to allow a better communication and collaboration among researchers with different cultural backgrounds as well as a better reusability of the knowledge produced through research.

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