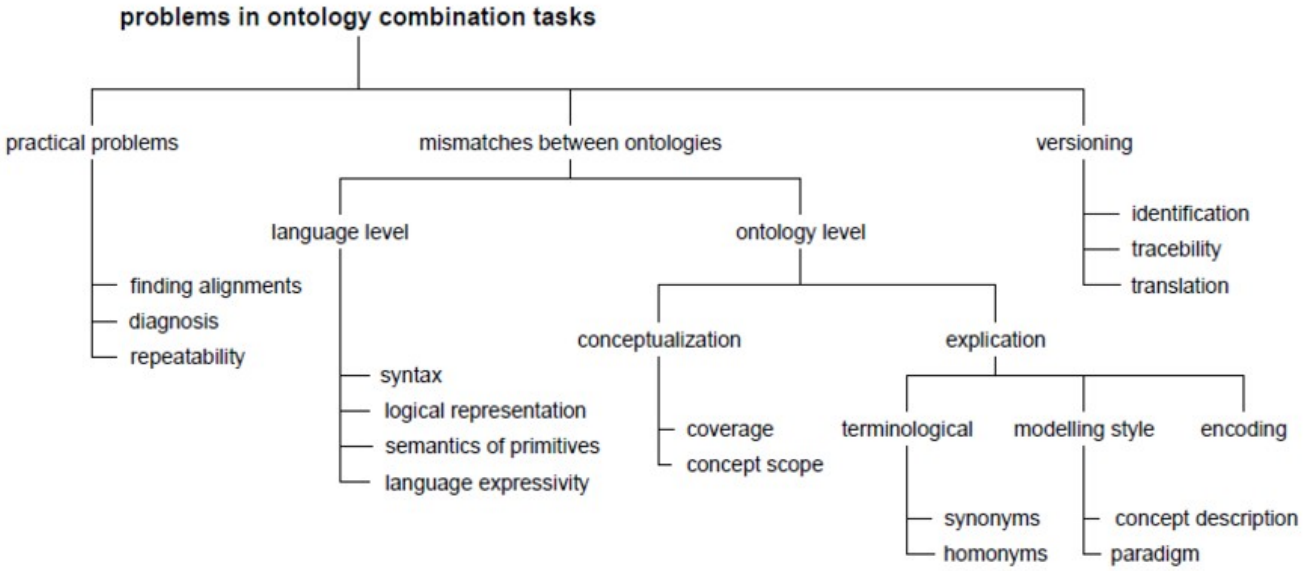
Heterogeneities according to Klein

- It classifies the disagreements between ontologies in two levels: The language level (meta-model) and the ontology level.



The resulting framework of issues that are involved in ontology combining

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Syntax (Klein)

KL 01

- « ...different ontology languages often use different syntaxes »

« For example, to define the class of chairs in RDF Schema (Brickley and Guha, 2000), one uses <rdfs:Class ID="Chair">. In LOOM, the expression (defconcept Chair) is used to define the same class. »

- « In this simple case, a rewrite mechanims is sufficient to solve those problems. »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Logical representation (Klein)

KL 02

- « ...the difference in representation of logical notions »

  « For example, in some languages it is possible to state explicitly that two classes are disjoint (e.g., disjoint A B), whereas it is necessary to use negation in subclass statements (e.g., A subclass-of (NOT B), B subclass-of (NOT A) in other languages. »

- « This type of mismatch is still relatively easy solvable, e.g. by giving translation rules from one logical representation to another. »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Semantics of primitives (Klein)

KL 03

- « ...Despite the fact that sometimes the same name is used for a language construct in two languages, the semantics may differ; e.g., there are several interpretations of A equalTo B. »

« For example, the OIL RDF Schema syntax (Broekstra et al., 2001) interprets multiple <rdfs:domain> statements as the intersection of the arguments, whereas RDF Schema itself uses union semantics »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Language expressivity (Klein)

KL 04

- « ...is the difference in expressivity between two languages »

« For example, some languages have constructs to express negation, others have not. »

- « This type of mismatch has probably the most impact. »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Scope (Klein)

KL 05

- « ...Two classes seem to represent the same concept, but do not have exactly the same instances, although these intersect. »

« The standard example is the class “employee”: several administrations use slightly different concepts of employee »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Model coverage and granularity (Klein)

KL 06

- « ...This is a mismatch in the part of the domain that is covered by the ontology, or the level of detail to which that domain is modelled. »

« example of an ontology about cars: one ontology might model cars but not trucks. Another one might represent trucks but only classify them into a few categories »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Paradigm (Klein)

KL 07

- « Different paradigms can be used to represent concepts such as time, action, plans, causality, propositional attitudes, etc. »

« For example, one model might use temporal representations based on interval logic while another might use a representation based on point »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Concept description (Klein)

KL 08

- « Several choices can be made for the modeling of concepts in the ontology. »

« For example, a distinctions between two classes can be modeled using a qualifying attribute or by introducing a separate class … Another choice in concept descriptions is the way in which is-a hierarchy is build; distinctions between features can be made higher or lower in the hierarchy. »

dissertation < book < scientific publication < publication,
or
dissertation < scientific book < book < publication

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Synonym terms (Klein)

KL 09

- « Concepts are represented by different names. »

« A trivial example is the use of the term “car” in one ontology and the term “automobile” in another ontology. »

- « Although the technical solution for this type of problems seems relatively simple (the use of thesauri), the integration of ontologies with synonyms or different langages requires usually a lot of human effort and comes with several semantic problems. Especially, one must be careful not to overlook a scope difference »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Homonym terms (Klein)

KL 10

- « The meaning of a term is different in an other context. »

« For example, the term “conductor” has a different meaning in a music domain than in an electric engineering domain. »

- « This inconsistency is much harder to handle; (human) knowledge is required to solve this ambiguity. »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Encoding (Klein)

KL 11

- « The meaning of a term is different in an other context. »

« For example, a date may be represented as “dd/mm/yyyy” or as “mm-dd-yy”, distance may be described in miles or kilometers, etc. »

- « There are many mismatches of this type, but these are all very easy to solve. In most cases, a transformation step or wrapper is sufficient to eliminate all those differences. »

KLEIN, Michel. Combining and relating ontologies: an analysis of problems and solutions. In : OIS@ IJCAI. 2001.

Heterogeneities according to Bergman

Class	Category	Subcategory
STRUCTURAL	Naming	Case Sensitivity
		Synonyms
		Acronyms
		Homonyms
	Generalization / Specialization	
	Aggregation	Intra-aggregation
		Inter-aggregation
	Internal Path Discrepancy	
	Missing Item	Content Discrepancy
		Attribute List Discrepancy
		Missing Attribute
		Missing Content
	Element Ordering	
	Constraint Mismatch	
	Type Mismatch	
DOMAIN	SchematicDiscrepancy	Element-value to Element-label Mapping
		Attribute-value to Element-label Mapping
		Element-value to Attribute-label Mapping
		Attribute-value to Attribute-label Mapping
	Scale or Units	
	Precision	
	DataRepresentation	Primitive Data Type
		Data Format
DATA	Naming	Case Sensitivity
		Synonyms
		Acronyms
		Homonyms
	ID Mismatch or Missing ID	
	Missing Data	
	Incorrect Spelling	
LANGUAGE	Encoding	Ingest Encoding Mismatch
		Ingest Encoding Lacking
		Query Encoding Mismatch
		Query Encoding Lacking
	Languages	Script Mismatches
		Parsing / Morphological Analysis Errors (many)
		Syntactical Errors (many)
		Semantic Errors (many)

- « Bergman uses the classification system of Pluempitiwiriyawej and Hammer who were then working on heterogeneities in XML data sources. This classification exposes about 20 categories and about 40 subcategories of distinct heterogeneities. "

BERGMAN, M. Sources and classification of semantic heterogeneities. Web Blog: AI3-Adaptive Information, Adaptive Innovation, Adaptive Infrastructure, 2006.

PLUEMPITIWIRIYAWEJ, Charnyote et HAMMER, Joachim. A classification scheme for semantic and schematic heterogeneities in XML data sources. TR00-004, University of Florida, Gainesville, FL, 2000.

Case Sensitivity (Bergman)

BE 01

- « In some languages (e.g., HTML, Pascal), text case is irrelevant. In other languages (e.g., XML, C, Java), text case is significant. »

- « To resolve conflicts involving text from sources with different case sensitivity, the fact whether case sensitivity matters or not must be specified explicitly. »

Synonyms (Bergman)

BE 02

- « When two different terms refer to the same real-world object or concept, they are also known as synonyms. »

For Example : Price and Cost of Book

- « One way of resolving the synonym conflicts is to look up alternative definitions in dictionary or request additional information from the user and generate mappings from unknown terms to the known terms. User input may also be needed to verify the mappings. »

Acronyms (Bergman)

BE 03

- « Parts of a series of words can form a new term. »

For Example : Megabytes and MB

- « To resolve acronym conflicts, the same approach as for resolving synonym conflicts can be applied: using a dictionary to generate mappings from the acronym term to the full string. In addition, user input may be needed to verify the mappings. »

Homonyms (Bergman)

BE 04

- « When terms refer to different real-world objects or concept... »

For Example : Customer Name and Book Name

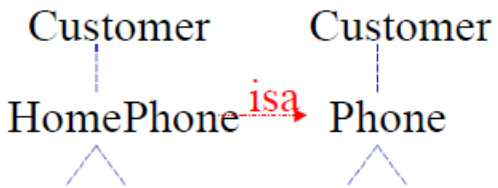
- « Homonym conflicts can be detected by considering the corresponding paths defined in the DTDs that are being matched. These paths lead from the root to the particular term. Homonym conflicts occur when there exists conflicting terms along the paths. To resolve homonym conflicts, for each pair of conflicting terms, we redefine the relationship between those two terms to be mismatched. »

Generalization/Specialization (Bergman)

BE 05

- « This type of conflict arises when the node in one DTD has a more general (special) meaning than the node in the other DTD. »

For Example :



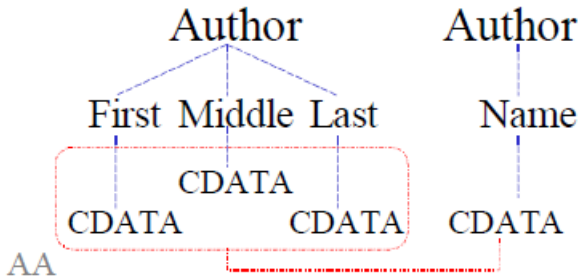
- « To resolve generalization concepts, the mappings from (to) the more specific to (from) the more general concepts must be defined (e.g., by looking them up in a dictionary or getting a user input). »

Intra-aggregation (Bergman)

BE 06

- « If the content of the source element or the attribute values of the source element are aggregated (or divided), we refer to this conflict as intra aggregation.»

For Example :



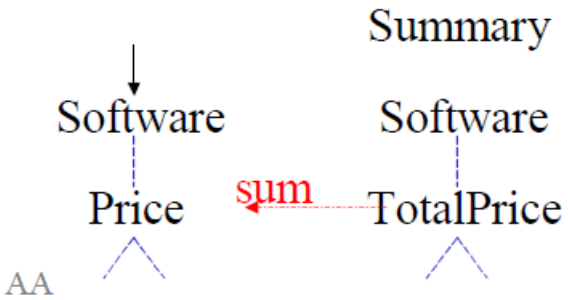
- « To resolve intra-aggregation conflicts, we need to define a function that combines/divides the content of the mapped element (e.g., Author). »

Inter-aggregation (Bergman)

BE 07

- « ...inter-aggregation conflicts occur across several instances of the same element type (e.g., Price) in the source. »

For Example :



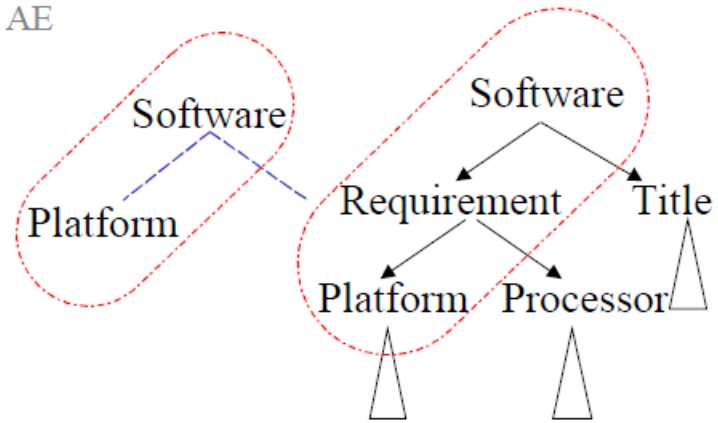
- « To resolve inter-aggregation conflicts, we need to define a function that aggregates the values of element instances declared in the source DOC. The aggregation function can be a simple arithmetic function (e.g., sum, average, count) or a user-defined function. »

Internal Path Discrepancy (Bergman)

BE 08

- « Internal path discrepancies arise when two paths to the same element only match partially or not at all. »

For Example :



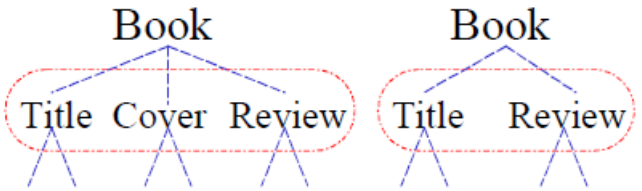
- « By comparing the source and the target paths, if there is an extra node in the target (source) path, the insertion (deletion) of the extra node need to be performed at the source path (because we are mapping from the source to the target paths.) »

Missing Item (Bergman)

BE 09

- « This type of conflict arises when the same element in two DTDs has a different definition and one or more items (subelements or attributes) of the element are missing in one document but not the other. »

For Example :



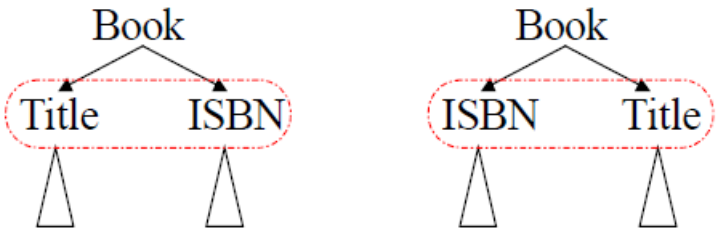
Attribute List Discrepancy (AA)

Element Ordering (Bergman)

BE 10

- « In XML, the order within a sequence of subelements is significant »

For Example :

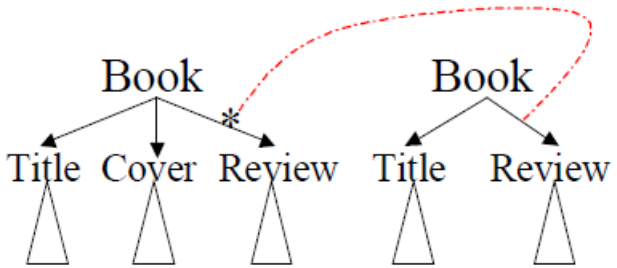


Constraint Mismatch (Bergman)

BE 11

- « In XML, it is possible to express constraints on content and attributes in a DTD. The constraints for contents are zero-or-more (*), one-or-more (+), zero-or-one (?), and exactly-one (.). »

For Example :



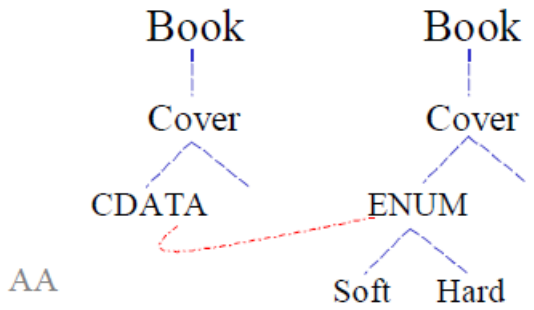
EE

Type Mismatch (Bergman)

BE 12

- « These conflicts arise when the element or attribute types of related items in source and target DTD are different. »

For Example :

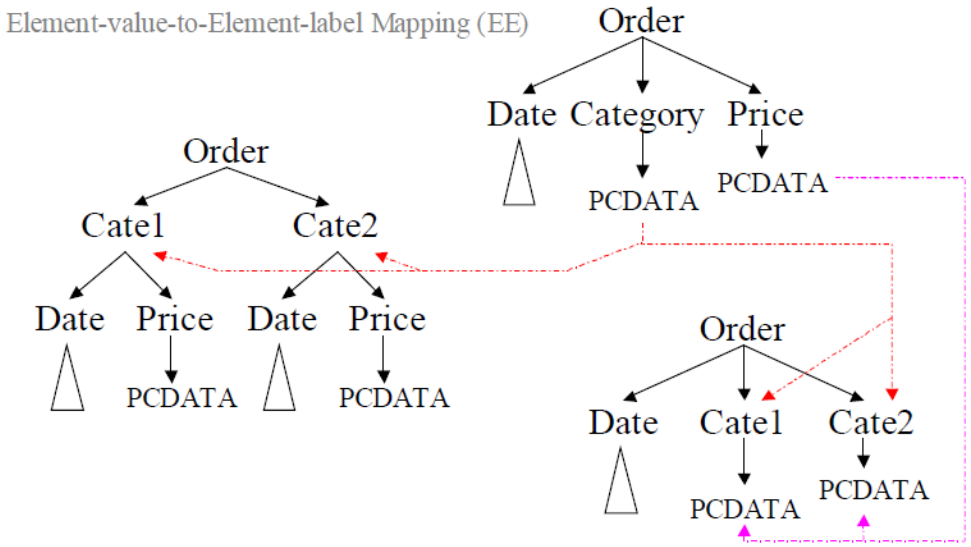


Schematic Discrepancies (Bergman)

BE 13

- « These conflicts arise when data in one schema corresponds to schema labels in the other. »

For Example :

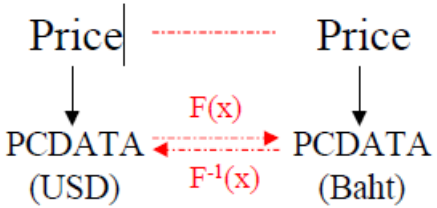


Scale or Unit (Bergman)

BE 14

- « This type of conflict arises when two simple elements or attributes are mapped to each other and their values are represented using different scale or units »

For Example :

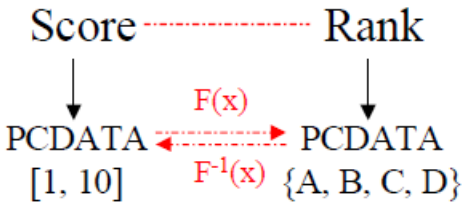


Precision (Bergman)

BE 15

- « This type of conflict arises when two simple elements or attributes are mapped and their values are represented using different precision. »

For Example :



Primitive Data Type (Bergman)

BE 16

- « In XML, every data value is of type string. However, data values in the conventional data source can have other primitive types. »
- « One way of resolving this conflict is to attach each simple element with an extra attribute indicating the original data type. »

Data Format (Bergman)

BE 17

- « ...there are still many ways one can represent the same information using strings »

For Example : one can represent a social security number as a string of numbers (e.g., 999999999) or as numbers with dashes (e.g., 999-99-9999).

Data Conflicts (Bergman)

- « Data conflicts arise when some properties of a real-world instance declared in two different DOCs represent a mismatch, or when two different real-world instances represented in different sources overlap. We divide data conflicts into four categories: Naming, ID-value, missing data and incorrect spelling. »

Naming - Case sensitivity (Bergman)

BE 18

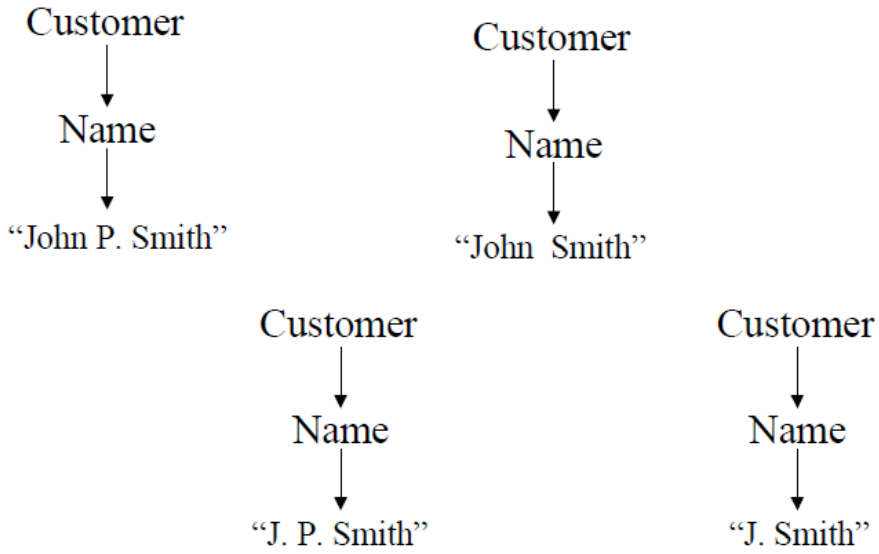
- « As mentioned before, each data value in XML is of primitive type string. In the case where the data values are text strings, the values can provide an important clue as to whether terms are related or not (e.g., when deciding whether or not Windows and windows are equivalent). »

Naming - Synonyms (Bergman)

BE 19

- « This type of conflict arises when two different terms have the same meaning or when two elements declared in different DOCs refer to the same real-world object. »

For Example :

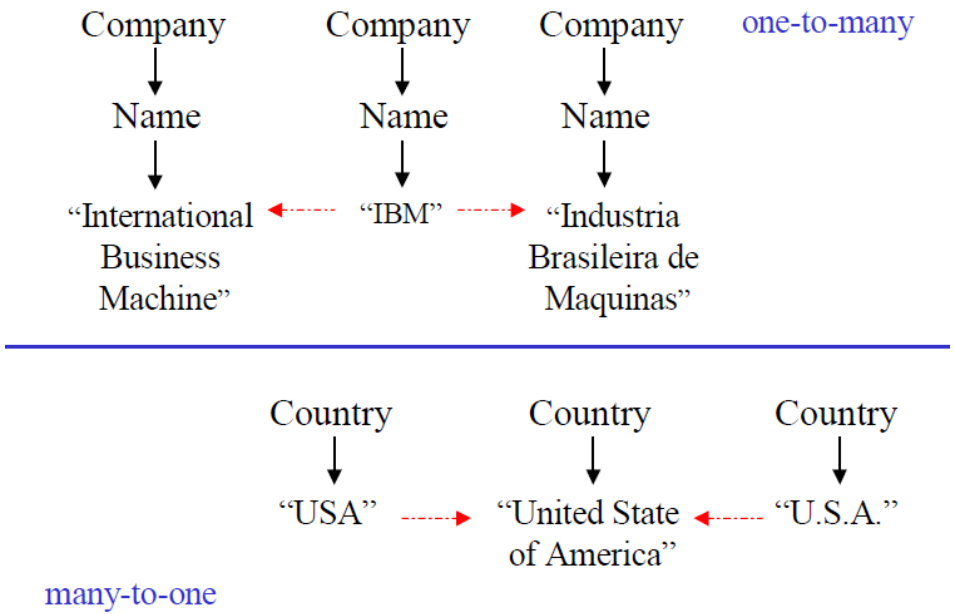


Naming - Acronyms (Bergman)

BE 20

- « Parts of a series of words can form a new term. »

For Example :

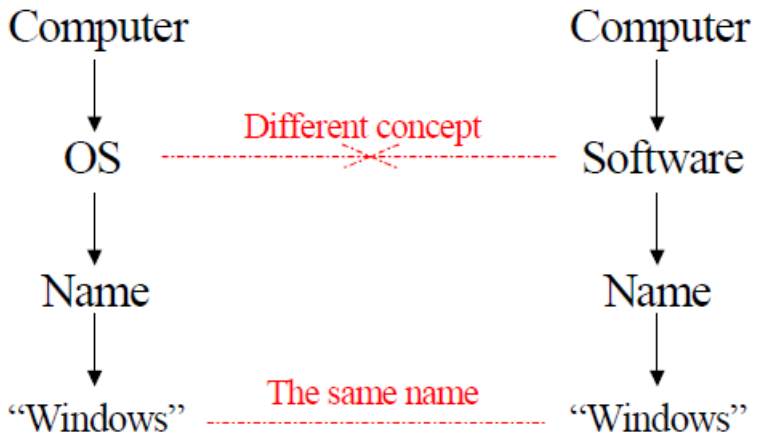


Naming - Homonyms (Bergman)

BE 21

- « This type of conflict arises when a term is used to refer to different real-world objects or concepts. »

For Example :



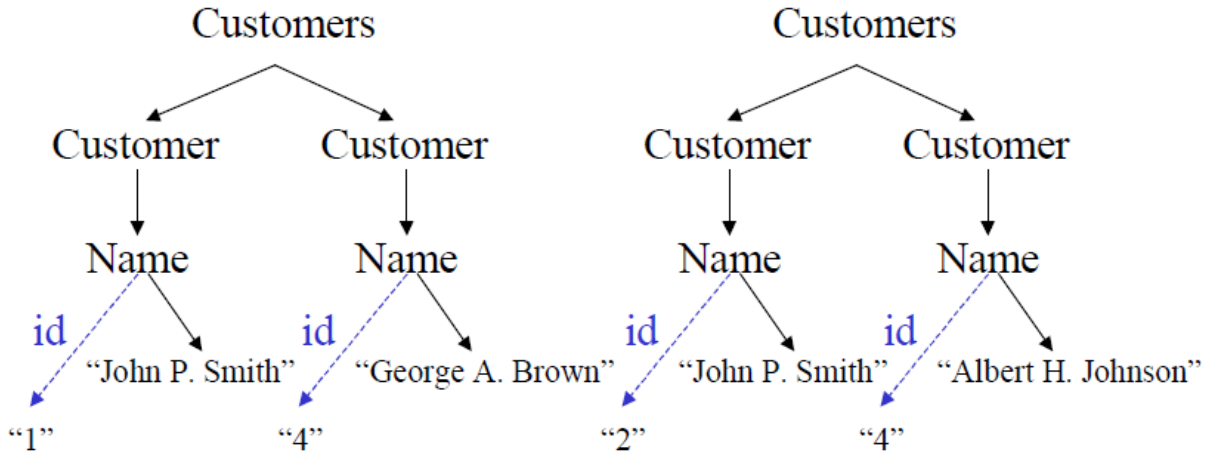
- « Homonym conflicts can be detected by considering the corresponding paths from the root to the nodes containing the same values.»

Naming - ID-value (Bergman)

BE 22

- « Each element type can have attributes of type ID associated with it. »

For Example :



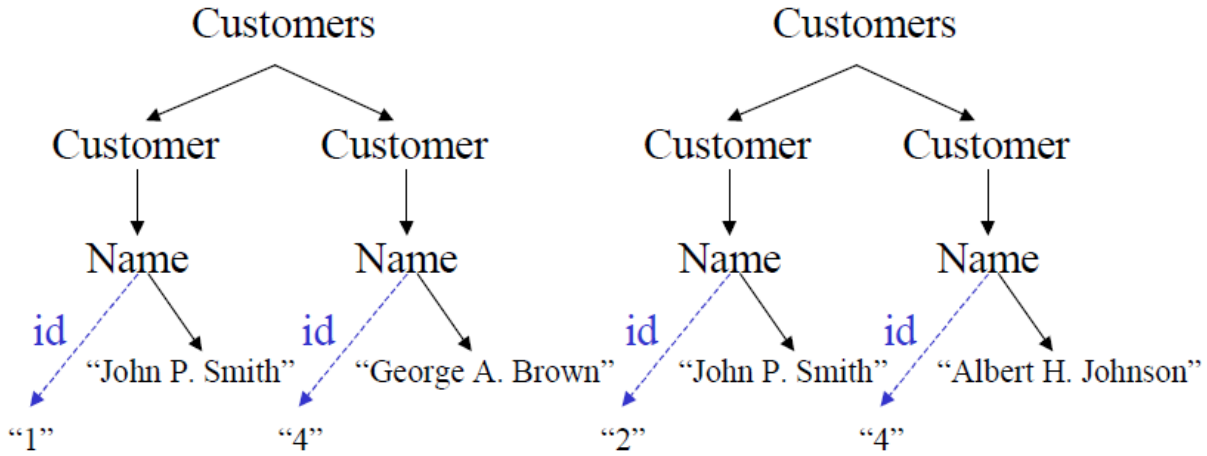
- « To resolve ID-value conflict, a global ID must be assigned to each element in the integrated document. »

Naming – Missing Data (Bergman)

BE 23

- « Each element type can have attributes of type ID associated with it. »

For Example :



- « To resolve ID-value conflict, a global ID must be assigned to each element in the integrated document. »

Naming – Incorrect Spelling (Bergman)

BE 24

- « These conflicts arise when the same data values in the sources are misspelled. As mentioned previously, closeness of two data elements is defined using a similarity function that is evaluated based on the content values of those elements. If the incorrect spelling exists, it will have an impact on mapping the two data elements. »

- « Using a spell check can reduce the effect of this conflict. »

Encoding (Bergman)

BE
25

- « »

Languages (Bergman)

BE
26

- « »

Heterogeneities according to Euzenat

- « Heterogeneity does not lie solely in the differences between goals of the applications according to which they have been designed or in the expression formalisms in which ontologies have been encoded »

Ontology matching
J Euzenat, P Shvaiko - 2007 - Springer

Syntactic heterogeneity (Euzenat)

EU 01

- « Syntactic heterogeneity occurs when two ontologies are not expressed in the same ontology language »
- « This obviously happens when comparing, for instance, a directory with a conceptual model. This also happens when two ontologies are modelled by using different knowledge representation formalisms, for instance, OWL and F-logic. »

Ontology matching
J Euzenat, P Shvaiko - 2007 - Springer

Terminological heterogeneity (Euzenat)

EU 02

- « Terminological heterogeneity occurs due to variations in names when referring to the same entities in different ontologies. »
- « This may be caused by the use of different natural languages, e.g., Paper vs. Articulo, different technical sublanguages, e.g., Paper vs. Memo, or the use of synonyms, e.g., Paper vs. Article. »

Ontology matching
J Euzenat, P Shvaiko - 2007 - Springer

Conceptual heterogeneity (Euzenat)

EU 03

- « Conceptual heterogeneity stands for the differences in modelling the same domain of interest »
- Difference in coverage : « occurs when two ontologies describe different, possibly overlapping, domains at the same level of detail and from a unique perspective.This is obviously the case for two partially overlapping geographic maps. »

Ontology matching
J Euzenat, P Shvaiko - 2007 - Springer

Conceptual heterogeneity (Euzenat)

EU 04

- Difference in granularity : « occurs when two ontologies describe the same domain from the same perspective but at different levels of detail. This applies to geographic maps with different scales, e.g., one displays buildings, while another depicts whole cities as points. »

Ontology matching
J Euzenat, P Shvaiko - 2007 - Springer

Conceptual heterogeneity (Euzenat)

EU 05

- Difference in perspective : « also called difference occurs when two ontologies describe the same domain, at the same level of detail, but from a different perspective. This occurs for maps with different purposes: a political map and a geological map do not display the same objects. »

Ontology matching
J Euzenat, P Shvaiko - 2007 - Springer

Semiotic heterogeneity (Euzemat)

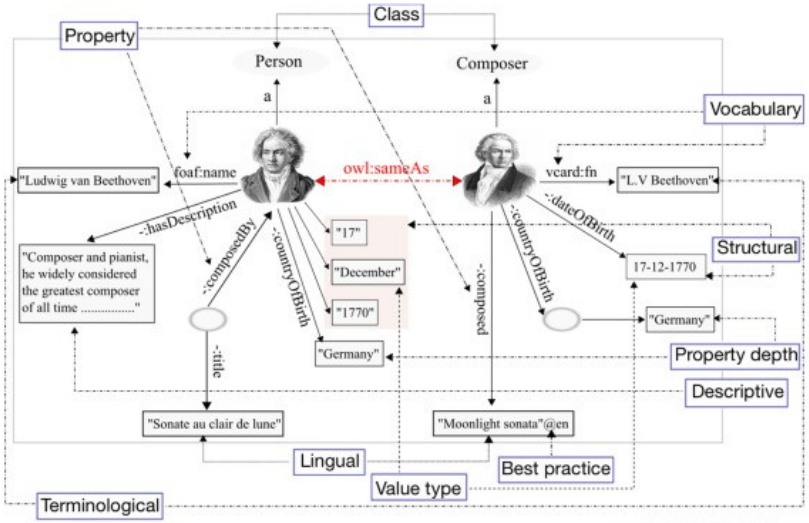
EU 06

- « Semiotic heterogeneity, also called pragmatic heterogeneity is concerned with how entities are interpreted by people. Indeed, entities which have exactly the same semantic interpretation are often interpreted by humans with regard to the context, for instance, of how they are ultimately used. »
- Murder knife and kitchen knife

Ontology matching
J Euzenat, P Shvaiko - 2007 - Springer

Heterogeneities according to Achichi

- « Understanding data heterogeneity in its multiple forms allows to identify and analyse the origins of the data linking problem and hence propose better solutions »
- « we will refer to data heterogeneity as any difference in the expression of a given piece of information across two graphs, observed in terms of schema (classes, properties), values, or general data structure »

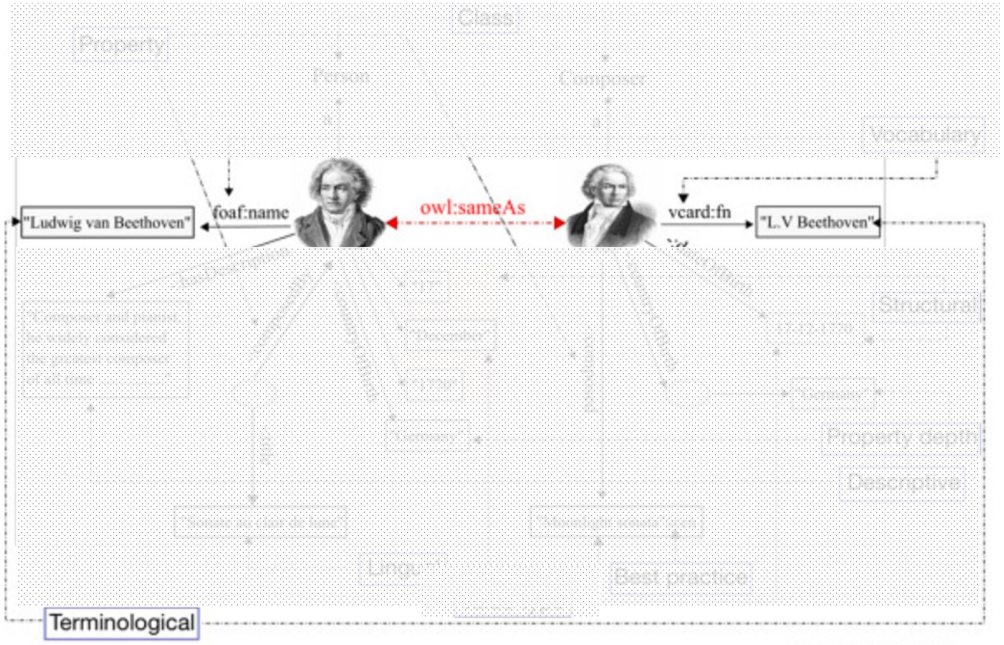


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Terminological heterogeneity (Achichi)

AC 01

- « We refer to dierences between the lexical labels used to denote the same information across graphs »
- Synonimy, polysemy, variations in spelling (acronyms, abbreviations...)

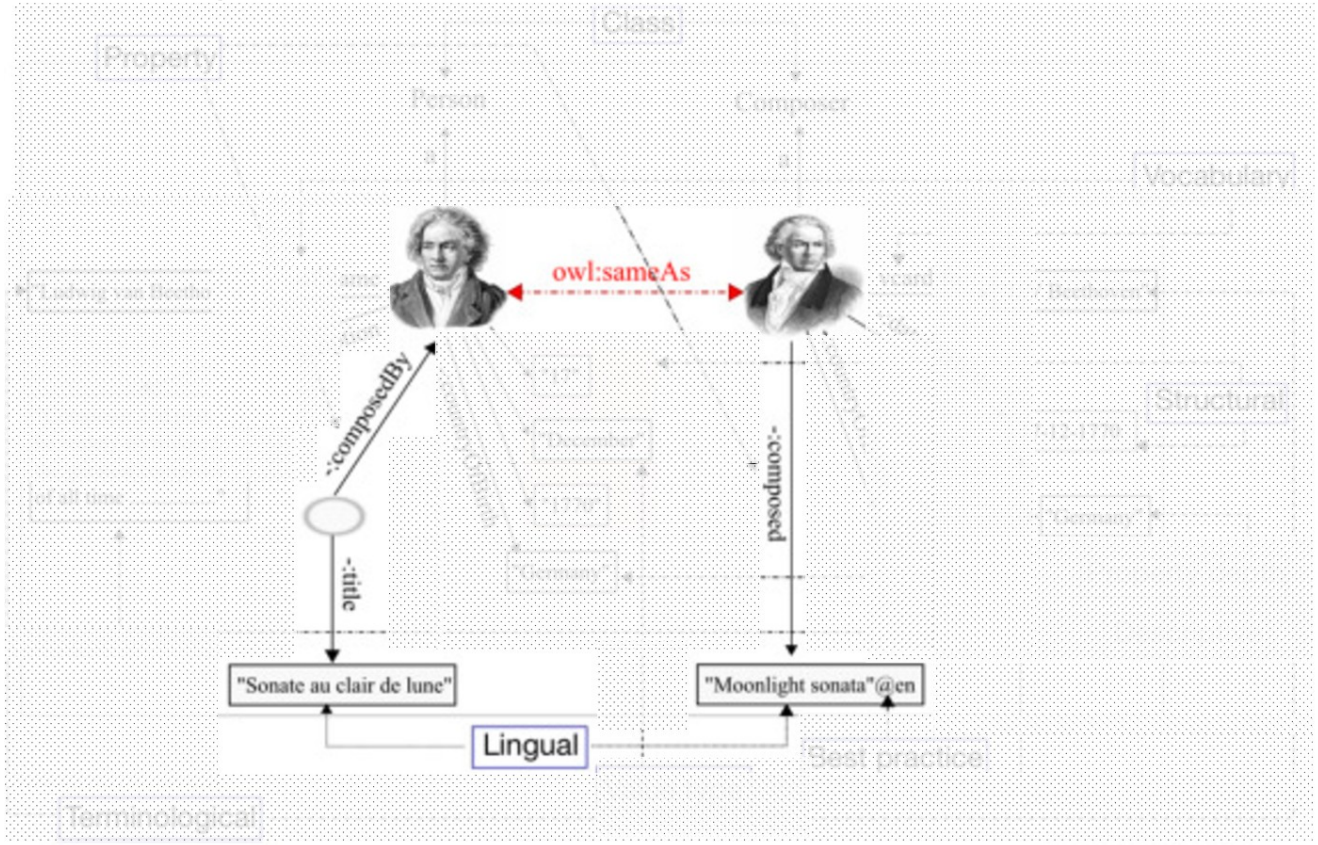


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Lingual heterogeneity (Achichi)

AC 02

- Multilingualism



Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Datatype vs object heterogeneity (Achichi)

AC 03

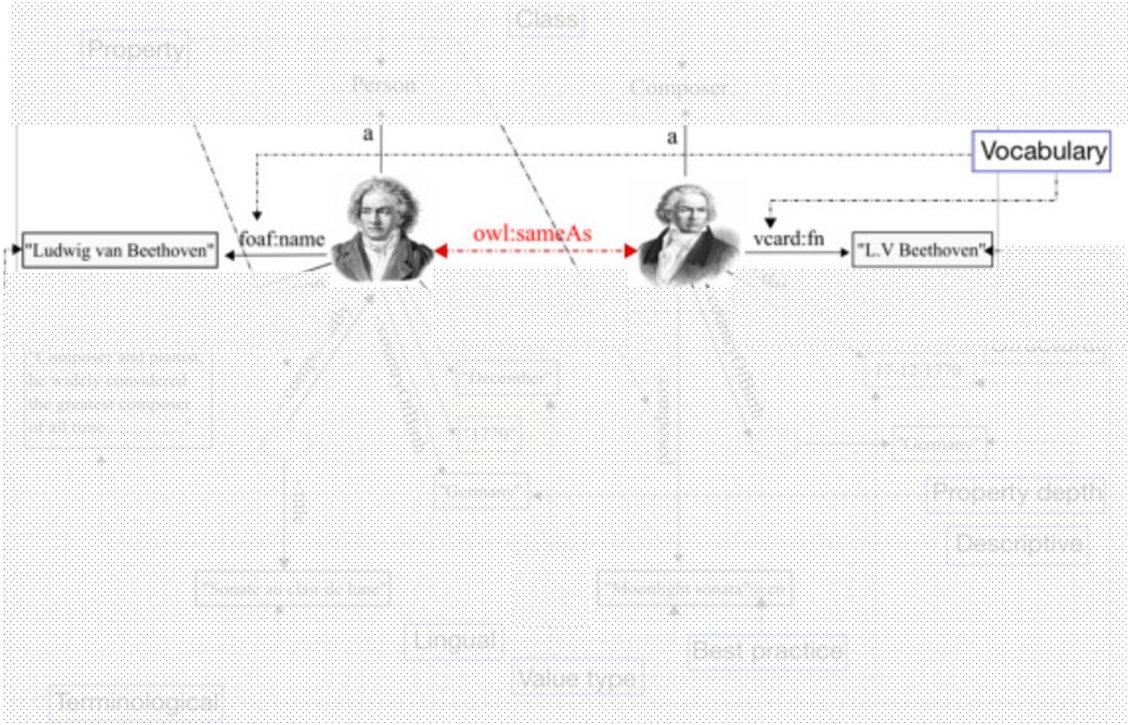
- « A piece of information can be given by a string literal via a datatype property, or by a URI, that is used to identify the same element in a controlled vocabulary »

Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Vocabulary heterogeneity (Achichi)

AC 04

- « an abundance of models and vocabularies/ontologies with different degrees of explicit rigour of their semantics, leading to different interpretations and usages »

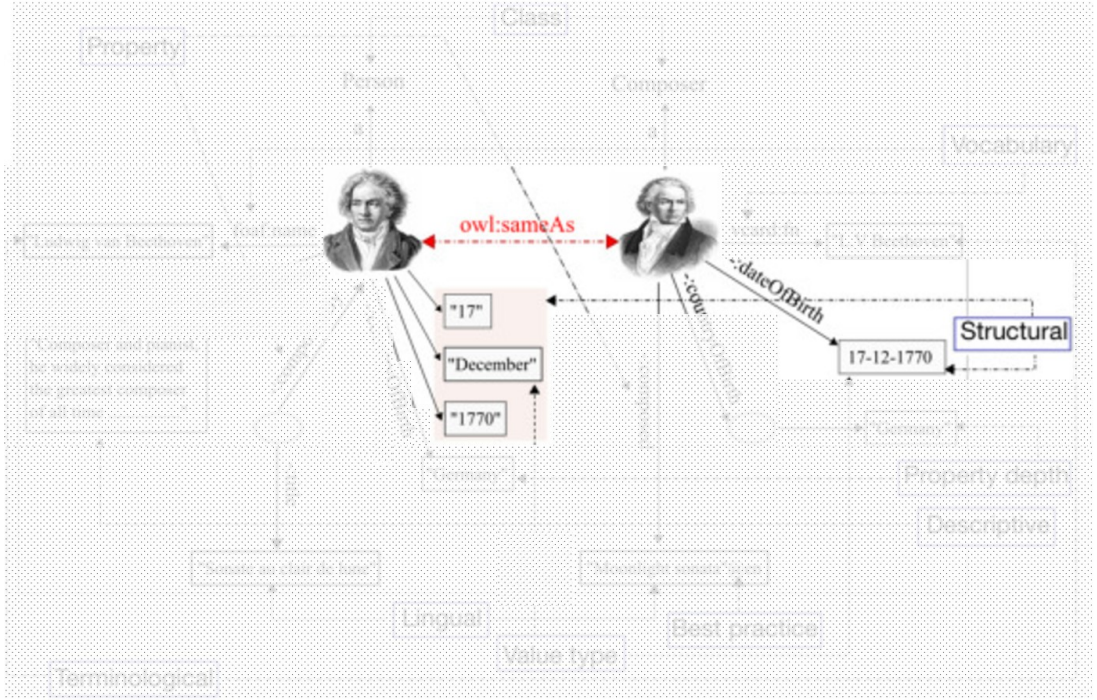


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Structural heterogeneity (Achichi)

AC 05

- The description of an entity can be done at different levels of granularity

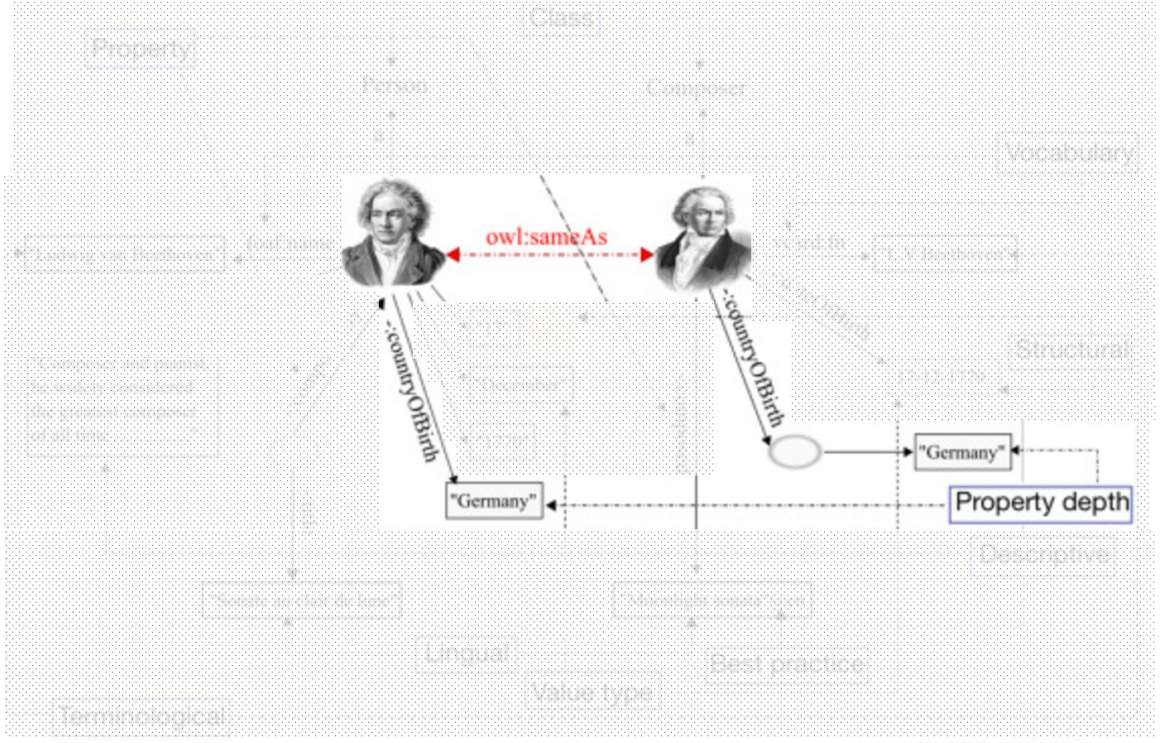


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Property Depth heterogeneity (Achichi)

AC 06

- The same piece of information can be found at different distances to the resource in two different graphs



Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Key heterogeneity (Achichi)

AC 07

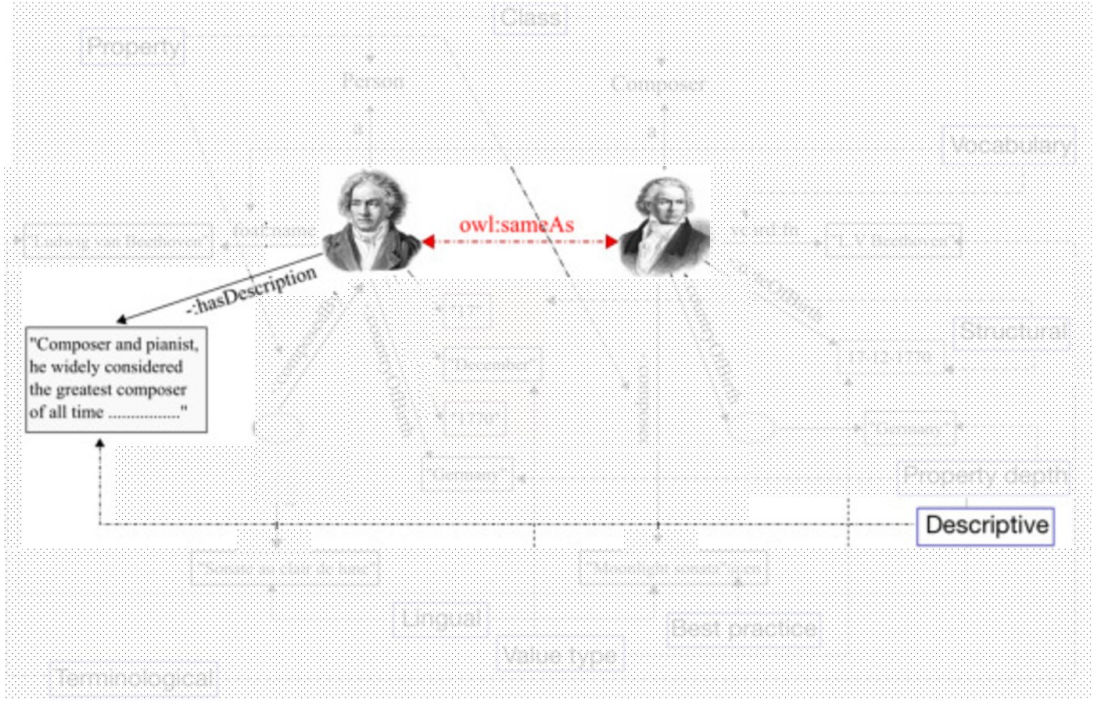
- « Key identification algorithms aim to discover discriminative properties on two datasets independently and thus identify potential candidates for link specifications of property-based state-of-the-art tools »

Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Descriptive heterogeneity (Achichi)

AC 08

- « A resource can be described with more information (a larger set of properties and types) in one dataset than in another »

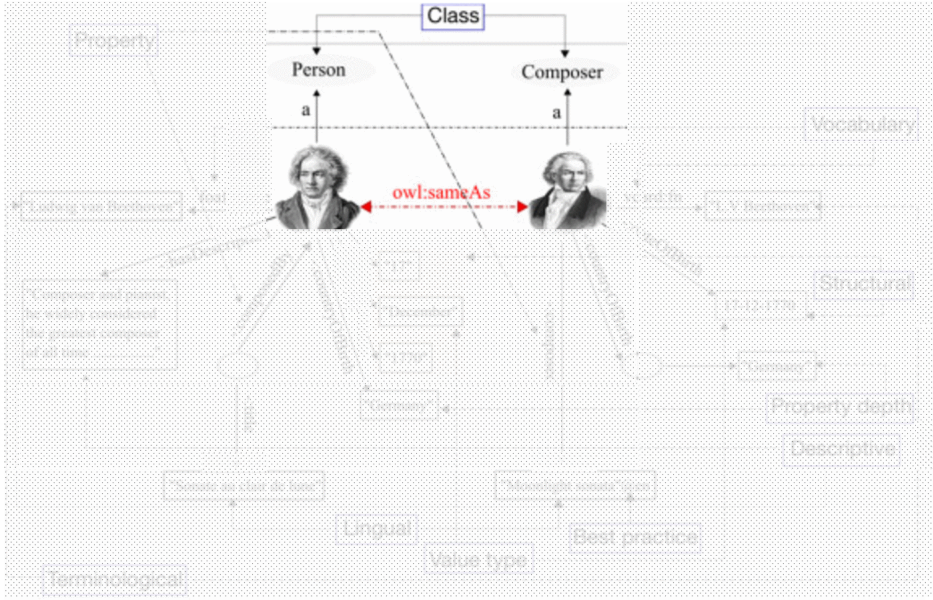


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Class heterogeneity (Achichi)

AC 09

- « the case of two resources belonging to different classes for which an explicit or an implicit hierarchical relationship is defined »
- « Moreover, two instances referring to the same object can belong to two different subclasses of a given class »

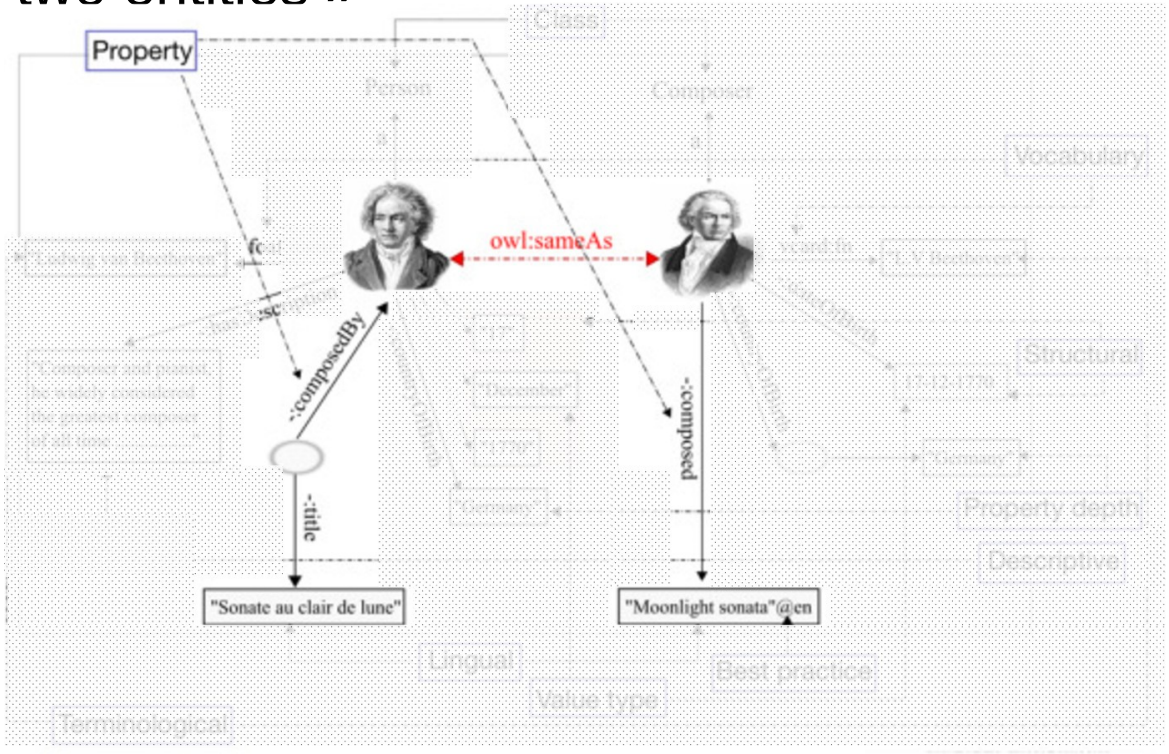


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Property heterogeneity (Achichi)

AC 10

- « The comparison process has to go beyond the value and property levels by comparing explicitly and implicitly specified values of the two entities »

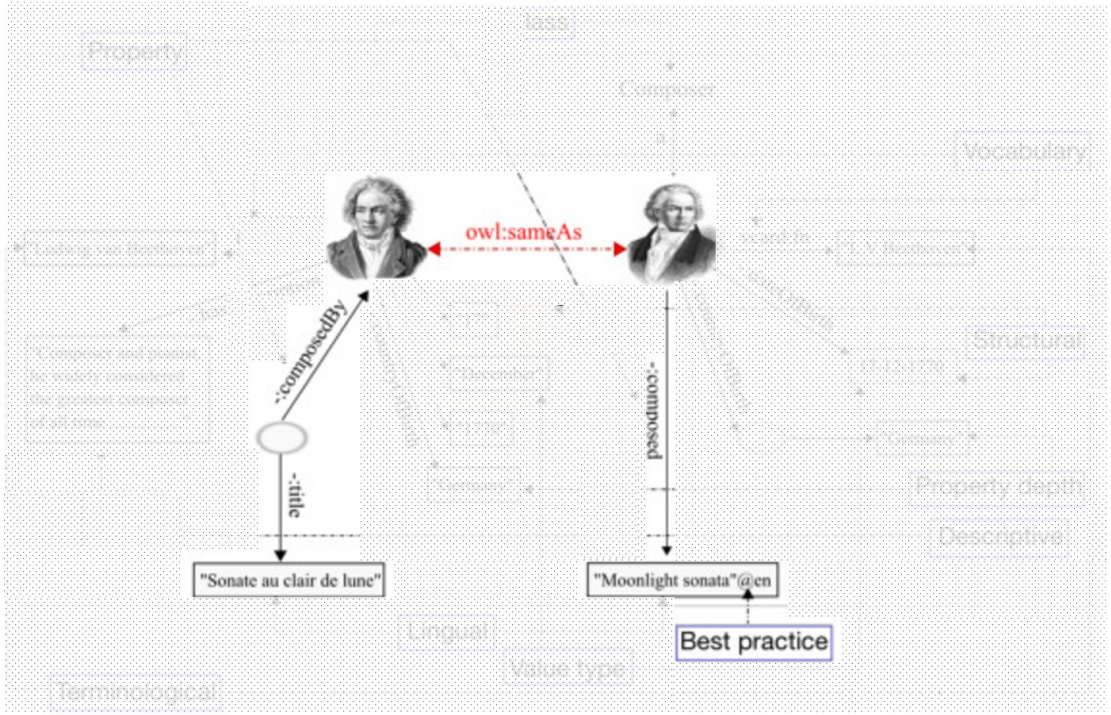


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Transgression to best practice (Achichi)

AC 11

- « Data representations can differ depending on the degree to which the semantic web best practices are respected in the data publishing process »

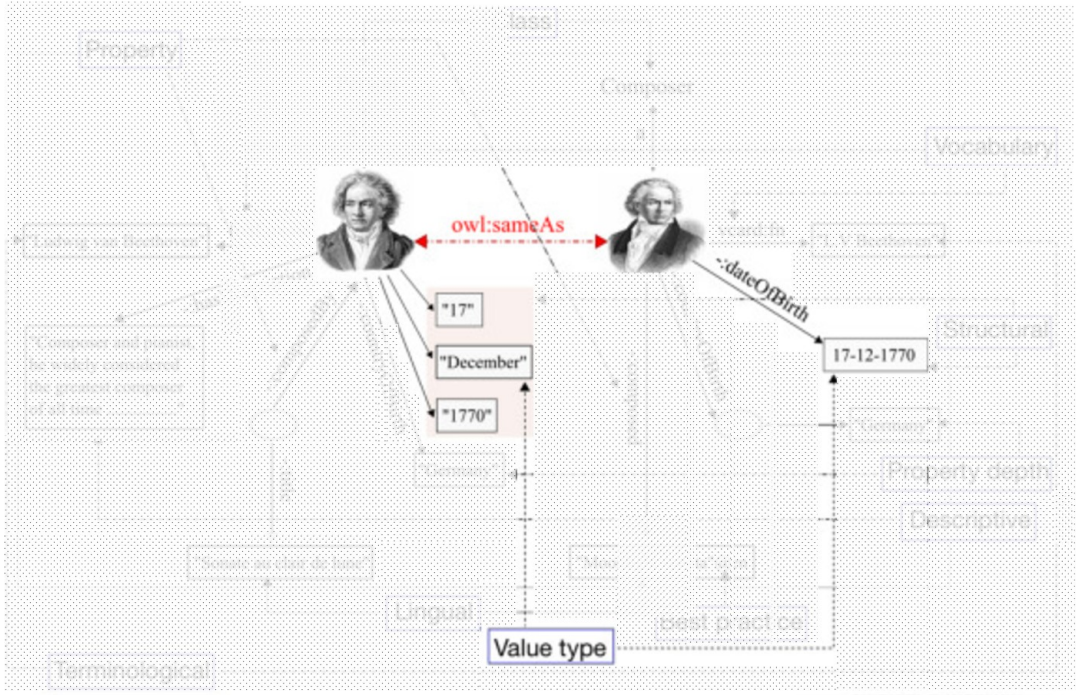


Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Value type heterogeneity (Achichi)

AC 12

- « This heterogeneity type concerns differences in encoding data, as for example, representing an age-value as a string or as a number, or not representing the date in a standard date format, but as a string. »



Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Dataset currentness (Achichi)

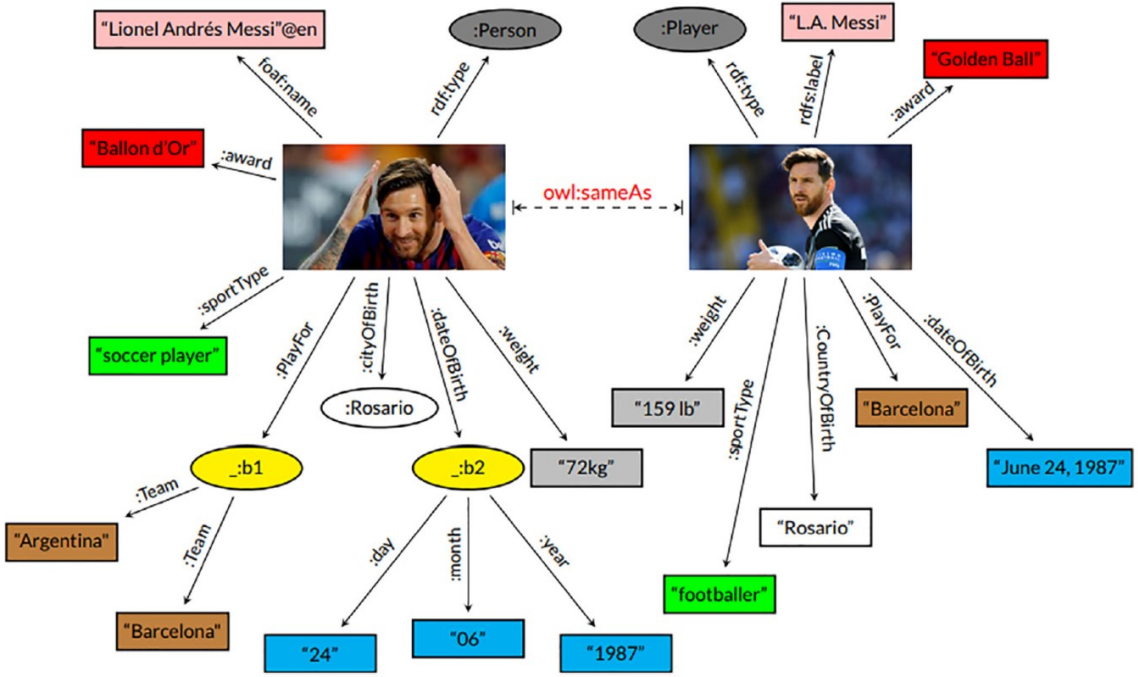
AC 13

- « The temporal evolution (or the lack thereof) of data and its dynamicity can lead to conceptual issues across datasets »

Achichi, Manel; Bellahsene, Zohra; Ellefi, Mohamed Ben; Todorov, Konstantin Linking and disambiguating entities across heterogeneous RDF graphs,2019.

Heterogeneities according to Assi

- The author classifies heterogeneity according to four aspects: value, structure, logic and scalability.

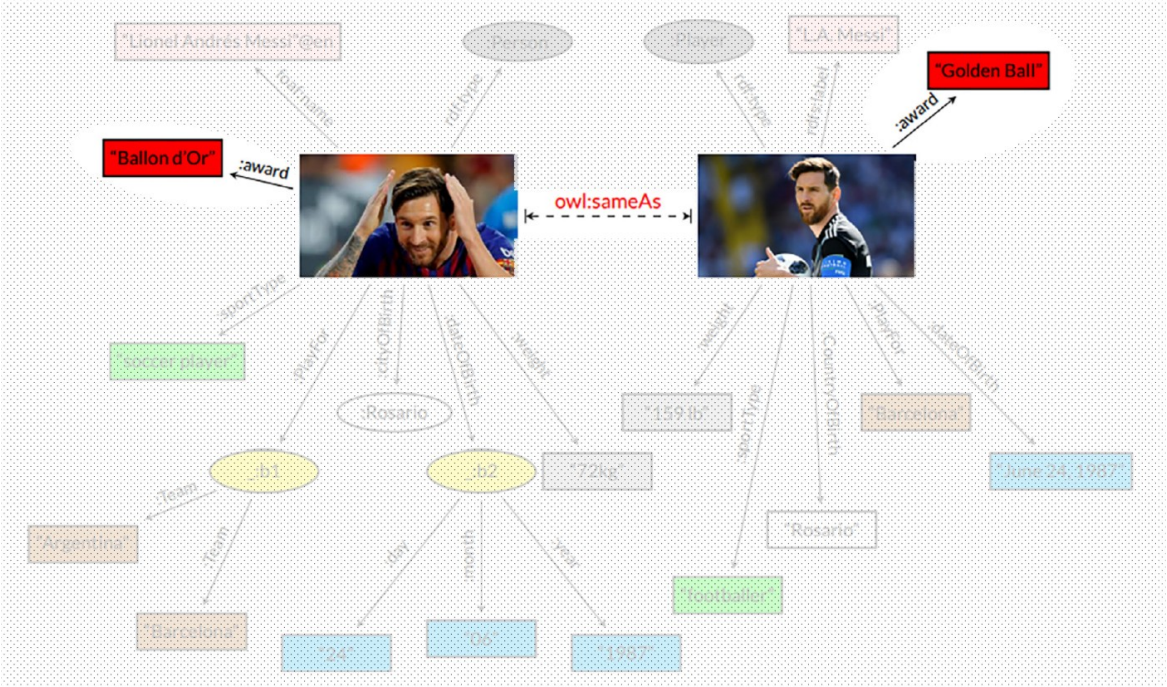


ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Multilingual (Assi)

AS 01

- The value of similar predicates can be expressed in different natural languages.

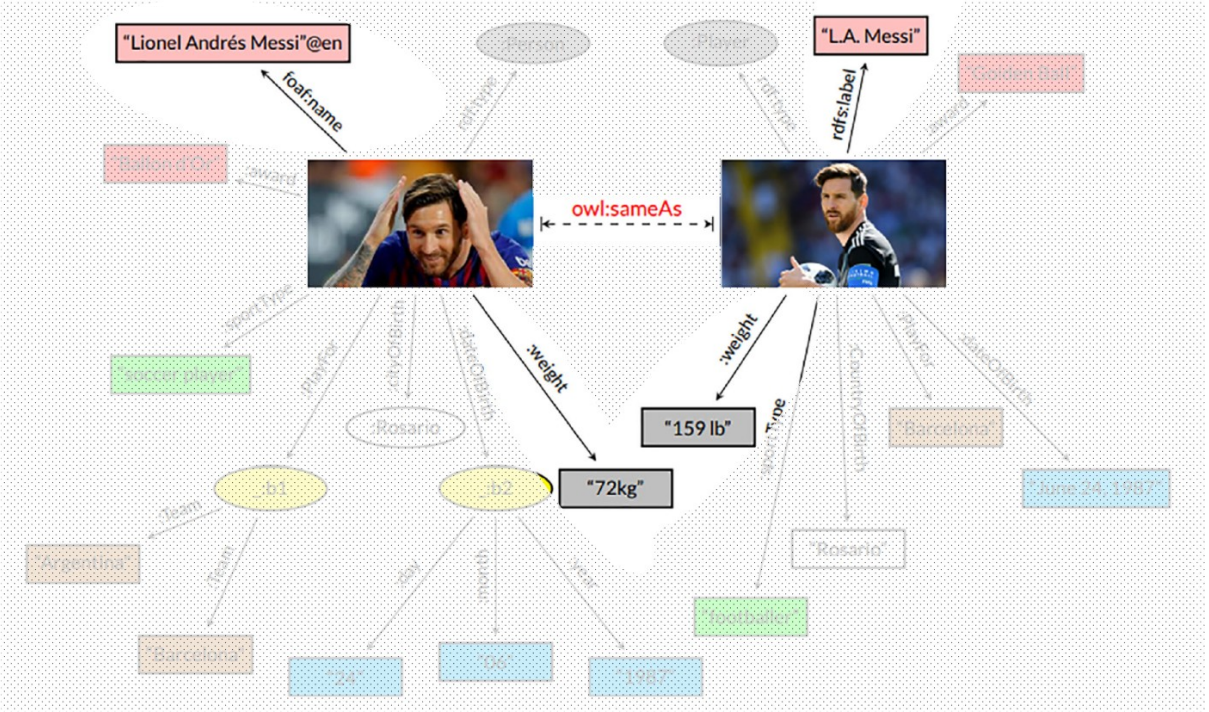


ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Data format (Assi)

AS 02

- « The data format denotes the textual variation (ie, acronyms, abbreviations, etc.) of the predicates' values. »

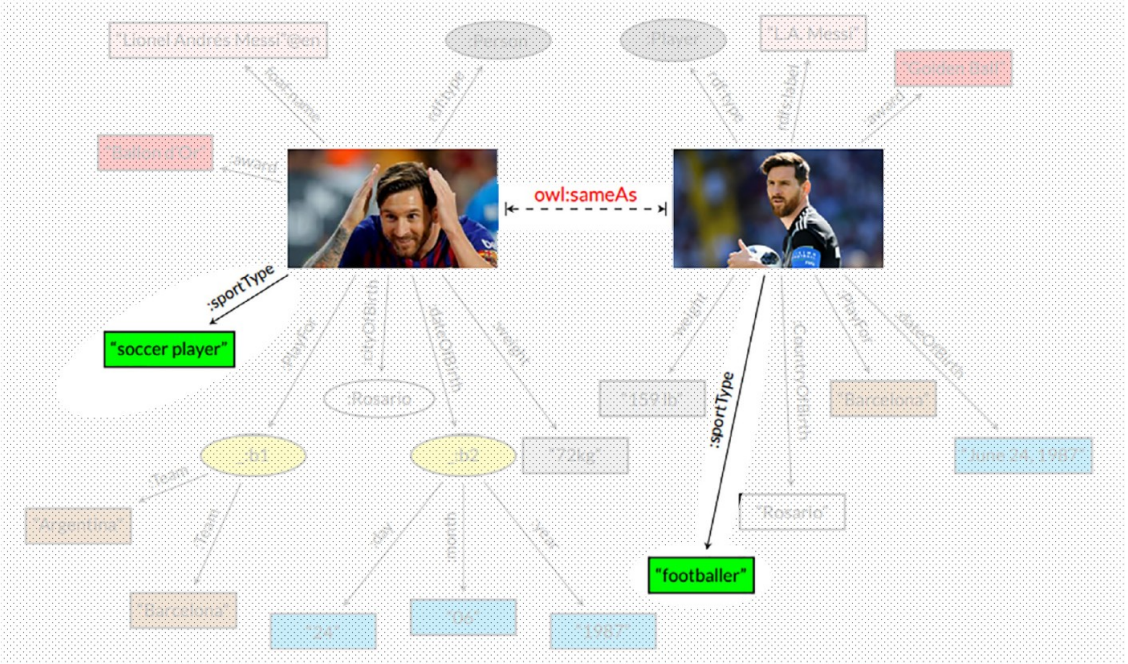


ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Data format (Assi)

AS 03

- « The data format denotes the textual variation (ie, acronyms, abbreviations, etc.) of the predicates' values. »
- « ...textual variations can include the semantic deviation. »

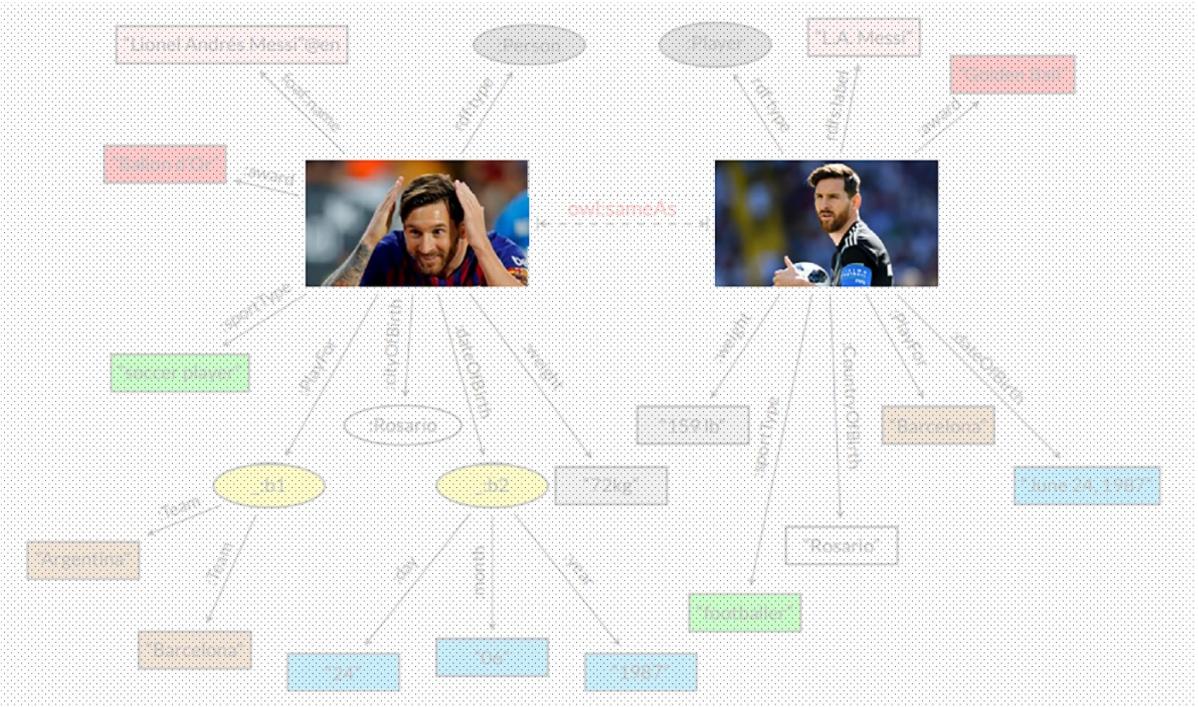


ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Data quality (Assi)

AS 04

- Ignoring LOD principles : « The LOD principles suggest the reuse of existing instance identifiers (ie, URIs) rather than the creating of new ones »



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Data quality (Assi)

AS 05

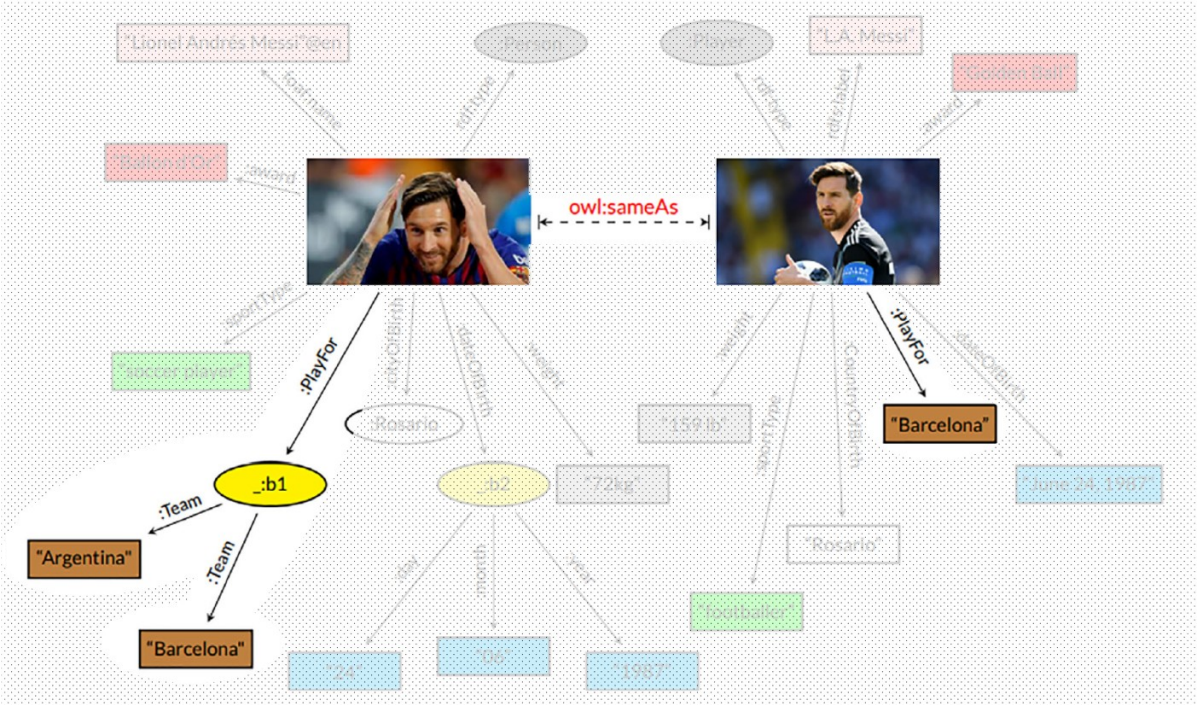
- Inconsistency : « Values of the same properties in two similar descriptions can hold conflicting data. For example, DBpedia identifies the population of Montreal as 1 649 519, while it is 1 600 000 according to Geonames. »

ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Data quality (Assi)

AS 06

- Incompleteness : « This results from the fact that similar descriptions carry partial data for a similar property »



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Data quality (Assi)

AS 07

- Incorrectness : « The incorrectness simply refers to the data typographical errors.»

ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Data quality (Assi)

- Outdated data : « The compared KBs can include “correct” data taken at different time periods.»

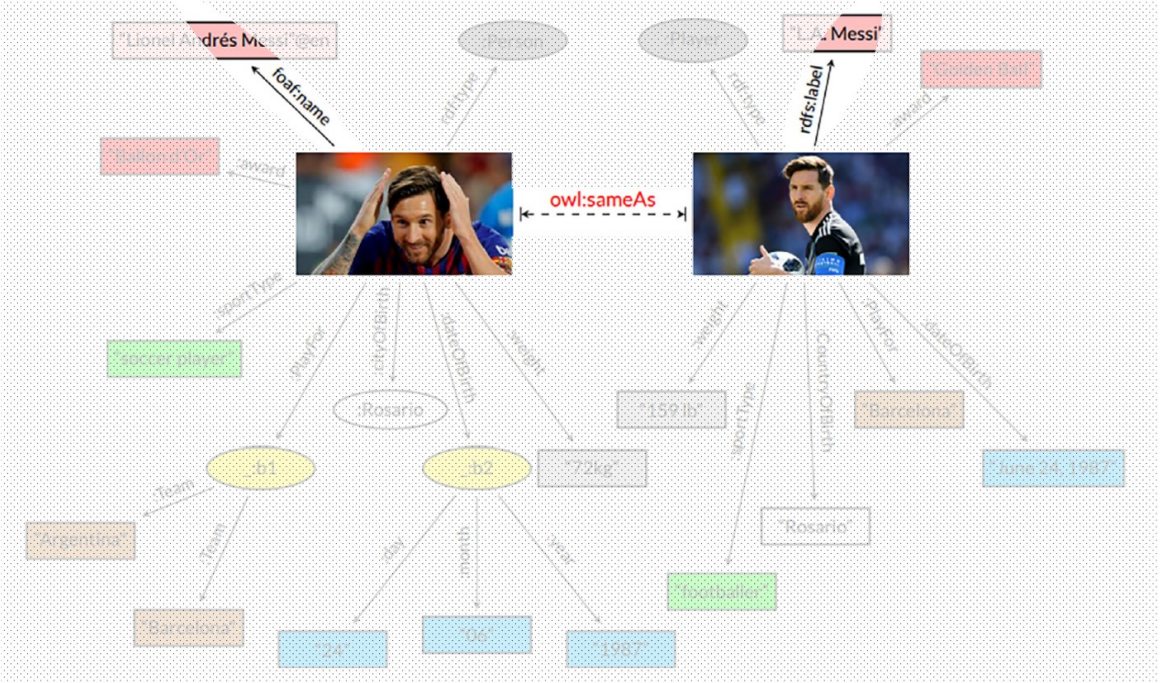
AS 08

ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Vocabulary heterogeneity (Assi)

AS 09

- « ...the same information can be expressed using different vocabularies in different KBs. »

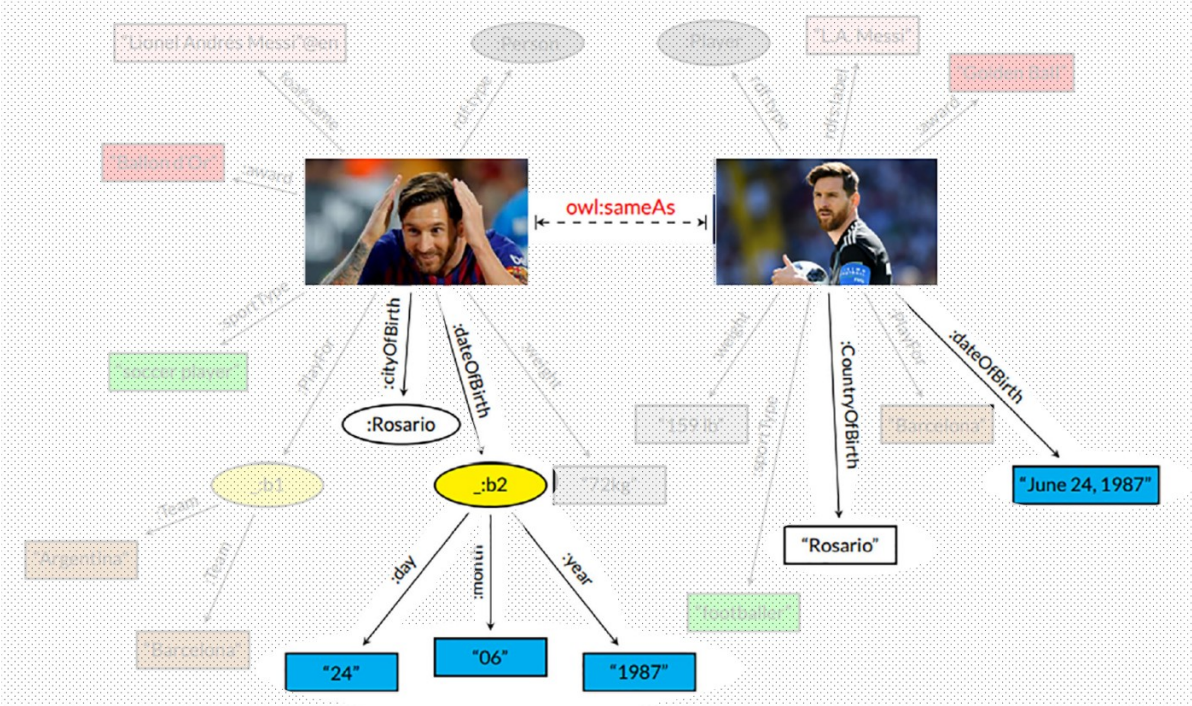


ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Predicat level (Assi)

AS 10

- « This kind of heterogeneity is related to the different ways the predicate is used to model an information »



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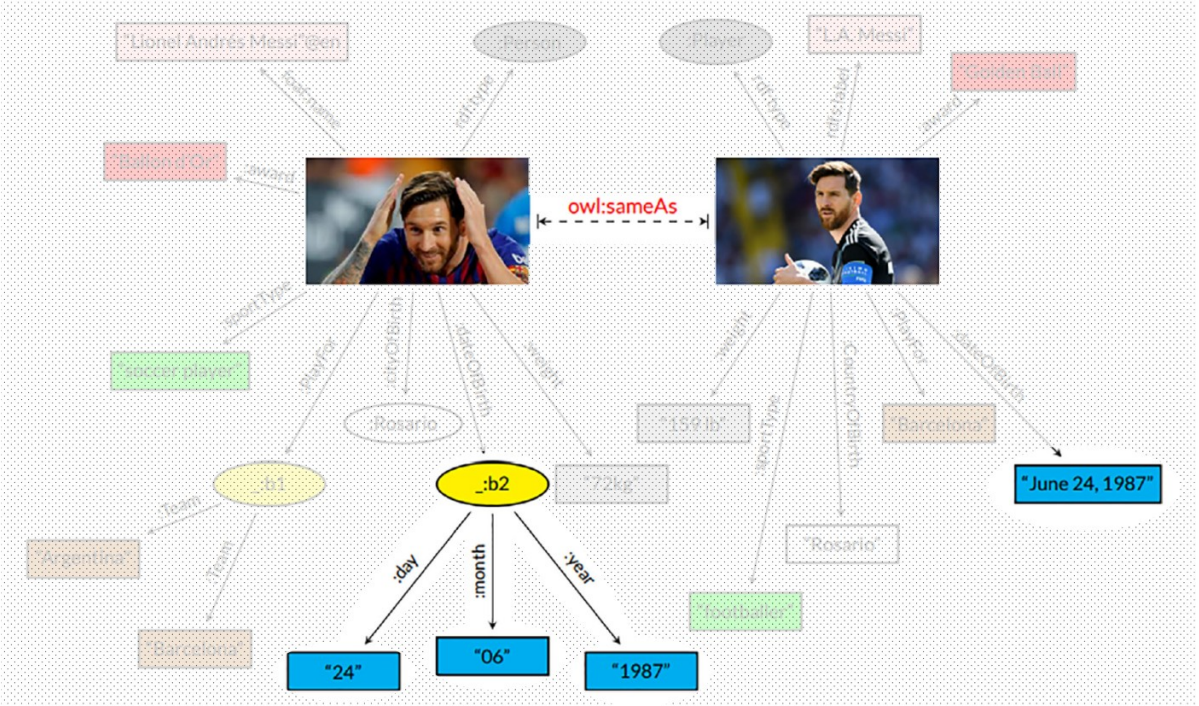
Predicat granularity (Assi)

AS 11

- « This type of heterogeneity results from the use of different aggregation criteria for predicates representation »



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Logical heterogeneity (Assi)

- « This aspect carries out the concept hierarchical variation to which instances belong to »

AS 12

<:player1, leadOf, ~BarceloneFc~> in KB1

<:club2, hasLeader, :player2> and <:club2, hasClubName, ~BarceloneFc~> in KB2

- « Here, the instance comparison process has to go beyond the value and property levels by comparing an explicitly specified value and an implicitly specified one between the two entities. »

ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.

Scalability (Assi)

AS 13

- « …besides the qualitative challenges that the classic IM approaches should face, additional quantitative and scalability challenges are introduced.

ASSI, Ali, MCHEICK, Hamid, et DHIFLI, Wajdi. Data linking over RDF knowledge graphs: A survey. Concurrency and Computation : Practice and Experience, 2020, vol. 32, no 19, p. e5746.