

1. Context
2. Definitions
3. Classifications of Ontology
Matching Techniques
4. Basic Techniques
5. Matching Strategies

Context

- We have to deal with heterogeneity
- Different models are based on different domains of knowledge and use different tools, at different detail levels
- Distributed nature of ontology development has lead to different ontologies in the same or overlapping domains



The need for ontology matching

- Creating global ontologies from local ontologies
- Reuse information between ontologies
- Dealing with heterogeneity
- Queries across multiple distributed resources
- Data transformation
- The same term in two ontologies may mean different.
- Different Organizations may use different ontologies for same domain, resulting different terms representing same concept; problems arise when they try to communicate with each other – “interoperability problem”

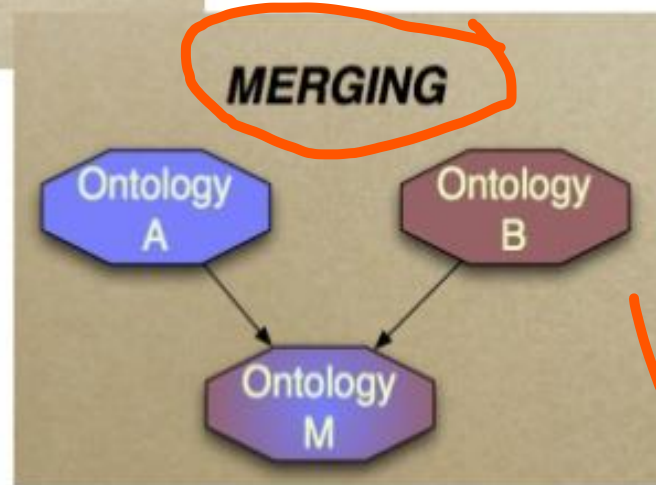
What is ontology matching?

- It is the process of finding relationships or correspondences between entities of different ontologies.
- Try to find relationships between each pair of concepts used in two different ontologies.
- Relationships between entities - classes, instances, properties or formulas

For example,

Equivalent, Subclass_Of, Superclass_Of, Siblings,
Similar (how much similar?),
Different (how much different?)

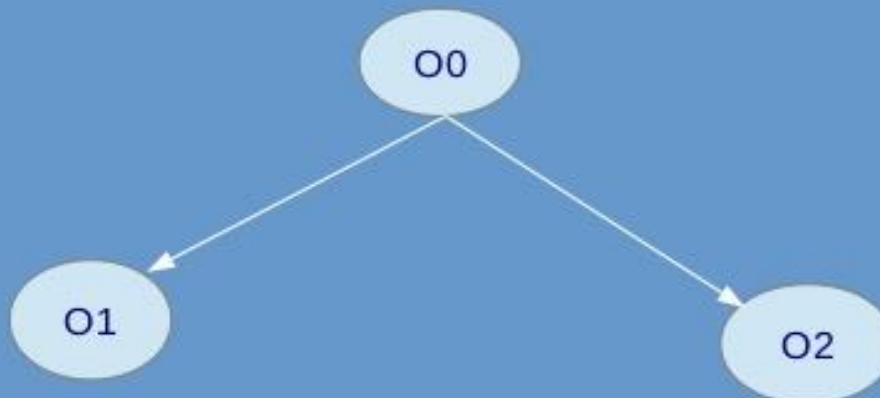
Other terms used



Ontology Alignment

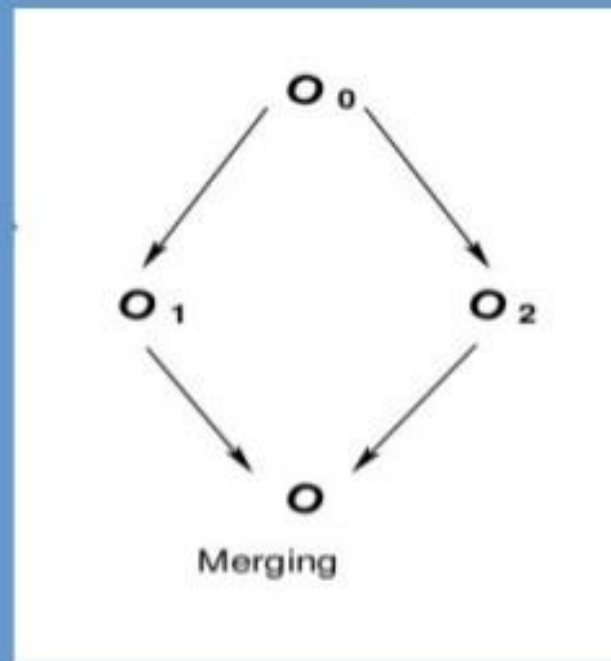
Two ontologies may be related in a more general fashion, namely by means of relations instead of functions.

Ontology Alignment the task of establishing a collection of binary relations between the vocabularies of two ontologies.



Ontology Merging

Ontology merging is the process of generating a single, coherent ontology from two or more existing and different ontologies related to the same subject.

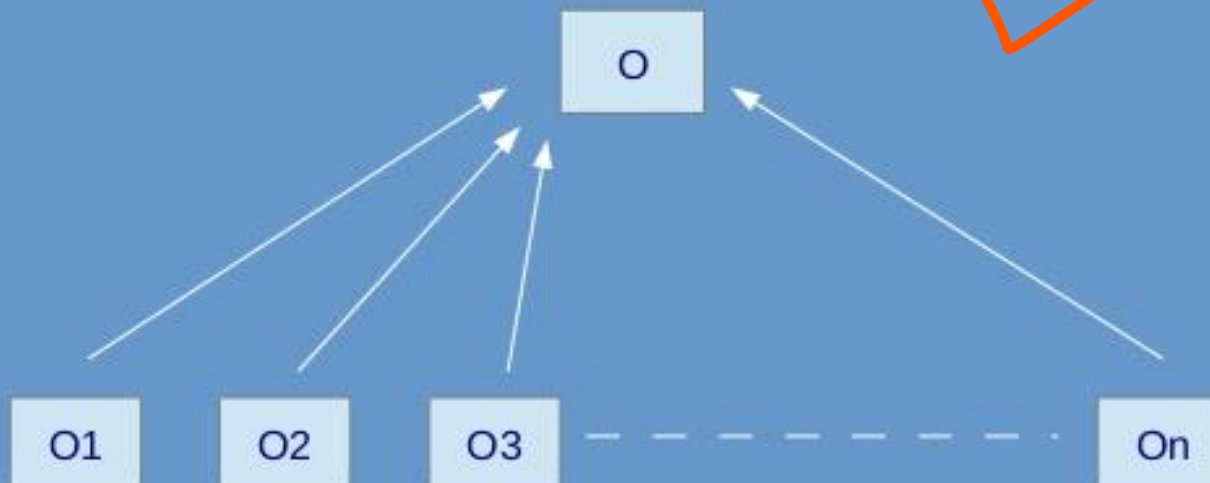


$$O = ((S1 \cup S2), (A1 \cup A2))$$

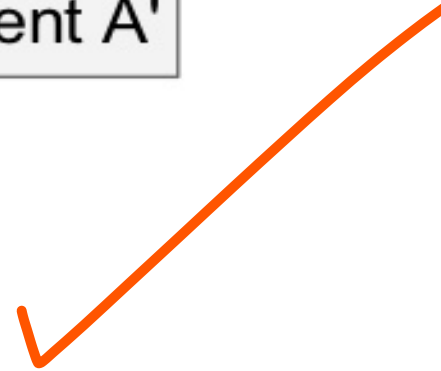
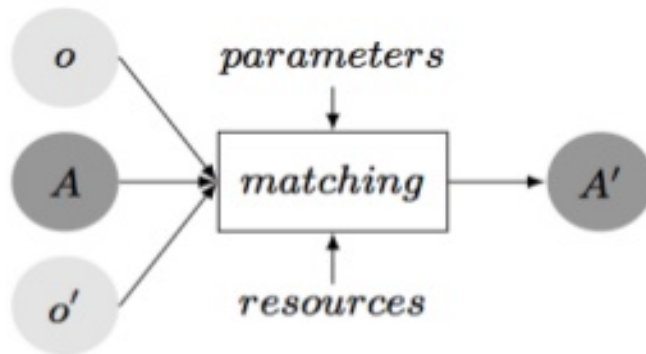
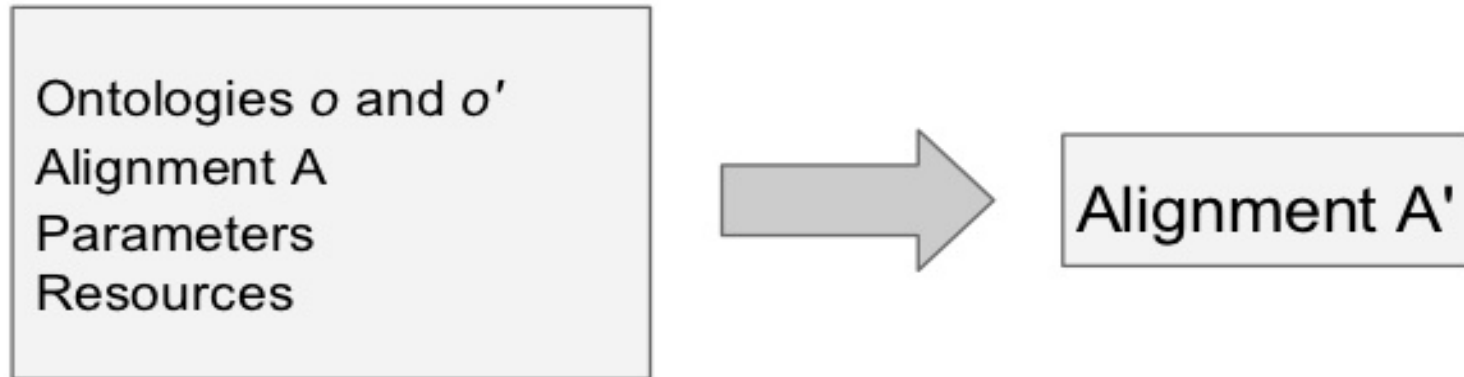


Ontology Integration

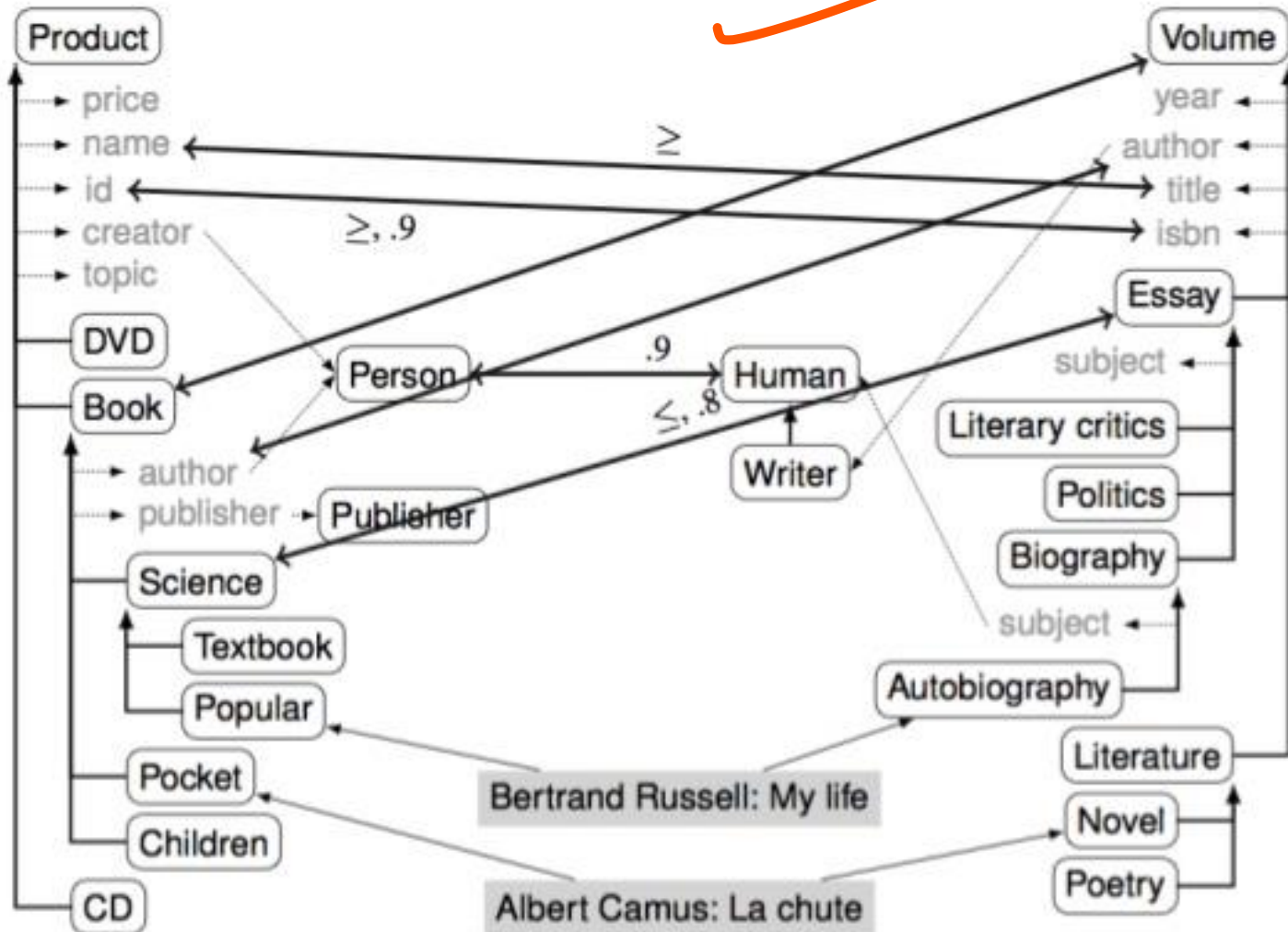
Ontology integration is the process of generating a new single ontology in one subject from two or more existing and different ontologies in different subjects (re-using).



The matching process



Ontology matching example



Classifying ontology matching in regard to the use



- Matching local ontologies to global ontologies
- Matching ontologies of complementary domains
- Merging two ontologies of the same domain

Categories of Ontology Mapping

- Category 1 : Mapping between an integrated global ontology and local ontologies
- Category 2 : Mapping between local ontologies
- Category 3 : Mapping on ontology merging and alignment

Category1

Tools and Systems:

- LSD (Learning Source Description)
- MOMIS (Mediator Environment for Multiple Information Sources)
- A Framework for OIS (Ontology Integration System)

Application Areas:

- Semantic Web
- Enterprise Knowledge management
- Data/Information Integration



Category2

Tools and Systems:

- Context OWL (Contextualizing Ontologies)
- CTXMATCH
- GLUE
- MAFRA (Ontology MAapping FRAmework for distributed ontologies in the Semantic Web)
- LOM (Lexicon-based Ontology Mapping)
- QOM (Quick Ontology Mapping)
- ONION (Ontology compositiON system)
- OKMS (Ontology-based knowledge management system)
- OMEN (Ontology Mapping Enhancer)
- P2P ontology mapping

Application Area: Semantic Web



Category3

Tools and Systems:

- SMART
- PROMPT
- OntoMorph
- HICAL
- AnchorPROMPT
- CMS (CROSI Mapping System)
- FCA-Merge
- CHIMAERA

Application Areas:

- Standard Search
- E-commerce
- Government Intelligence
- Medicine

