**Introduction**

The problem of **ontology mapping**:
- Define for two ontologies to which extent they represent the same domain of knowledge;
- Define and apply a measure of ontology similarity.

**Why ontology mapping?**
- Growing use of ontolgy applications
- Decentralized manual or semi-automatic ontology acquisition

**Levels of measuring ontology similarity:**
- Structural
- Semantic
- Syntactic (Terminological)

**Two stage approach to building ontology mappings**
- Take into account both the structural and semantic properties of ontologies
- Study structure before semantics.

**Initial assumptions. Ontologies**
- are hierarchical (partonomic and hyponomic relations only)
- serve to categorize documents w.r.t. their contents
- have correctly been assigned a set of documents distributed among the concept nodes

**Structural Ontology Similarity**

- Graph representation of ontologies: Start with directed rooted trees (semi-lattices)
- Generalize in terms of operations on graphs
- Define a suitable ontology graph distance inducing an ontological metric space
- A flexible three component parameter dependent measure of structural ontology similarity, taking into account:
  - Ontology distance in the ontological metric space
  - Size of the sets of documents assigned
  - Distribution of documents among ontology nodes (definition of shattering vectors)
- Model selection for structural ontology similarity measure. The trade-off between a too broad and a too strict definition

**From structure to semantics**
- The measure of structural similarity is "the filter" which restricts the number of concepts to be the subject of semantic similarity check

**Semantic similarity measures**

**Instance based approach**

**Jaccard Similarity**

\[
P(A \cap B) / P(A \cup B) = f(P(A,B))
\]

**Text Categorization**

Defining the similarity between concepts by testing the similarities between instances / text documents contained in each of the concepts.

**Variable Selection with SVMs**

Carry out a variable selection procedure independently on both concepts to compare and define the similarity in terms of coinciding most pertinent variables.