Intelligent Systems on the World Wide Web

3b Ontology Learning

Lecture Slides
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Typical Customers' Questions

- Can you build the ontology fast and cheap? (Time)
- Is it difficult to build it? (Difficulty)
- How do you know its complete? (Coverage)
- How do you know it's correct? (Confidence)

Partial Answer -> Ontology Learning

Analyse the Problem

- a set of strings that describe lexical entries L for concepts and relations
  - „house" (english) vs. „Haus" (German)
  - „school" (organization vs. building)
  - „bank" (on the river) vs. „bank" (of China)
  - „liquidate" vs. „kill" (X – makes-die – Y)

Separation between lexicon and concepts helps to express and use ambiguous terms!

Analyse the Problem

- a set of strings that describe lexical entries L for concepts and relations
- a set of concepts C
  - laCasa, schoolbuilding, financeInstitute, kill
  - word sense disambiguation!

Finding relevant terms and grouping them into concepts are two tasks!

Analyse the Problem

- a set of strings that describe lexical entries L for concepts and relations
- a set of concepts C
- a taxonomy of concepts with multiple inheritance HC
  - school-building isa building
  - high-school-building isa school-building

Analyse the Problem

- a set of strings that describe **lexical entries** L for concepts and relations
- a set of concepts C
- a taxonomy of concepts with multiple inheritance HC
- a set of non-taxonomic relations — R — described by their domain and range restrictions
  - school-organization hasBuilding schoolbuilding
  - given „school“ and „building“ decision about
    - New relation: School hasBuilding building
    - New concept: school-building

Analyse the Problem

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- a set of non-taxonomic relations — R — described by their domain and range restrictions
- a heterarchy of relations HR
- relations F and G that relate concepts and relations with their lexical entries, respectively
- a set of axioms A that describe additional constraints

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TF / IDF

Comparing Distributions

Analyse the Problem

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- a set of… …tional constraints

Hierarchical Clustering

FCA

Analyse the Problem

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Assoc Rules

FCA

Analyse the Problem

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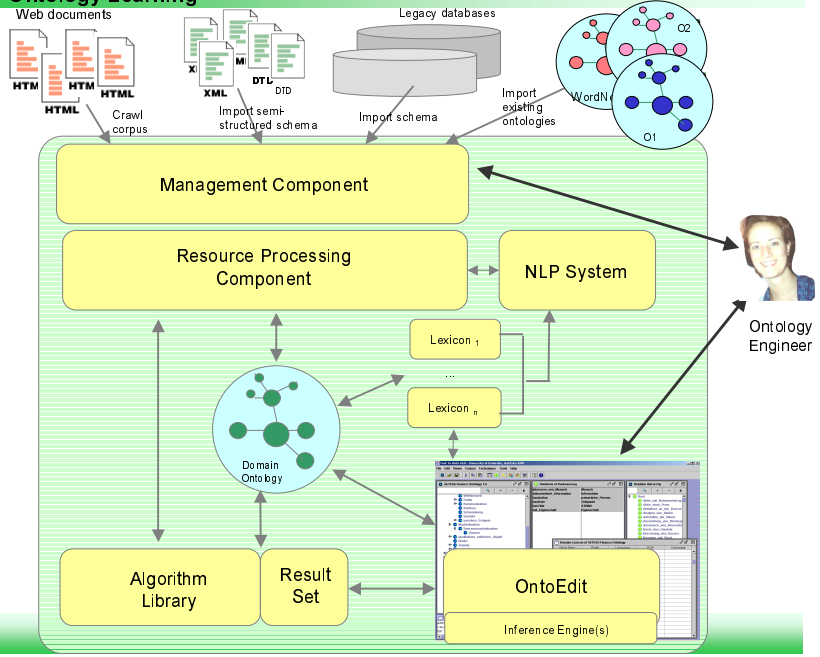
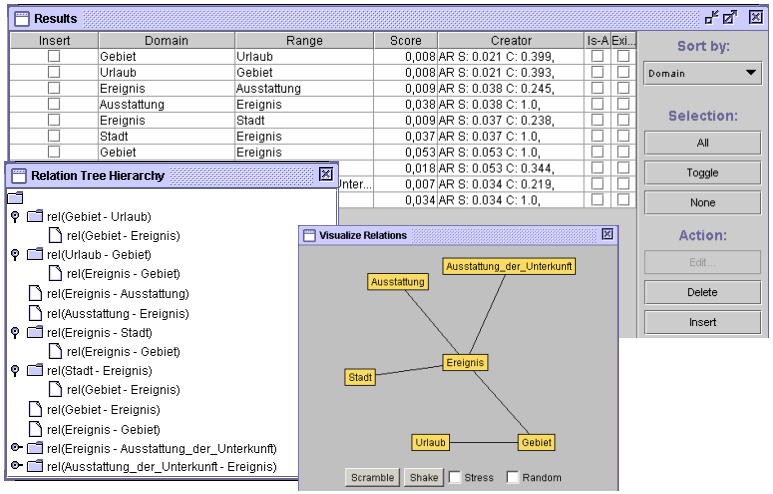
Categorization & Learning ??

Ontology Learning



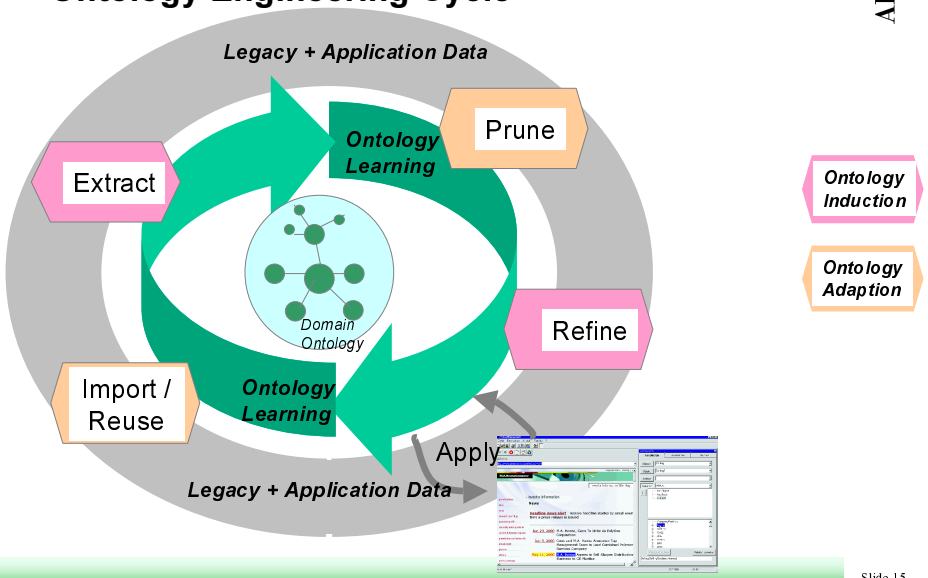
Ontology Learning

Result Presentation



Ontology Learning

Ontology Engineering Cycle



Ontology Induction

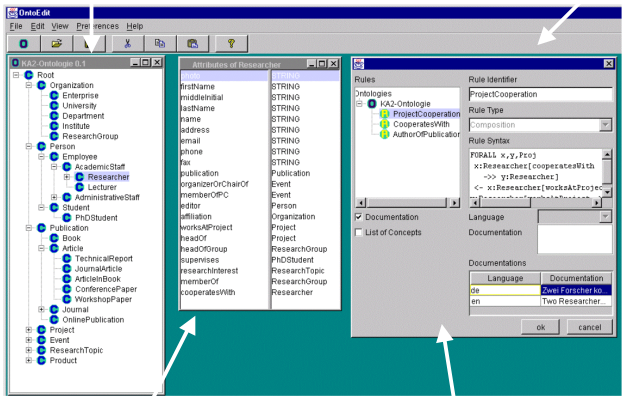
Ontology Adaption

Ontology Learning

OntoEdit

Explorer- View to the Ontology

Development and modification of ontologies



attributes

Rule editor