

# 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)

Slide 2

## 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!

Slide 3

Slide 4

## 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!

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## 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

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## 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

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## 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
- 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

Slide 8



## 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 T
- 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
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TF / IDF  
Comparing  
Distributions

Slide 9



## Analyse the Problem

- a set of strings that describe lexical entries L for concepts and relations
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Hierarchical  
Clustering  
FCA

Slide 10



## Analyse the Problem

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Assoc Rules  
FCA

Slide 11



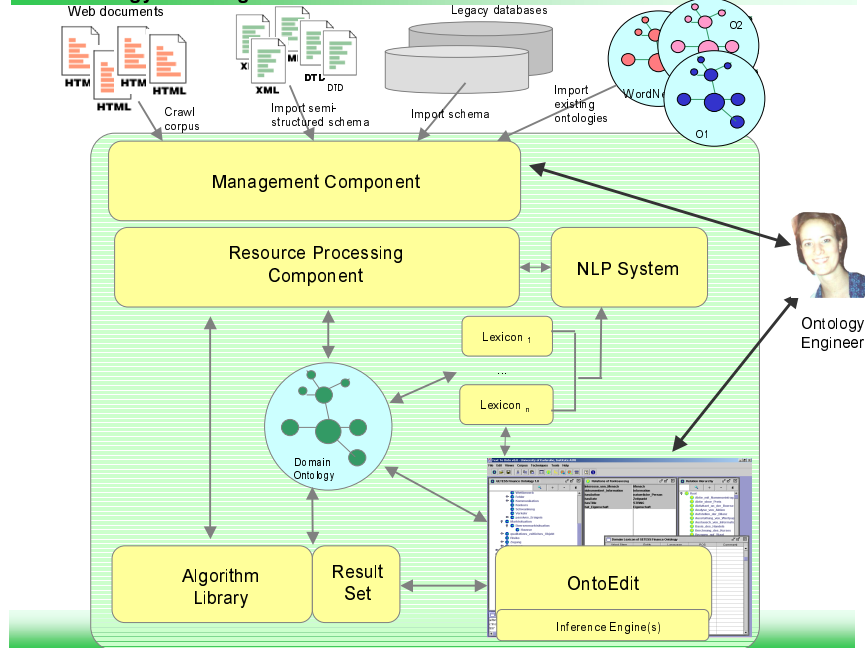
## Analyse the Problem

- 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
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Categorization &  
Learning ??

Slide 12

## Ontology Learning



Slide 13

## Ontology Learning

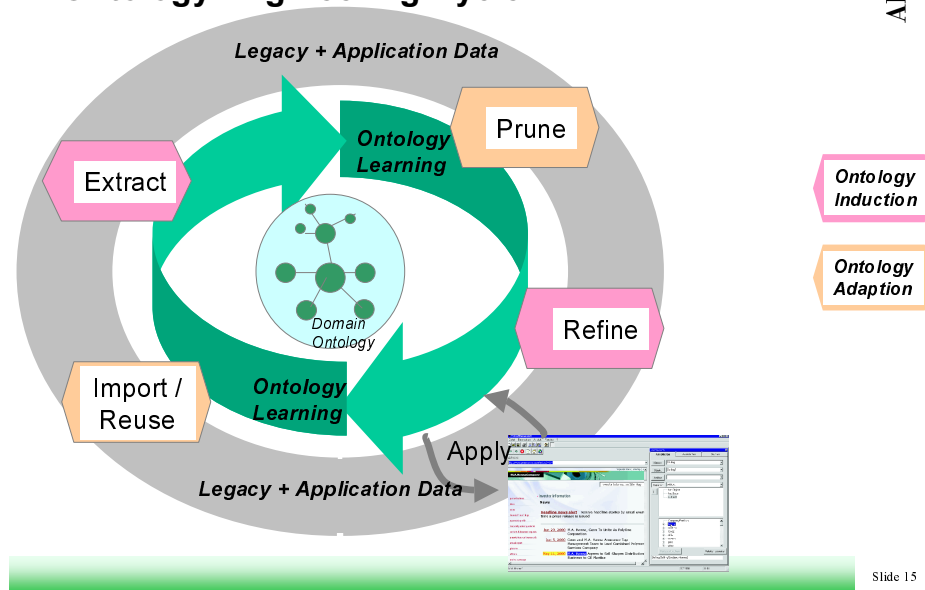
## Result Presentation

The screenshot shows the 'Results' window of the ontology learning system. It contains a table with columns: Insert, Domain, Range, Score, Creator, Is-A Ext..., and Sort by. The table lists various ontology elements and their relationships. Below the table, there are two panels: 'Relation Tree Hierarchy' showing a tree structure of relations, and 'Visualize Relations' showing a graph visualization of the relations.

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## Ontology Learning

## Ontology Engineering Cycle



Slide 15

## Ontology Learning

## OntoEdit

Explorer- View to the Ontology

Development and modification of ontologies

The screenshot shows the OntoEdit software interface. It features a tree view of the ontology on the left, a list of attributes in the middle, and a rule editor on the right. The rule editor is titled 'Rule Identifier' and 'Rule Syntax'.

attributes

Rule editor

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