Knowledge Representation for the Semantic Web

Winter Quarter 2010

Slides 10 – 03/02/2010

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Slides are based on

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Foundations of Semantic Web Technologies

Chapman & Hall/CRC, 2010

Flyer with special offer is available.

http://www.semantic-web-book.org
• Two ontologies on the web – and imagine an application which would need to use both.
• Task: Ontology integration. I.e., make one ontology out of two.

• There’s lots of work (and research) on how to do this (including some kind of loose coupling between the ontologies). We take a conservative approach: Really make one ontology.

• How to start? How to do it?
  → Start with the subclass hierarchy of the named classes.
    Then go from there.
**Taxonomies**

**u:**
- Human
  - Employee
  - Student

**f:**
- Male
  - Father
  - Uncle
- Female
  - Grandfather
Integration – simple cases

u:

T

Human

Gender

Degree

Employee

Student

f:

T

Male

Female

Father

Uncle

GrandFather

f: Father ⊆ u: Human
f: Uncle ⊆ u: Human
f: GrandFather ⊆ u: Human
Integration – simple cases

u:

```
  T
 / \
|   |
Human Gender Degree
 /  |   |
Employee Student f:Father f:Uncle
   |   |
f:GrandFather
```

f:

```
  T
 / \
|   |
Male Female
```

what to do with the genders?
Gender Issues

presumably, there are some roles, e.g. u:hasGender and some individuals, e.g. \{u:male,u:female\} ⊆ u:Gender

add, e.g.,
f:Male ≡ ∃u:hasGender.{u:male}
f:Female ≡ ∃u:hasGender.{u:female}
Gender Issues

\[ u: \]

\[ \text{Human} \quad \text{Degree} \quad \text{Gender} \]

\[ \text{f:Male} \quad \text{f:Female} \]

\[ \text{Employee} \quad \text{Student} \quad \text{f:Father} \quad \text{f:Uncle} \quad \text{f:GrandFather} \]

\[ f: \text{Male} \equiv \exists u: \text{hasGender}.\{u: \text{male}\} \]

\[ f: \text{Female} \equiv \exists u: \text{hasGender}.\{u: \text{female}\} \]

\[ \text{Alternately: do some more fundamental remodeling} \]
What do to

• Compare your taxonomies. Are there overlaps? Make one taxonomy out of them.

• In case of difficulties, have a closer look at the ontologies and find either a way to “map” between them or remodel to make things fit both worlds.

• Once the taxonomies are integrated, check all roles, in particular domain and range statements, and adjust/adapt where needed.

• Finally check the individuals/ABoxes. Most of that should be sorted already.

Make notes on paper such that you can easily reproduce the integrated ontology from your notes at home.