Designing Expert Systems

7. Multistrategy Rule Learning: Hands On

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Knowledge Base Development: Rules

1. Define domain model
2. Create ontology
3. Define rules
4. Verify and update rules

Traditionally:
- Define initial model
- Import and create initial ontology
- Define and explain examples
- Critique examples

With Disciple:
- Define initial model
- Import and create initial ontology
- Define and explain examples
- Critique examples

- Extend domain model
- Specify instances
- Learn ontological elements
- Learn rules
- Explain critiques
- Refine rules
Rules: Programming versus Learning

EXAMPLE

IF: Assess whether ?O1 is a potential PhD advisor for ?O2.

Q: Is ?O2 interested in the area of expertise of ?O3?

A: Yes, because ?O2 is interested in ?O3 which is the area of expertise of ?O1.

MAIN CONDITION

<table>
<thead>
<tr>
<th>Var</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>?O1</td>
<td>(PhD advisor, associate professor)</td>
<td>(person)</td>
</tr>
<tr>
<td>?O2</td>
<td>(PhD student)</td>
<td>(person)</td>
</tr>
<tr>
<td>?O3</td>
<td>(computer science)</td>
<td>(PhD research area)</td>
</tr>
</tbody>
</table>

Var | Relationship | Var
--- |-------------|---
?O2 | is interested in | ?O3
?O1 | is expert in | ?O3

Hands On: System Installation

Install the system from:

Load the “PAD-m2o\CS681” scenario KB.
Hands On: Modeling

Assess whether John Doe is a potential PhD advisor for Bob Sharp

- professional reputation
- students learning experience
- responsiveness to students
- quality of student results

advisor placement record
doctoral study duration
publications with advisor
student presentations
personality and compatibility with student

What kind of criterion is advisor placement record? placement type criterion

Assess the student placement of John Doe.

Who is a graduated PhD student of John Doe?
Adam Pearce whose PhD dissertation is Pearce 2007.

Assess the reputation of the employer of Adam Pearce.

What is the reputation of the employer of Adam Pearce?
Adam Pearce is employed by Google who has the highest reputation.

The reputation of the employer of Adam Pearce is highest.
Hands On: Manual Definition of Rules

Study the ontology and manually define the three reduction rules suggested by the modeling:

Rule 1: Assess whether John Doe would be a good PhD advisor for Bob Sharp with respect to advisor placement record.

Rule 2: Assess the student placement of John Doe.

Rule 3: Assess the reputation of the employer of Adam Pearce.
Hands On: Learning of Rules

Use the rule learning module of Disciple to learn three reduction rules from the following modeling:

Rule 1: Assess whether John Doe would be a good PhD advisor for Bob Sharp with respect to advisor placement record.

Rule 2: Assess the student placement of John Doe.

Rule 3: The reputation of the employer of Adam Pearce is highest.
Discussion

Compare the processes and the results.