

# State of the Art Ontology Mapping

By Justin Martineau

## Overview

- Motivation
- Theory
- Practice
- PROMPT for Protégé

## Motivation

### Ontology Mapping Benefits:

- Business
    - Better communication with subcontractors
  - Artificial Intelligence Researchers
    - Source of Training Data
    - Way to share learning results
  - Programmers
    - Tool to make better applications
  - Laymen
    - Indirectly through Tools
- Ex: Tool for comparison of Similar Products

## *Theory*

### Applicable Techniques:

- Machine Learning
- Natural Language Processing
- Heuristics
- Database Schema Merging
- Formal Concept Analysis (Produce a Concept Lattice)
  - Cluster into Objects with same subset of properties & Properties belonging to object clusters

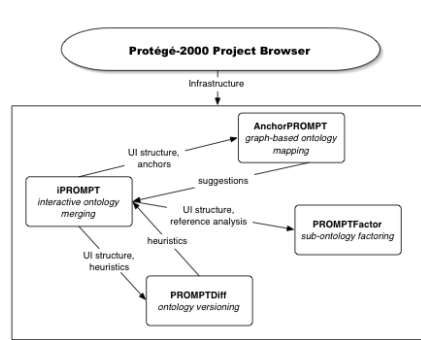
## Practice

- FCA-Merge - uses Formal Concept Analysis, & NLP
- IF-Map - uses thy of info flow (Barwise & Seligman 97)
- SMART - uses linguistic similarity and heuristics
- PROMPT - uses linguistic similarity and heuristics
- GLUE - uses ML, Meta-Learning, Naïve Bayes, Relaxation Labeling ...
- CAIMAN - uses ML, text classification and probability
- ITTalks - uses text classification, and Bayesian reasoning
- ONION - uses Heuristics, user checks input, ML of user choices
- ConceptTool - uses Description Logic, linugistics, heuristics

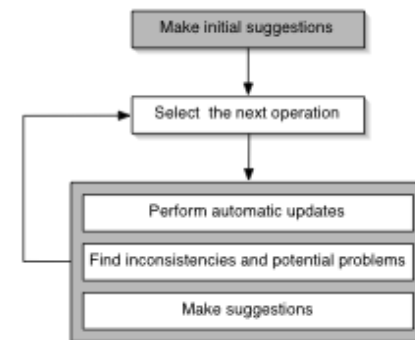
## *Prompt for Protégé*

- Many Different Tools
  - iPrompt - Ontology-mergering tool
  - AnchorPrompt - Ontology-alignment tool
  - PromptDiff - Ontology-versioning tool
  - PromptFactor - Determine semantic sub-ontologies

## *Prompt Architecture*



## *iPrompt Ontology-Merging Flowchart*

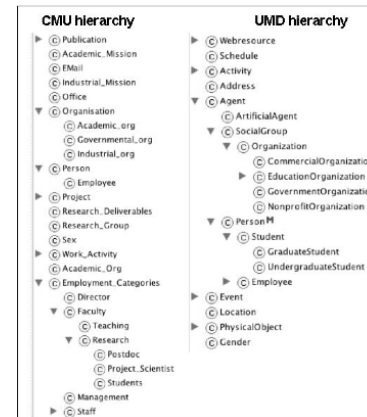


## iPrompt UI

- Suggestions ordered based on last operation to maintain user's focus
- Can prefer one Ontology over another, so conflicts are resolved in its favor
- Suggestions are Explained
- Logs operations, Log can be open and applied.

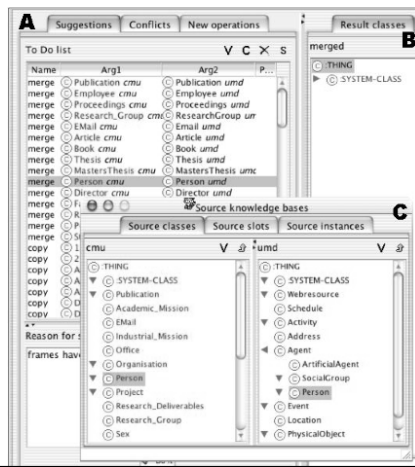
## Ex: Merging 2 Ontologies

Before Starting the Merger



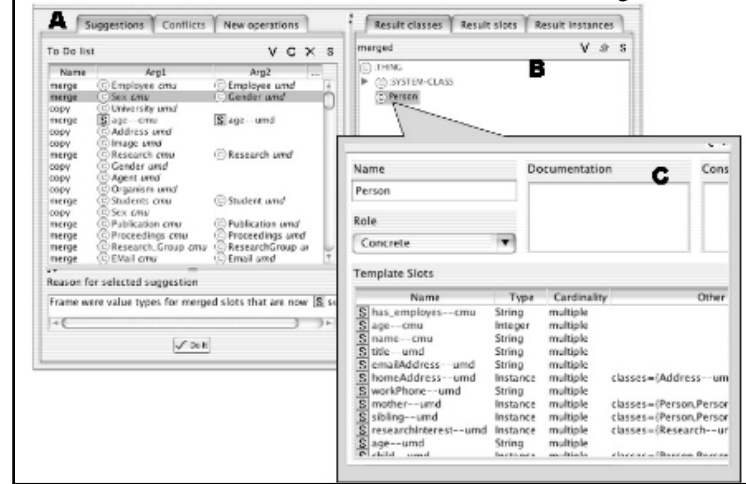
## Ex: Merging 2 Ontologies

An Empty Ontology with a list of suggestions



## Ex: Merging 2 Ontologies

Person Class added, Receives slots from both Ontologies



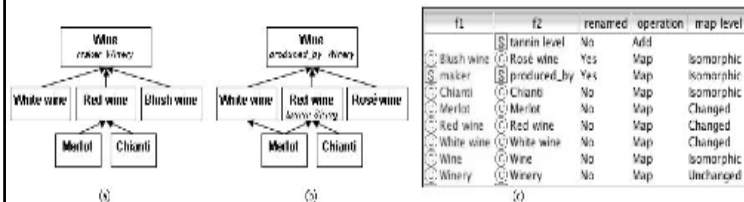
## *iPrompt Conflicts*

- Name Conflict
- Dangling Pointers (Suggests Importing)
- Class Hierarchy Redundancy
- Slot Value Restriction Violations

## *PromptDiff - Ontology Version Tracking*

- ⊕ Unix Diff doesn't work well with Ontologies
- ⊕ Heuristic Algorithm
- ⊕ Produces Structured Diff Representation

## *Ex: Wine Ontology*



## Questions

Figures and Images from:  
The PROMPT Suite: Interactive Tools For Ontology Merging And Mapping