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Introducing Fuzzy Trust for Managing Belief Conflict over Semantic Web Data

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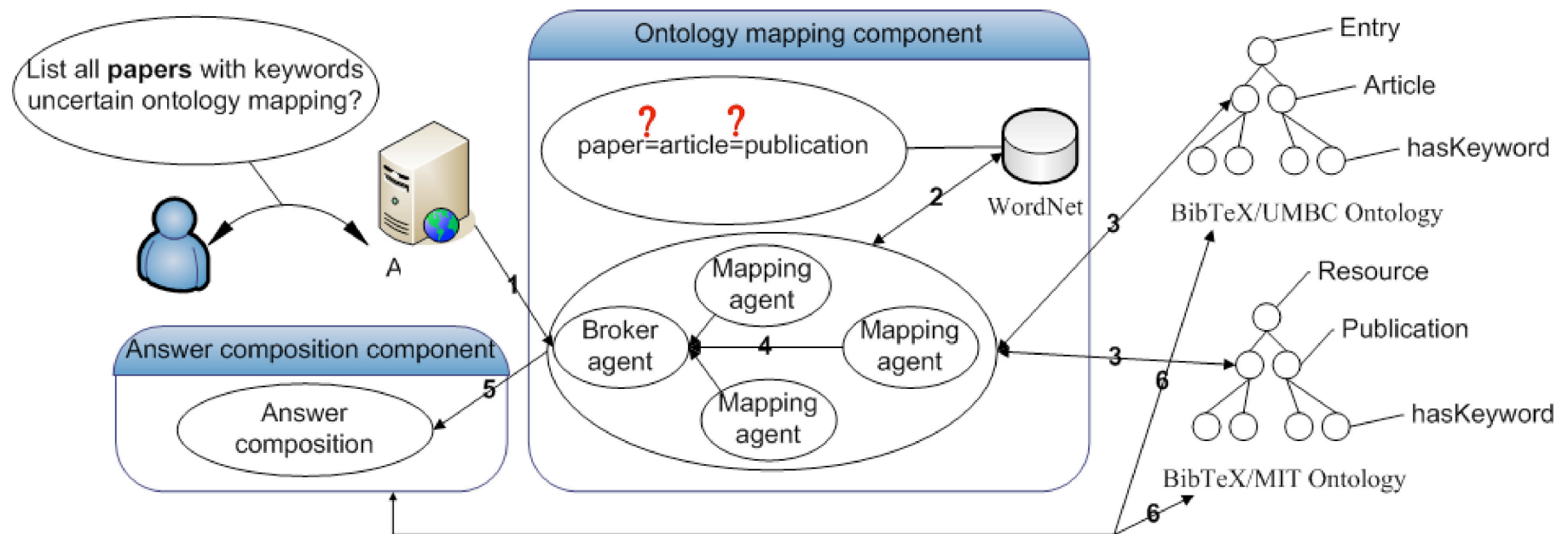


Outline

- Introduction and context
- Problem of interpreting SW data
- Fuzzy trust for conflicting belief
- Evaluation
- Conclusions



- Evaluate ontology mappings for large ontologies
- Human experts combine their assessments
- Final assessment is a collective judgment
- Subjective belief of human expert-software agent



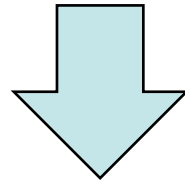


To determine similarity between terms:

- Use different linguistic or semantic information
- Use different similarity measures
- Use different background knowledge
- Combine them to get a more reliable view

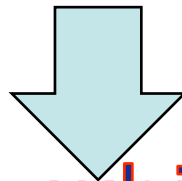


In case of agreement



No problem combine them

Otherwise



Determine which cannot be trusted
and exclude it

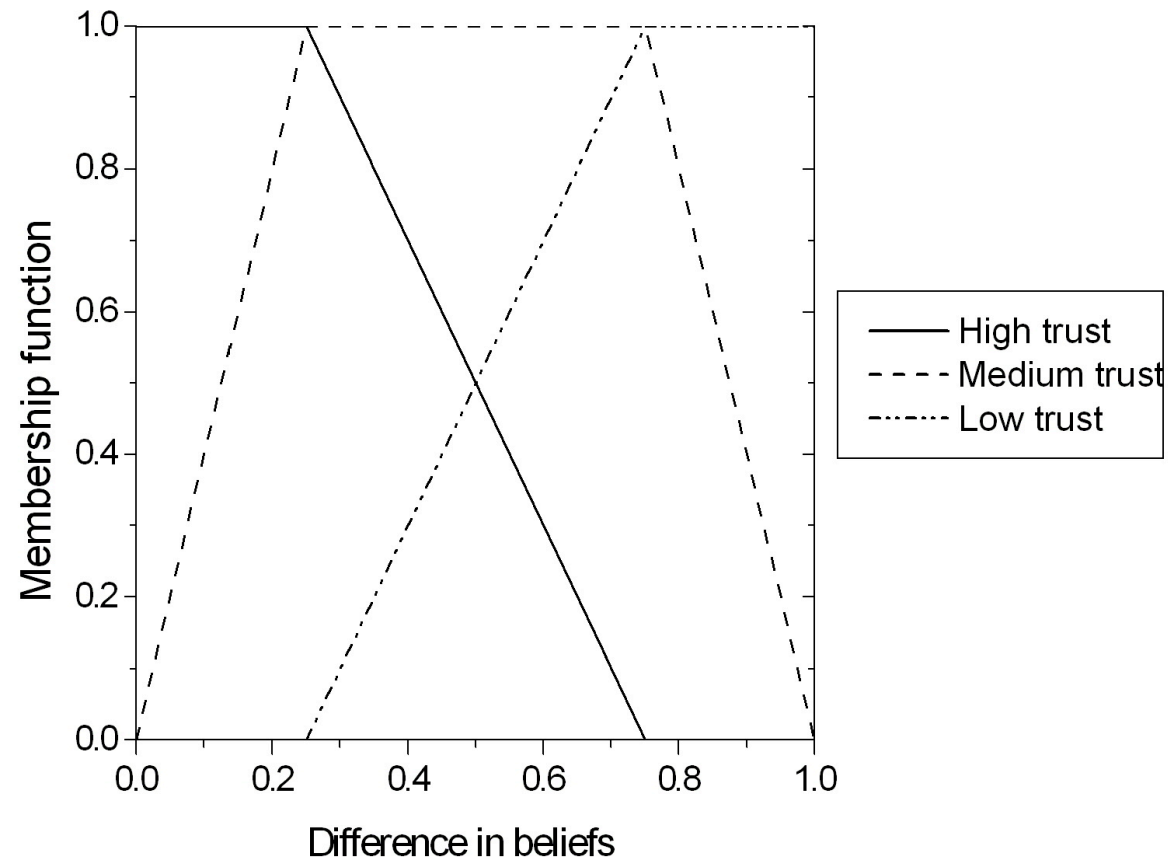


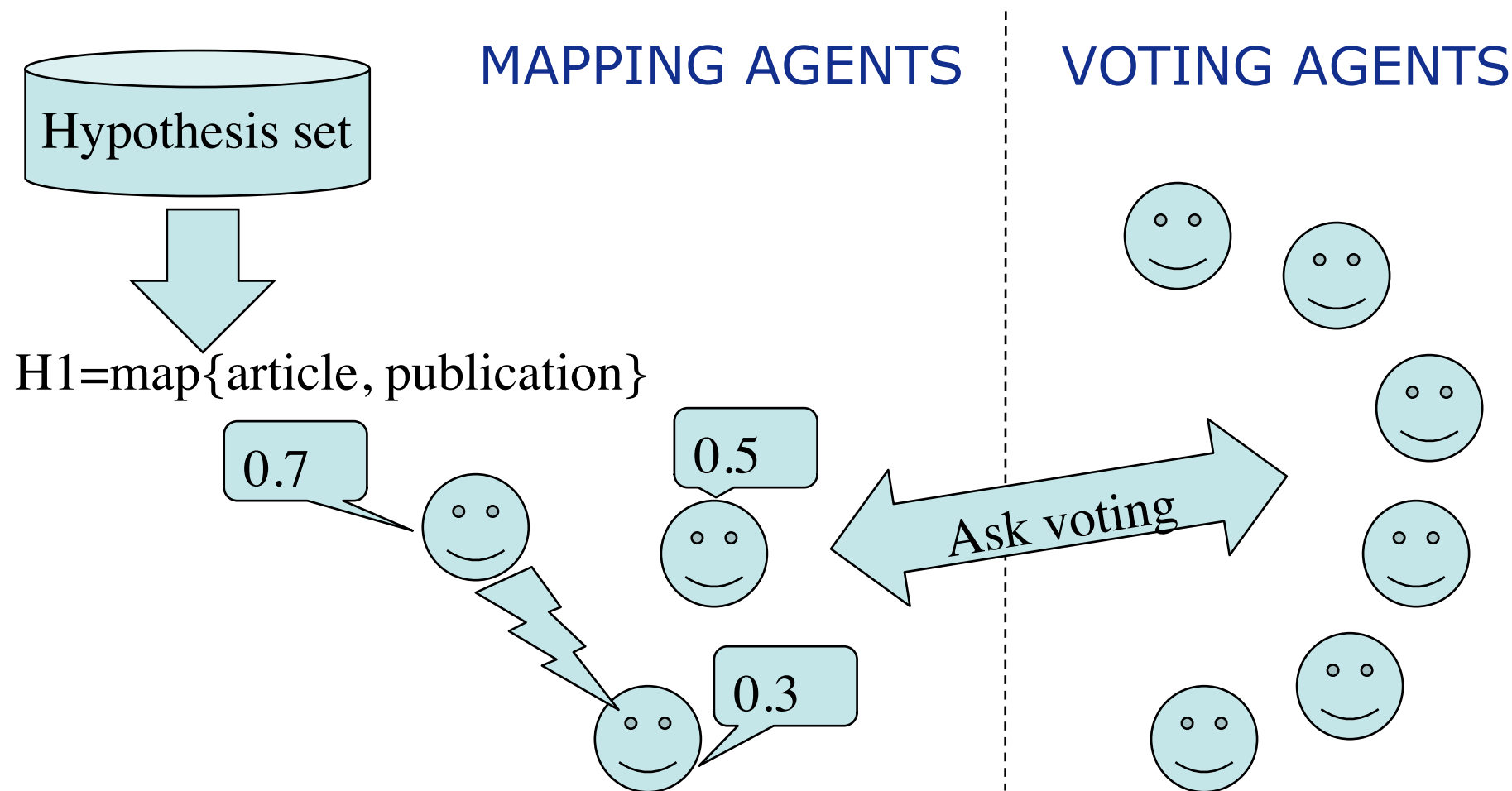
Determine binary trust

- For a number of agents (voters)
- Agents' belief is subjective
- Involves certain degree of vagueness
- Trust and distrust cannot always be definitely assessed



Fuzzy trust for conflicting beliefs







Linguistic variables (labels)

- Low trust (L_t)
- Medium trust (M_t)
- High trust (H_t)

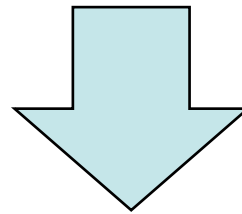
Fuzzy sets for each voter

- $\mu(\text{Low trust})$
- $\mu(\text{Medium trust})$
- $\mu(\text{High trust})$



Fuzzy trust for conflicting belief

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
L_t	L_t	L_t	L_t	L_t	L_t	L_t	L_t	L_t	L_t
M_t	M_t	M_t	M_t	M_t	M_t				
H_t	H_t	H_t							

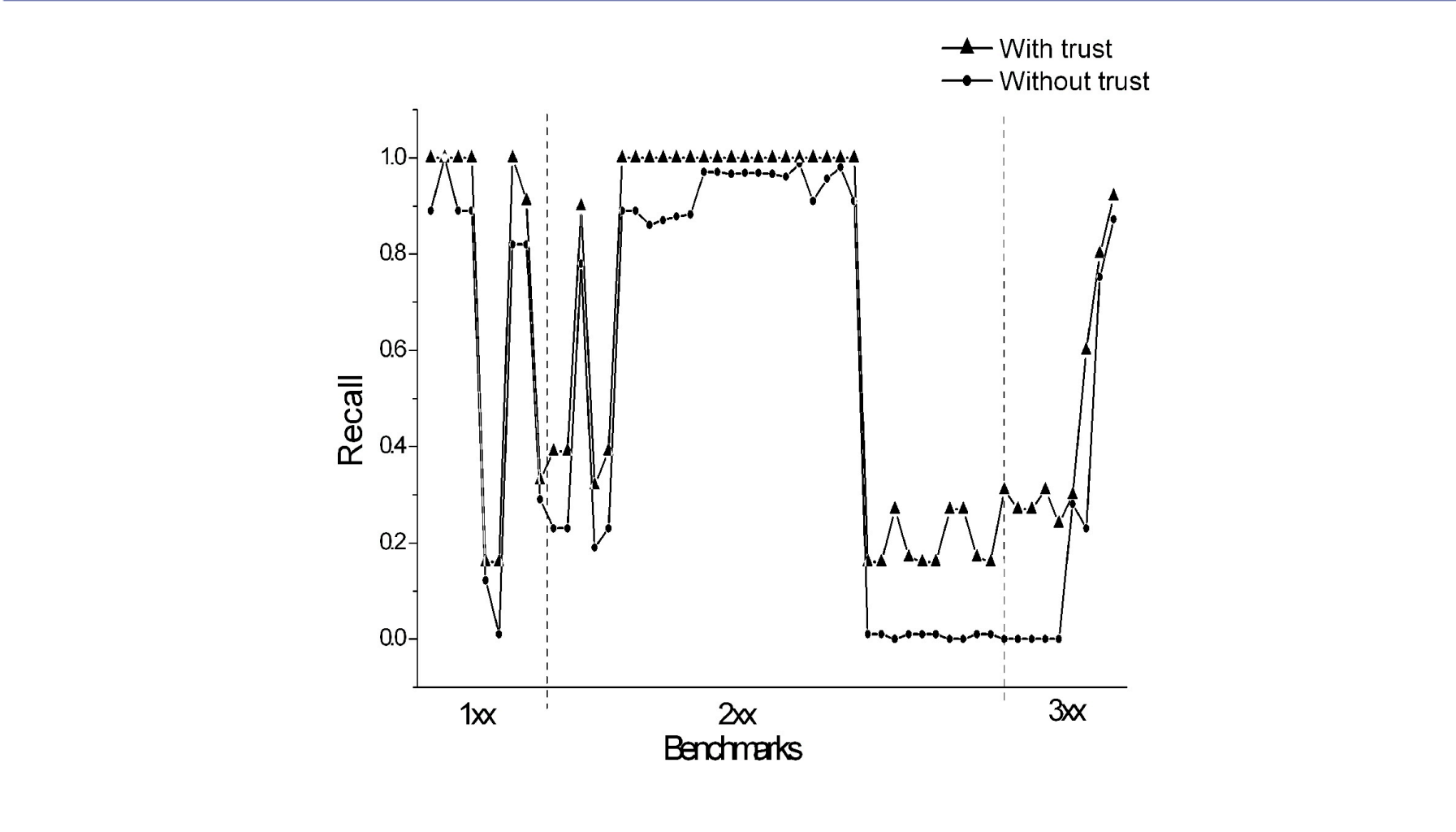


A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
H_t	M_t	L_t	L_t	M_t	M_t	L_t	L_t	L_t	L_t



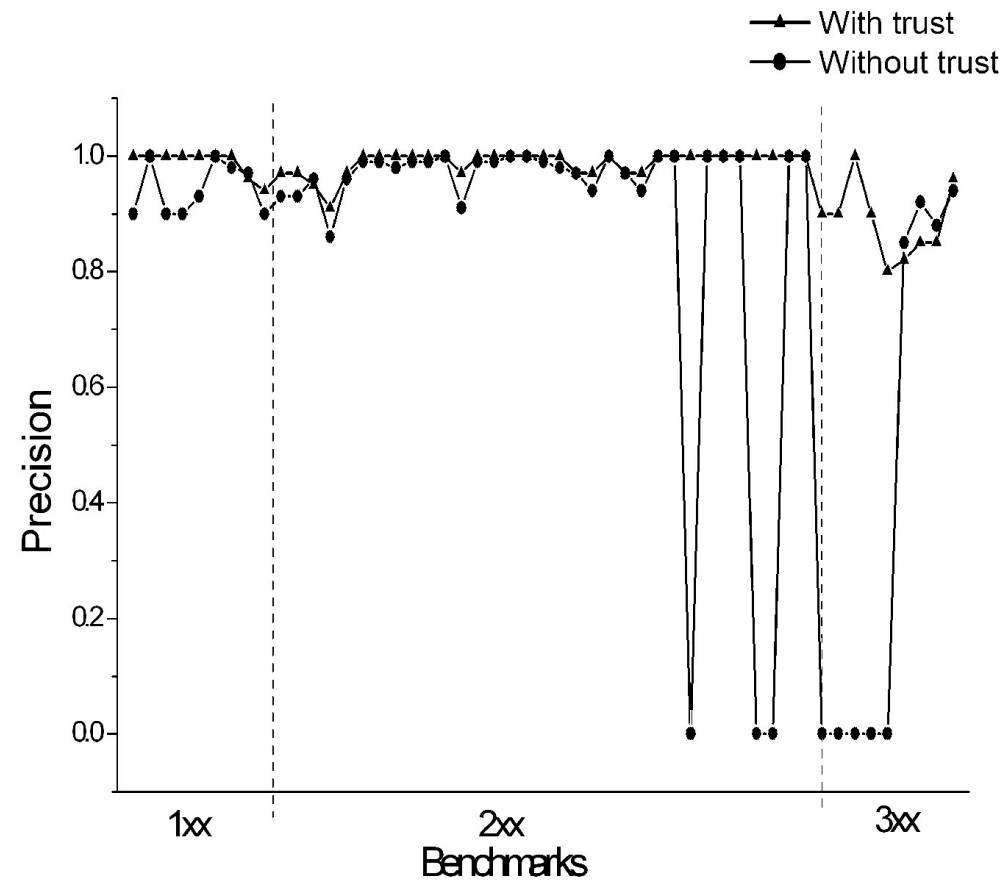
Sample ontologies from the benchmark

- Ontology Nr. 103: Language generalisation (OWL Lite)
- Ontology Nr. 204: Different naming conventions
- Ontology Nr. 205: Synonyms
- Ontology Nr. 221: No hierarchy
- Ontology Nr. 222: Flattened hierarchy
- Ontology Nr. 221: Expanded hierarchy
- Ontology Nr. 301: Real ontology –BibTex(MIT)



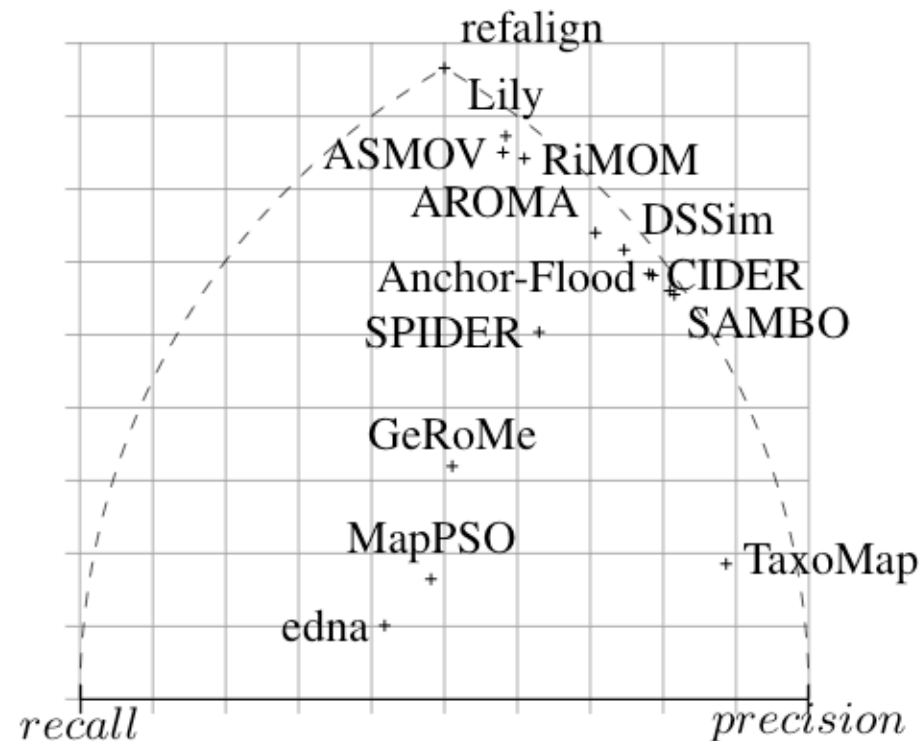


Evaluation





First results of the Ontology Alignment initiative 2008 Caterina Caracciolo et al.





- Dynamic trust assessment
- Fuzzy voting model
- Conflict resolution between agent beliefs
- Membership functions can change dynamically



Thank You!