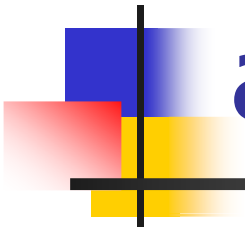
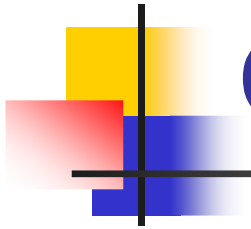


# Semi-Automatic Information and Knowledge Systems

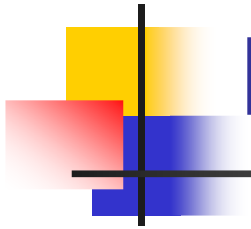
Falcon-AO

Mileski Marjan 0425976



# Content

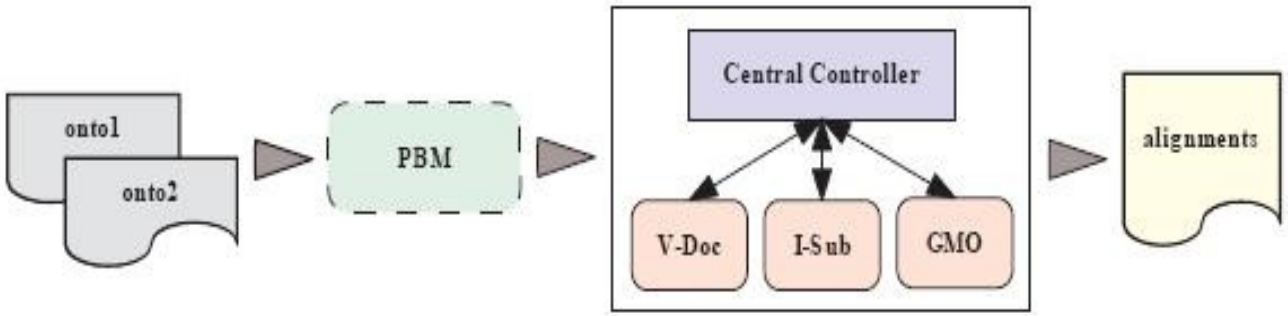
- Falcon-AO?
- Architecture
- Linguistic Matching for Ontologies
- Graph Matching for Ontologies
- Linguistic vs. Structural Comparability
- Strengths and Weaknesses
- Conclusion and improvements for future
- Run Falcon-AO and show some examples



# Falcon-AO

- Finding
- Aligning
- Learning ontologies
- Capturing Knowledge
- Ontology-driven approach
- Automatic tool for Aligning Ontologies

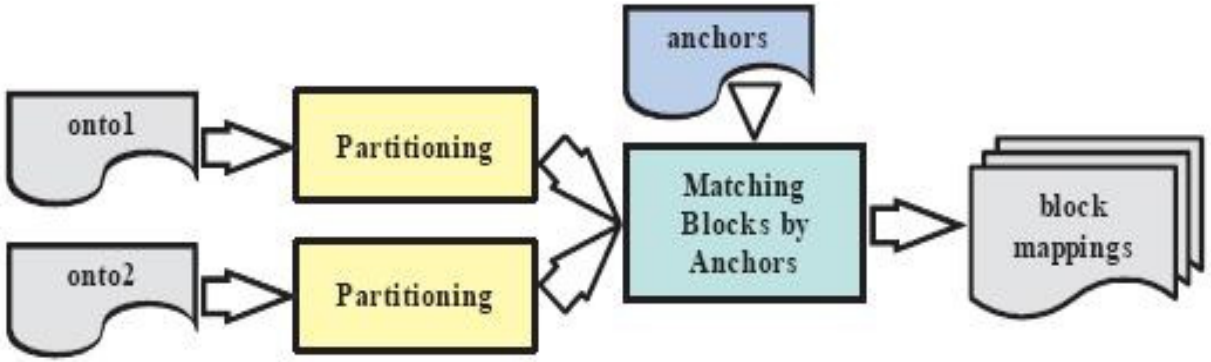
# Architecture




- Central Controller
- 3 matchers integrated: V-Doc, I-Sub and GMO
- PBM for large-scale ontologies

# Architecture

- PBM:
- Partition Based Block Matching



# Linguistic Matching for Ontologies

- Function for capturing string similarity SS:

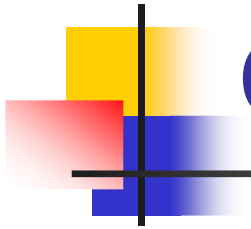
$$SS = 1/e^{\frac{ed}{|s1.len+s2.len-ed|}}$$

- Term weighting funtions:

$$\begin{aligned} TermWeighting &= TF * IDF \\ TF &= \frac{t}{T} \\ IDF &= \frac{1}{2} * (1 + log_2 \frac{D}{d}) \end{aligned}$$

- Similarity between documents: $DS = N \cdot N^t$
- Final linguistic similarity(from experience):

$$LinguisticSimilarity = 0.8 * DS + 0.2 * SS$$



# Graph Matching for Ontologies

- GMO
- Directed bipartite graphs
- Measures structural similarity between graphs:
- Main Idea:
  - Similarity of 2 entitys: Accumulation of similarities of statements (triples)
  - Similarity of 2 statements: Accumulation of similarities of entities of the same role

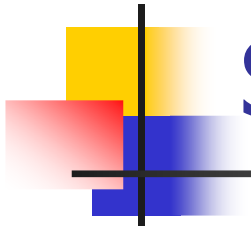
# Linguistic vs. Structural Comparability

- Linguistic comparability (LC) for 2 ontologies:

$$LC = \frac{M}{\sqrt{N_{O_1} * N_{O_2}}}$$

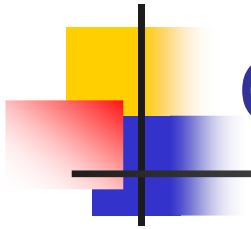
- Structural comparability (SC) for 2 ontologies, with VSM method:

$$\begin{aligned} SC &= \frac{V_1 \cdot V_2}{\|V_1\| \ \|V_2\|} \\ &= \frac{\sum_{j=1}^{n} v_{1j} * v_{2j}}{\sqrt{\sum_{j=1}^{n} v_{1j} * v_{1j}} \ \sqrt{\sum_{j=1}^{n} v_{2j} * v_{2j}}} \end{aligned}$$



# Strengths and Weaknesses

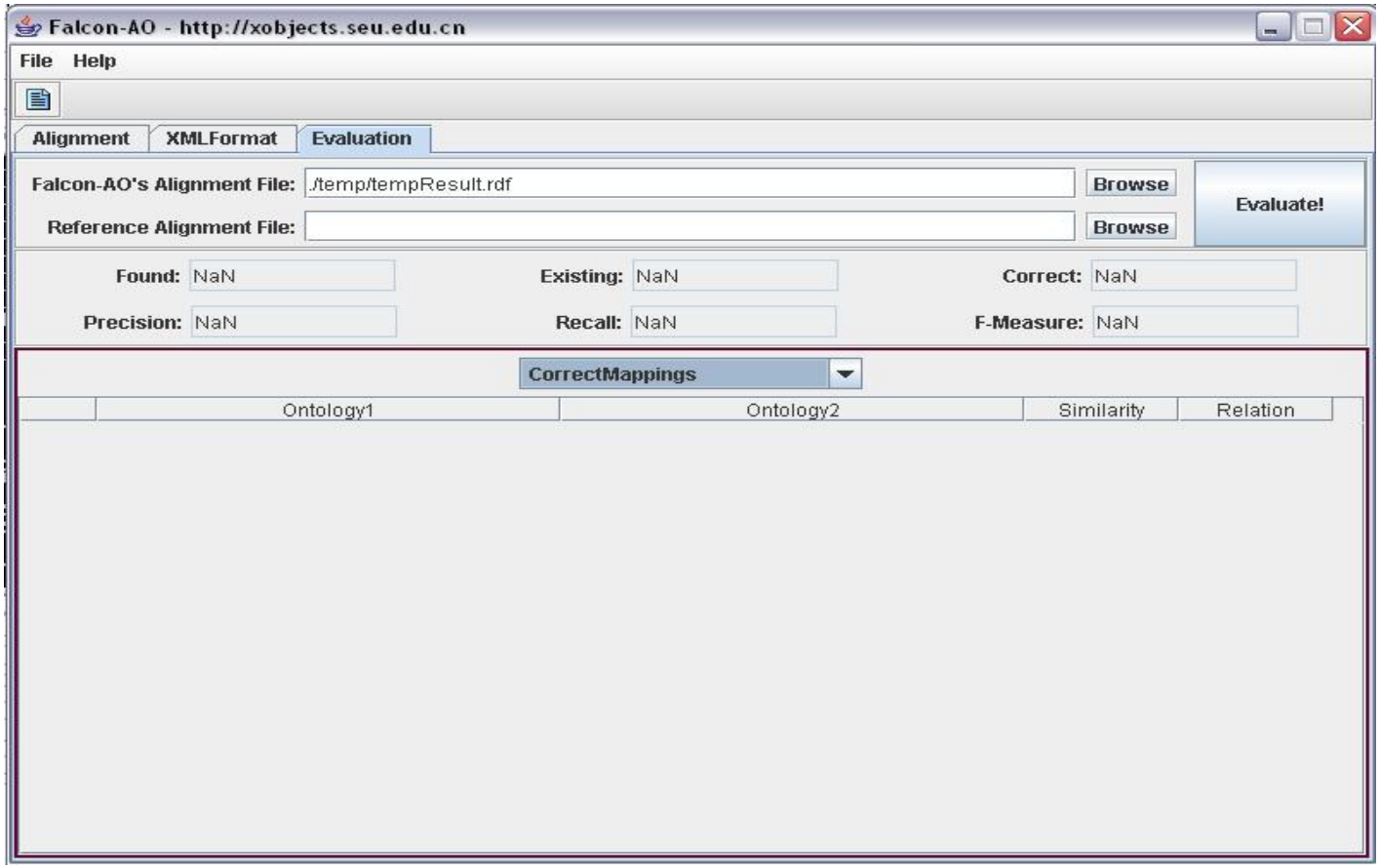
- Strengths:
  - flexible, 3 elemtary matchers for managing alignment
  - good performance, alignment for large-scale ontologies in acceptable time
  - good performance for similar ontologies
- Weaknesses:
  - algorithms are still attempts
  - No domain knowledge considered yet
  - difficulties with alignments with semantic relationship (Reasoning important)
  - problems in mapping for ontologies with different structure/vocabulary

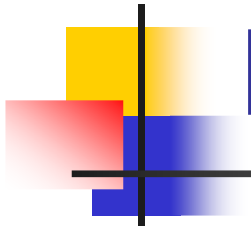


# Conclusion and improvements for future

- Conclusion:
  - New automatic tool for ontologie alignment
  - Good performance of Falcon-AO (version 0.6) on tests 2006
- Future for later versions:
  - Use lexicons or thesauri in alignment
  - combination of different matchers?
  - Support many-to-many mapping
  - improve linguistic and structural comparability

# Some Examples





# References


- [Wie Hu, Gong Cheng, Dongdong Zheng, Xinyu Zhong, and Yuzhong Qu 2006] Wei Hu: The Results of Falcon-AO in the OAEI 2006 Campaign, 2006
- [Ningsheng Jian, Wei Hu, Gong Cheng, Yuzhong Qu 2006] Ningsheng Jian: FalconAO: Aligning Ontologies with Falcon, School of Computer Science and Engineering, Southeast University, Nanjing 210096, P. R. China, 2006
- [Falcon-AO Ressources] http://xobjects.seu.edu.cn/project/falcon/matching/resources.html
- [Jérôme Euzenat, Malgorzata Mochol, Pavel Shvaiko, Heiner Stuckenschmidt, Ondřej Šváb, Vojtěch Svátek, Wilhelm Robert von Hage, and Mikalai Yatskevich 2006] Jérôme Euzenat: Results of the Ontology Alignment Evaluation Initiative 2006, 2006

- Thanks for your attention…