Requirements for and Evaluation of User Support for Large-Scale Ontology Alignment

Valentina Ivanova, Patrick Lambrix, Johan Åberg Linköping University, Sweden

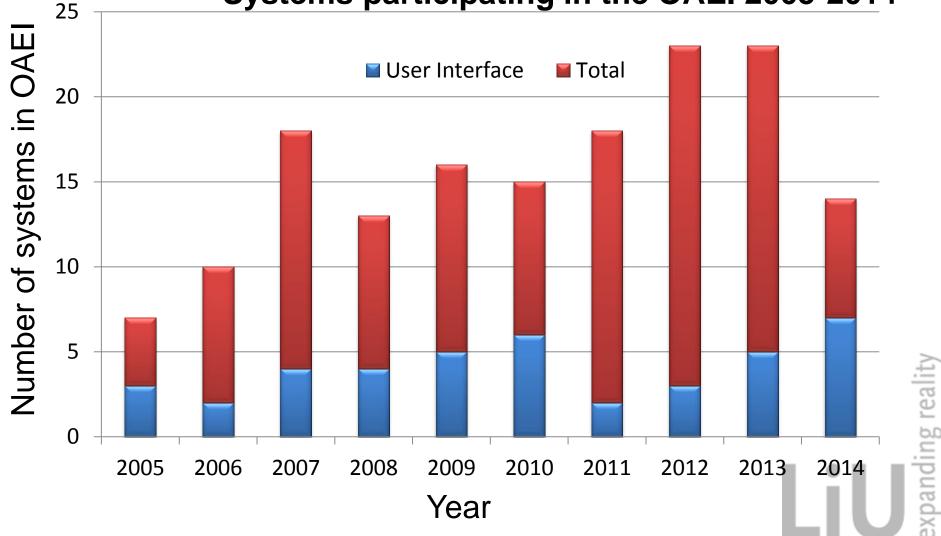
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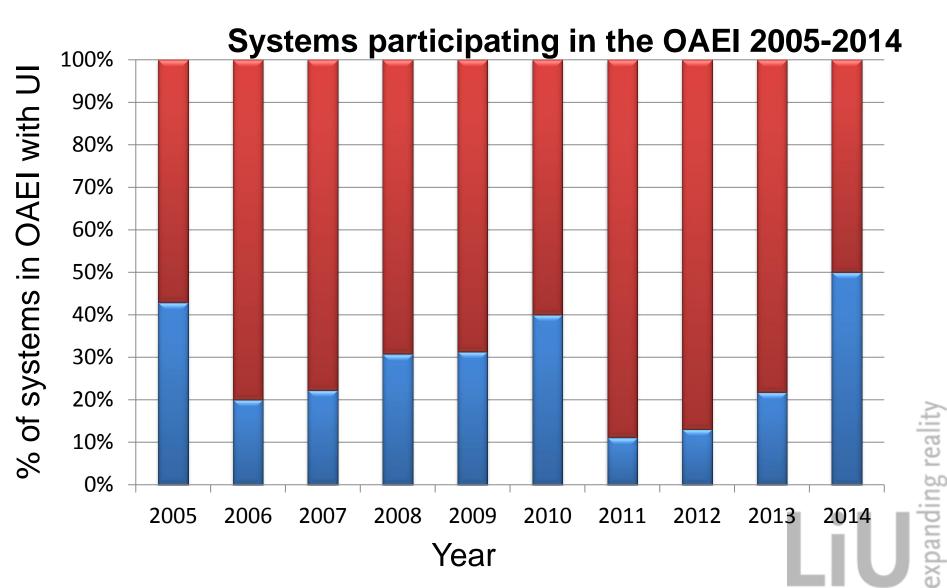
Conclusions

- Requirements for user support for Large-Scale OA
- Literature study
 - Infrastructure and Algorithms category supported to different level or not at all;
 - Explanation category the least supported from the user interface categories.
- User interface evaluations
 - Seemingly *trivial* issues like search and ontology visualization play a crucial role.

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Systems participating in the OAEI 2005-2014



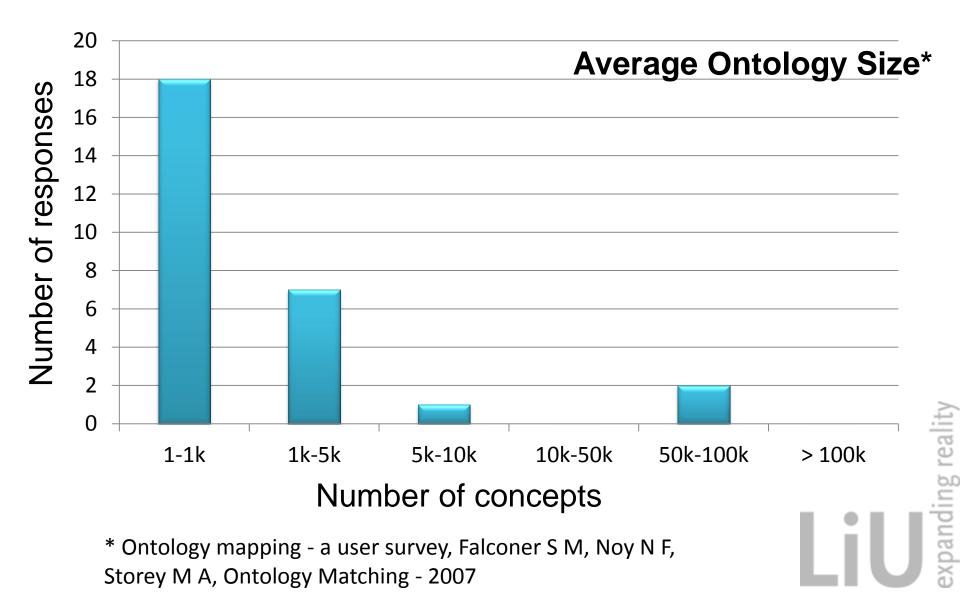


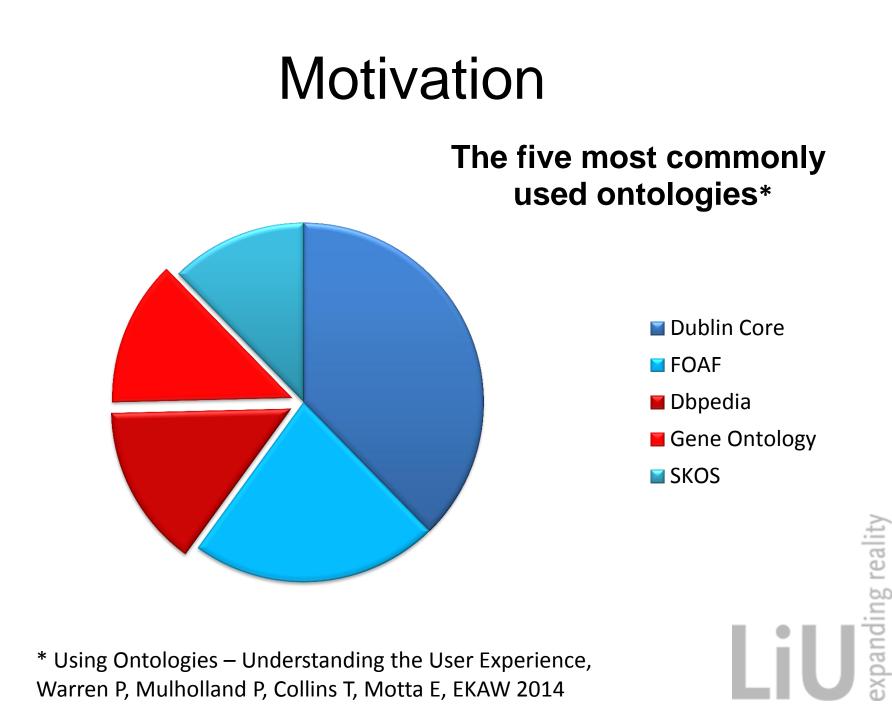
- Challenges in Ontology Matching*:
 - explanation of matching results
 - fostering user involvement
 - social and collaborative matching
 - alignment management: infrastructure and support

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* Ontology Matching: State of the Art and Future Challenges, Shvaiko P, and Euzenat J, IEEE Transactions on Knowledge and Data Engineering





- OAEI:
 - 2005 anatomy
 - 2006 food
 - 2007 environment, library
 - 2008 very large crosslingual resources, fao
 - 2012 largebio
- OAEI Interactive track 2013

Outline

- Large-Scale Requirements
 - User Interface*
 - Infrastructure and Algorithms
 - Requirements Coverage
- Usability Evaluation
 - Heuristic Evaluation
 - Observational Study
 - System Usability Scale questionnaire (SUS)

Discussion

* A cognitive support framework for ontology mapping, Falconer S M, Storey M A, 2007, LNCS vol. 4825



User Interface Requirements

Interaction

- 2.1 Explore ontologies
- 2.2 Explore/verify potential mappings
- 2.3 Explore/remove verified mappings
- 2.4 Perform searching and filtering
- 2.5 Create/manipulate mappings

Analysis and Decision Making

1.1 Discover mappings1.2 Make mapping decisions1.3 Inspect definition of term1.4 Inspect context of term





Analysis and Generation

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- 3.1 Generate mappings
- 3.2 Execute mappings
- 3.3 Save state
- 3.4 Resolve conflicts

Representation

- 4.1 Ontologies4.2 Potential mappings4.3 Verified mappings
- 4.4 Candidate-heavy regions4.5 Possible starting points4.6 Progress4.7 Reason for suggestion

A cognitive support framework for ontology mapping, Falconer S M, Storey M A, 2007, LNCS vol. 4825

User Interface Requirements

Categories M Manipulation					
IInspec	tion				
E Expla	nation				

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Infrastructure and Algorithms

- Sessions interrupt the alignment process
- Partitioning a large task into smaller tasks
- Reduce unnecessary user interventions
- Social and collaborative matching
- Environment
- Recommendations/Ranking
- Debugging step during the alignment process
- Configure the alignment process
- Trial execution of mappings and temporary mappings

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			manipulate	#2.5 add metadata to mapping	-	\checkmark	✓	\checkmark	-	-	-
			nan	#2.3 move a mapping to list	-	\checkmark	✓	\checkmark	+	-	-
			ц	#5.0 ontology	\checkmark	-	✓	\checkmark	-	-	-
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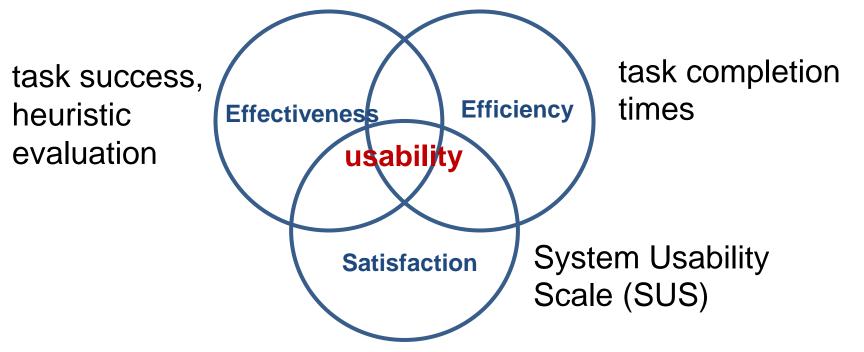
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Usability Evaluation

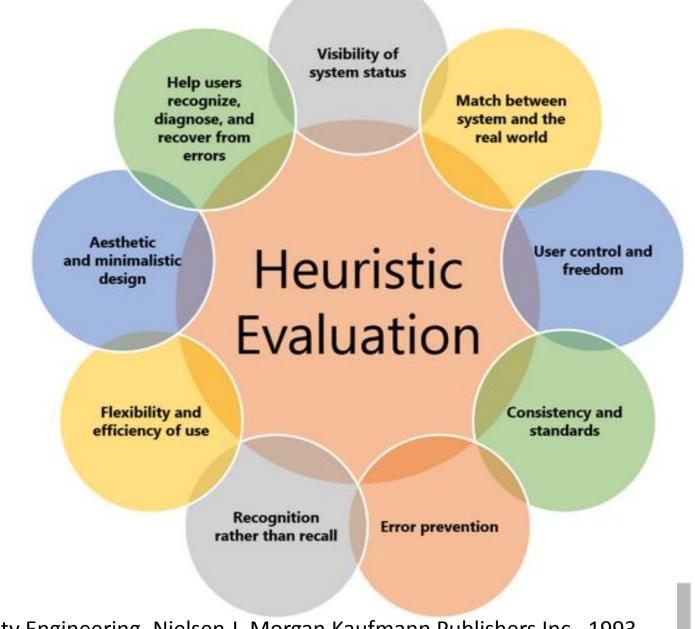
• ISO 9241-11 standard for usability:



• Three systems – COMA, SAMBO, CogZ

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Usability Engineering, Nielsen J, Morgan Kaufmann Publishers Inc., 1993. Picture: https://planbozchi24.files.wordpress.com/2013/09/he.png expanding reality

Observational Study

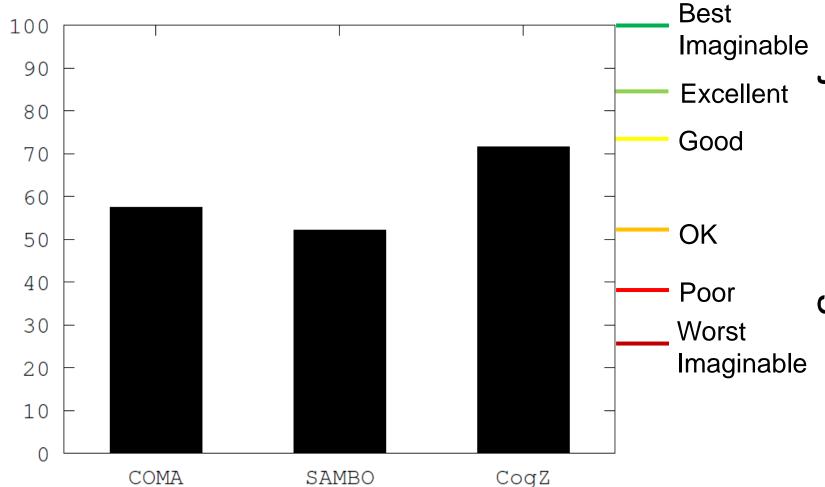


- OAEI 2014 Anatomy track ontologies
- 8 participants
- 11-17 tasks/per system/per hour
- Tasks and Results
 - CogZ supports most;
 - Explanation category the least supported;

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 Improved performance to the last tasks.

System Usability Scale (SUS)



SUS: A quick and dirty usability scale, Brooke J, In Usability Evaluation in Industry, 1996 * Determining What Individual SUS Scores Mean: Adding an Adjective Rating Scale, Bangor A, Kortum P T, Miller J T, J. of Usability Studies, 2009

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Discussion

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- Tree representation
 - Visualization
 - Multiple inheritance
- Search
- Terminology

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Workshop on Visualizations and User Interfaces for Ontologies and Linked Data

VOILA 2015

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