Semantic and text-processing technologies for use within an integrated work-learn environment

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aposdle– New ways ...
... to work, learn and collaborate
Outline

- Introduction
- Knowledge Desktop
- APOSDLE
- Challenges for NLP and ST in e-Learning
- Conclusion
Introduction

- **Now:** Automated support for manual/repetitive work
- **Future:** Automated support for knowledge-intensive work
  - Work-integrated learning vs. separate times for working and learning
  - Work-integrated authoring vs. separate times for working and teaching/documenting
Knowledge Desktop

- Intelligent information delivery based on work (task and domain) context and competencies
- Using and extending organization-wide knowledge
  - No separate resources for working and learning
- Dynamic building of learning groups
- Knowledge Desktop shows relevant resources (documents, contacts etc.) when and how they are necessary
APOSdle

- Advanced Process-Oriented Self-Directed Learning Environment
  - www.aposdle.org

- APOSdle shall deliver...
  - available resources
  - resources automatically prepared for learning
  - contacts to experts and possibility for collaboration

- ... at the right time
APOSdle

- APOSdle knows about

Tasks - Users - Competencies - Knowledge (domain) - Resources
APOSDLE

- Semantic technologies in order to describe
  - users (competencies)
  - context (process and knowledge domain)
  - resources

- Text-based analysis (statistical text mining and content-based similarity detection)
  - for facilitation of models creation
  - for content-based classification of resources
  - for retrieval of resources
APOS DLE

Application of “Scruffy” Technologies

- Automatic discovery of user context based on user interactions
- Automatic inference of user competencies based on task executions
- Automatic extraction and mapping of semantic structures based on analysis of backend systems
- Automatic identification of similarities between resources based on text, multi-media data and semantic analysis
- Automatic maintenance of similarity measures and user profiles based on usage data and user feedback
Intermediate observations

- Models creation

- Evolution of knowledge / shift in domain

- Number of digital resources is surprisingly enough NOT huge within organisations!
Intermediate observations

- Models creation
- Evolution of knowledge / shift in domain
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- Ontology learning (NLP, ST)
- Ontology evolution (ST)
- For smaller numbers NLP wins over statistical methods
Challenges for NLP

- **Ontology learning**
  - Relevant term extraction, relationship extraction, extraction of additional knowledge (definitions, constraints etc.)
  - Quality must be relatively high in order to perform better than asking experts

- **Content analysis**
  - Understanding content of resources

- **Structure analysis**
  - Understanding structure of resources (chapter, introduction, ...)
  - Understanding type of resources (example, guideline, definition)

**Multilinguality!**
Challenges for ST

- **Models alignment**
  - Models of competencies, tasks, knowledge must be mapped
  - Goal is dynamic mapping!

- **Ontology evolution**
  - Models naturally evolve, domain of an organization may shift
  - Not trivial, especially w.r.t. existing mappings and annotations

- **Ontology views**
  - Not everyone may be allowed to see/use every part of every model
Conclusion

- Vision is a knowledge desktop
- APOSDLE approach
  - statistical/heuristic textmining
  - semantic technologies

Analysis of natural language is the next big issue that will decide on the quality of such a support system!

Advanced semantic technologies will provide technical background for realisation