

Rules for an ontology-based approach to adaptation

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Structure

- Motivation
- State-of-the-art
 - Overview on adaptation approaches
 - Drawbacks
- Overview on ontology-based approach
- ODAS ontology
- **Adaptation Rules**
 - **Structure and content of an adaptation rules**
 - **Examples**
- Summary

Motivation

Welcome, thanh tran!
Home - My Account - Sign Out

Adaptation Business Personal

Content and Layout Look and Feel My Communities Desktop

Search

Content [v] [x] [o]

Navigation Adaptation

Wiki Private Nodes Public Nodes

Weather 90210 71.0 °F Chicago 35.0 °F Frankfurt/Main 37.0 °F Rome, Italy 46.0 °F Beijing 21.0 °F City or Zip Code Search

Admin Company Portlets Server Users Groups Roles

Adapted Recommendations

Content related to "Introduction (about:OWL)"

- Avoiding Paradoxes (about: OWL , OWL Semantic)
- Future extensions (about: OWL , Evolution of OWL)
- Handling Malformed Graphs (about: OWL , OWL Syntax, OWL Semantic)
- OWL as a Description Logic (about: OWL , DL Class)
- OWL Full as an RDF Extension (about: OWL , RDF)
- Influences on OWL (about: OWL , DL class, Frames Model, RDF syntax)
- Providing a Viable Semantic Theory for OWL (about: OWL , OWL Semantic)
- Readability (about: OWL , OWL Semantic)
- Retaining Decidability (about: OWL , Reasoning with OWL)
- Semantics for OWL DL (about: OWL , OWL Semantic)
- Semantics for OWL Full (about: OWL , OWL Semantic)
- Predecessors of OWL (about: OWL , SHOE, DAML-ONT, OIL, DAML+OIL)

Recommendations

Content similar to "Introduction (about:OWL)"

Illustration for "Introduction (about:OWL)"

Service for "Introduction (about:OWL)"

Adaptive Content

+ From SHIQ and RDF to OWL: The Making of a Web Ontology Language

Introduction

- -paragraph 1

Content currently read

OWL [10] is a new ontology language for the Semantic Web, developed by the World Wide Web Consortium (W3C) Web Ontology Working Group. OWL was primarily designed to represent information about categories of objects and how objects are interrelated□the sort of information that is often called an ontology. OWL can also represent information about the objects themselves□the sort of information that is often thought of as data.

- +paragraph 2

- Increasing amount of available resources on the Web as well as enterprise portal

- [Nielson]

- “Cognitive Overload”
- “Lost in information space”

- Personalized information delivery !!

- Push + Pull
- Adaptation + Search

“...adapting the delivery of content resources of any imaginable types to the needs of the user in terms of the **presentation** of the content, the **structure** of the **content** and the content itself”

Adaptation Approaches

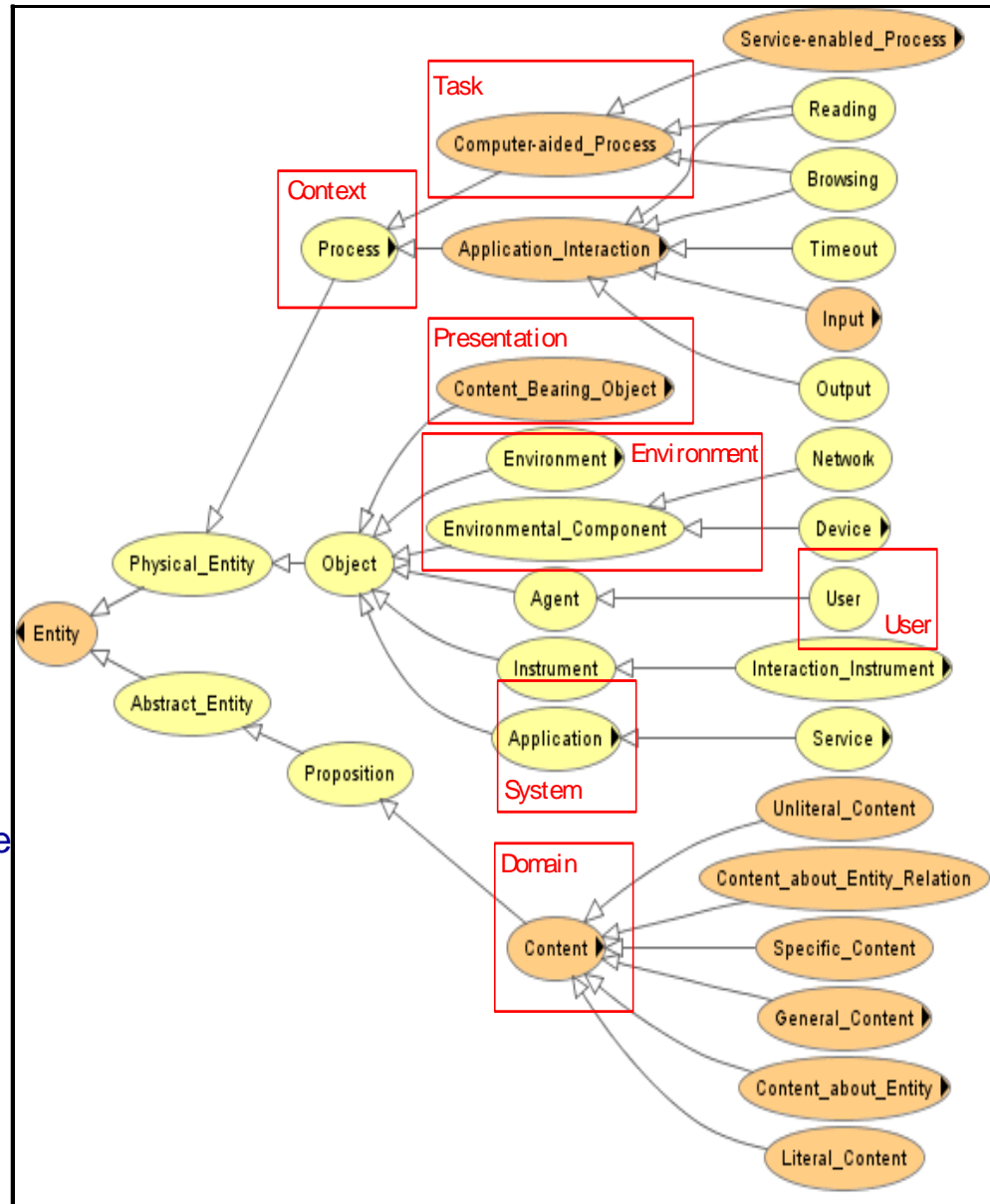
- Filtering-based approaches
 - Content-based filtering → model bases on **content** ratings of the user
 - Collaborative Filtering → model bases on similar **users** and their ratings
 - Drawbacks:
 - Objective characteristics (group-based preferences) vs. subjectivity (individuality)
 - “Overspecialization”, “Sparsity” and “New Item” problem
- Advanced approaches
 - Content + User: combined the two complementary dimensions
 - Add more information sources such as **task, system, environment**
 - **Presentation** model for adapted presentation
- Drawbacks
 - **“Lack of data”**
 - model data can only be acquired in specialized systems
 - **“black boxes”**
 - Underlying algorithm too complex
 - Computerized oracles which give advice but cannot be questioned

An Ontology-based approach to adaptation

- “Black box” → **transparent** adaptive behaviour
 - **Framework for rules** that can capture the underlying rationales
 - Simpler to understand, can be inspected and modified by the user
 - Enable feedback loops and increase trust
- “Lack of data” → **interoperability** of model information
 - exchange of model information across systems on the basis of an standardized **domain ontology for adaptive systems**
- Multidimensional
 - Ontology **concepts** employed for the representation of the different dimensions required for **sophisticated personalization**
 - Task + Content + Presentation + User + System + Environment

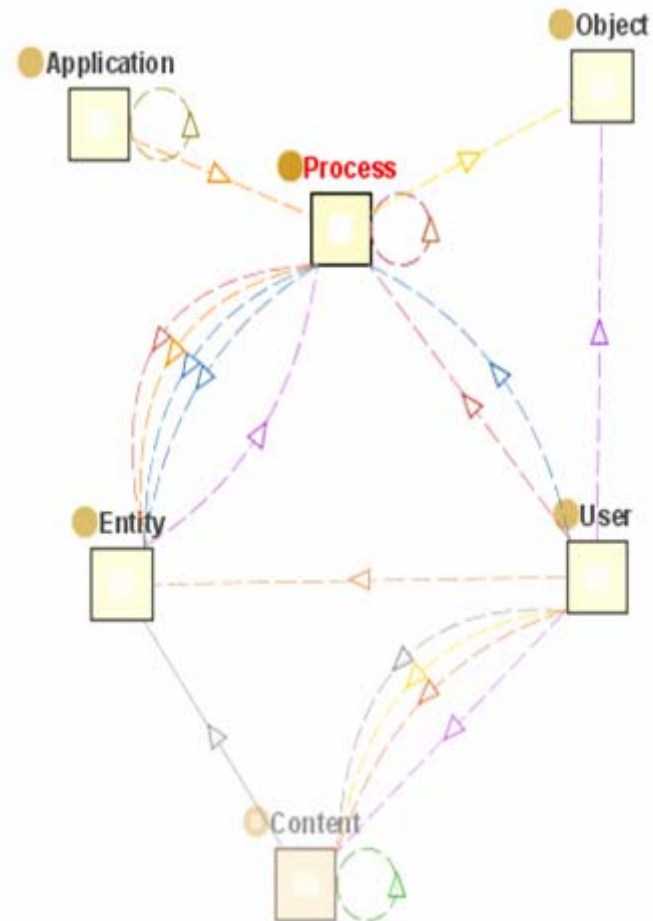
ODAS – ontology for the domain of adaptive systems

- ODAS – “a documented and formalized conceptualization of objects and relations that are relevant for the adaptation of hypermedia resources to the user context”
- **interoperability**
 - Alignment with foundational ontology for cross domain interoperability
 - Alignment with related ontology and metadata standard for the interoperability of particular subparts
 - User → PAPI, LIP
 - Content → Dublin Core, LOM
- **extensibility**
 - Clarity:
 - documentations and formalization of the intended meaning to avoid conceptual ambiguity
 - Minimal ontological commitment
 - Minimal encoding biases



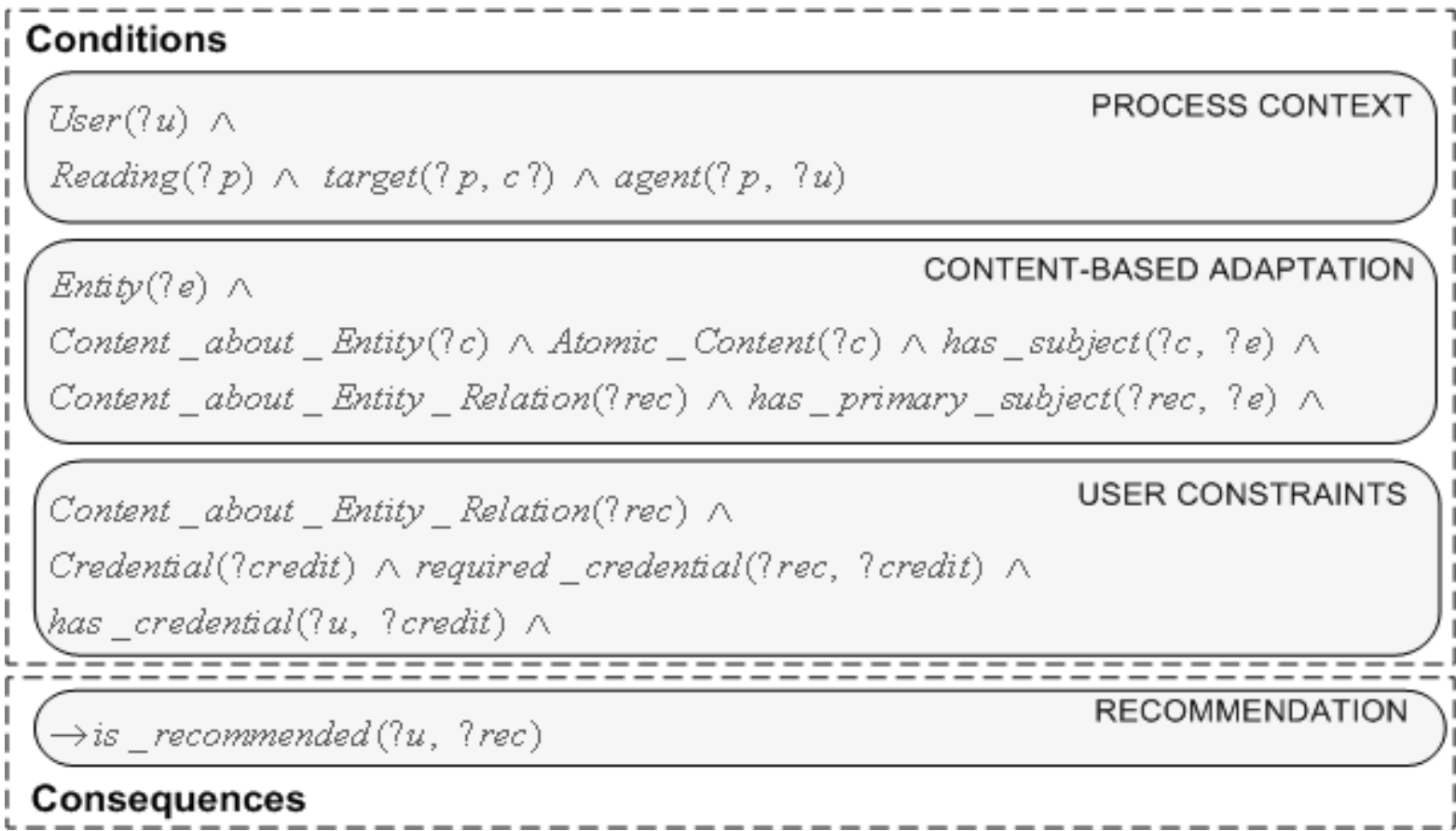
ODAS - A process representation of context

- **Context:** Application Interaction
 - Representation of the adaptation context
 - Intuitive notion: “by means of some input devices part of the **environment**, the **user** interacts with the **application** that in turn, processes and presents the **resources** to the user via a display device to accomplish a **task**”
- **Task:** Computer-Aided Process
 - Notion: “a task can be modeled as a complex process and interpreted as a **sequences (hierarchy) of processes** – either atomic application interactions or more complex ones called computer-aided process”
- **Computation / Inferences**
 - New information from recorded user interactions
 - Reading: Activation + Timeout
 - Has read: user involve in reading



Adaptation rules – exploitation of ODAS conceptualization

- **Context-related** part: “entry point” to access various model dimensions
- **Adaptation-related** part: content- or task-based adaptation
- **Constraints-related** part: adapt the set of recommended resources to user and environmental constraints



Adaptation rules – examples

- Narrative-based adaptation

$$\forall u, x, y, \dots: ["\text{context}" \wedge \text{AtomicContent}(x) \wedge \text{AtomicContent}(y) \wedge \text{isPostOf}(x, y) \wedge "\text{constraints}" \rightarrow \text{isRecommended}(u, y)]$$

- Task-based adaptation

$$\forall p, p1, p2, s, c, \dots: [\text{ApplicationInteraction}(p1) \wedge \text{User}(u) \wedge \text{isInvolvedIn}(u, p1) \wedge \text{ComputerAidedProcess}(p) \wedge \text{isPartOf}(p1, p) \wedge \text{ApplicationInteraction}(p2) \wedge \text{isPostProcess}(p2, p1) \wedge \text{Service}(s) \wedge \text{instrument}(p2, s) \wedge \text{ExecutableContent}(?c) \wedge \text{isRepresentationOf}(?e?s) \wedge "\text{constraints}" \rightarrow \text{isRecommended}(u, c)]$$

- User constraints

$$\forall u, y, \dots: ["\text{context}" \wedge "\text{adaptation}" \wedge \text{Content}(y) \wedge \text{User}(u) \wedge \text{interestIn}(u, y) \wedge \neg \text{knows}(u, y) \rightarrow \text{isRecommended}(u, y)]$$

Summary

- Address drawbacks by
 - ODAS ontology to capture relevant model dimensions
 - Structure and content and examples of adaptation rules
- Benefits
 - **Sophisticated personalization**
 - Increase **transparency, user-control and trust** towards the system
 - Facilitate **exchange of information**
 - User data
 - Content metadata
 - Adaptation rationales
 - Pave way for **open-corpus adaptation**
 - interoperability of content semantics
 - Automated syndication and inclusion of resources in a dynamic and ad-hoc way
 - Require integration of domain ontologies
- Problems
 - tradeoff of semantic interoperability and efficiency of DL reasoning
 - Axiomatized ontology for interoperability
 - Lightweight ontology for adaptation

THANK YOU

