

Profiles semantics for personalized resources access

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Outline

- 1 Introduction
 - General context and problems
- 2 Profiles modelling
 - Profile generic model
 - Profiles instances : logical structure and contents
 - Profiles graph : structure, contents, semantics
- 3 Profiles matching
 - Determining attributes couples of compatible semantics
 - Attributes matching
 - Profiles matching
- 4 Conclusion and Prospects

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General context of resources access and problems

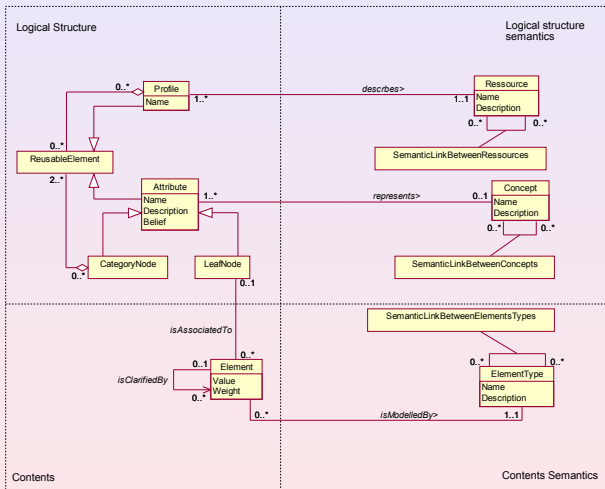
- Heterogeneity of resources
 - Information placed at disposal
 - logical structure, contents
 - Users
 - needs, preferences, goals
 - inconstancy
 - etc.
- Difficulties of cooperation between different models/applications
- Need of extensible, flexible, re-usable and interoperable models (Berners-Lee *et al.*, 2001)
- Generic (Kobsa, 2001) and semantic profiles modelling (Dolog *et al.*, 2003)



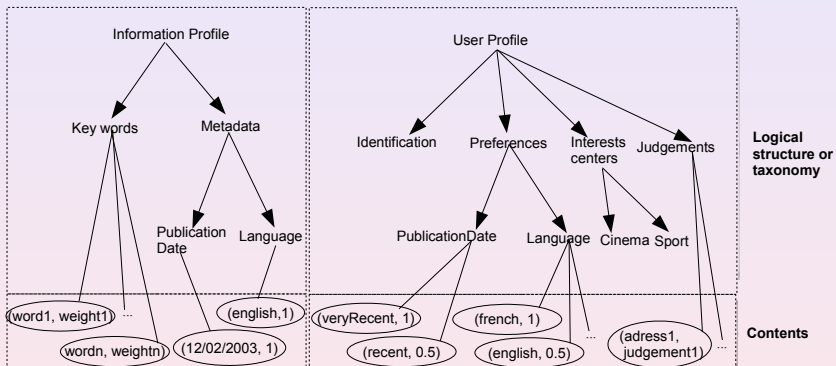
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Profile generic model : in UML

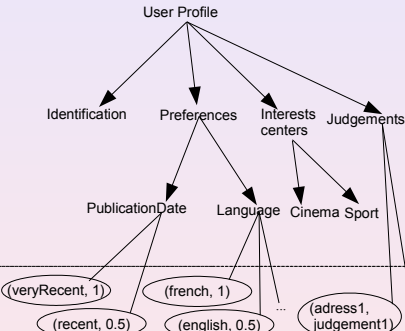


Instances of logical structure and contents

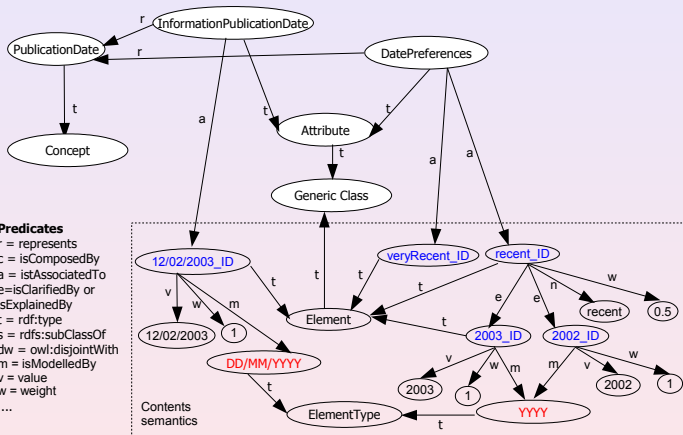


Logical structure or taxonomy

Contents



Profiles graph extract : structure, contents, semantics



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RDF document (extract) associated to a profile graph

```
<?xml version="1.0" encoding="UTF-8" ?>
<rdf :RDF xmlns :ex="http://mon_url.fr/" xmlns :rdf="http://www.w3.org/...">
<xmlns :sp="http://...#">
  <rdf :description rdf :ID="ArticlePublicationDate">
    <sp :isAssociatedTo rdf :ID="12/02/2003_ID"/>
  </rdf :description/>
  <rdf :description rdf :ID="12/02/2003_ID">
    <sp :value> 12/02/2003 </sp :value>
    <sp :weight> 1 </sp :weight>
    <sp :isModelledBy> DD/MM/YYYY </sp :isModelledBy>
  </rdf :description/>
</rdf :RDF>
```

Triplets list : [ArticlePublicationDate, sp : isAssociatedTo, 12/02/2003_ID], [12/02/2003_ID, sp : value, 12/02/2003], [12/02/2003_ID, sp : weight, 1], [12/02/2003_ID, sp : isModelledBy, DD/MM/YYYY]



Determining attributes couples of compatible semantics

Given $x, y \in A$, x and y can be matched if and only if,

$\forall [x, p, a] \in G, \exists [y, p, b] \in G$ so that $p \in P$ and

- 1 $a = b$
- 2 or $a, b \in V$ and *searching*($a, a1$) and *searching*($b, b1$). If \exists *TransformationRule*($a1, b1$) then :
 - 1 if $A1$ (value or terms list of attribute x) and $B1$ (terms list of attribute y) are disjoint \implies reference system change.
From "(2003, 1)" to "[(*veryRecent*, 1), (*recent*, 0.5)]";
 - 2 if $A1 \subset B1$ or inversely \implies change of the dimension.
From "(*english*, 1)" to "[(*french*, 1), (*english*, 0.5), (*spanish*, 0.25)]"

Attributes matching

- Boolean matching : mono-valued attributes
- IR matching : multi-valued attributes

expressing attribute a_d (initially in v_3 base) in u base				
u base	veryRecent(t_1)		recent(t_2)	
d base	2005(v_1)	2004(v_2)	2003(v_3)	2002(v_4)
a_d dimension change : from v_3 base to d base				
a_u in d base	1	1	1	1
a_d in d base	0	0	1	0
a_d vector space change : from d base to u base				
a_u in u base	1		0.5	
a_d in u base	0		1	

Profiles matching

- $a = (f_1, f_2, \dots, f_n)$: attributes couples of compatible semantics
- $p_{d,u} = (v_{d,u,f_1}, v_{d,u,f_2}, \dots, v_{d,u,f_n})$: attributes matching results
- $p_{a_s,x} = (w_{f_1}, w_{f_2}, \dots, w_{f_n})$: matchings importance

factors vector a'	f_1	f_2	f_3	f_4	...	f_n
Preferences orders i	1	1	2	3	...	k
factors weight vector $p_{a',x}$	w_{f_1} $= \alpha_1$	w_{f_2} $= \alpha_1$	w_{f_3} $= \alpha_2$	w_{f_4} $= \alpha_3$...	w_{f_n} $= \alpha_k$

- $\alpha_i = \beta \sum_{j>i} \alpha_j$
- $f(p_{d,u}, p_{a',x}) = \frac{\sum_j v_{d,u,f_j} \cdot w_{f_j}}{\sum_j w_{f_j}}$: attributes matching aggregation

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Conclusion and future work

- Profile generic model
 - Model based on semantics
 - Model for extensibility, flexibility and interoperability of profiles
- Profiles matching
 - matching based on semantics → more matching flexibility
- Future work
 - Implementation of an assistant tool for profiles description and visualization : structure, contents and semantics
 - Evaluation of matching flexibility with large profiles collections



Thank you for your attention