

# The Sediment Metaphor: Serendipity for Browsing Ontologies

Katharina Siorpaes, Martin Hepp, Andreas Klotz  
DERI, University Innsbruck, Austria

**Overview:** We present a novel technique for user interfaces of semantic systems based on an adaptive extension of the tag cloud paradigm

## Problem: Navigation in large vocabularies

### Main Limitations

1. Elements are typically sorted according to **relations between them** (mainly the taxonomic relations) or in **alphabetical order**, but the order does not reflect the current **relevance** of the elements.
2. Just like ontologies change due to **conceptual dynamics** in many domains of discourse, the **relevance of single ontological elements within vocabularies changes over time**.

## Approach: The Sediment Metaphor

- Reflection of **relevance** of ontology elements.
- **Adaptation** to user search behavior.
- Concepts with decreasing significance **lose prominence** while the process of **fading** is sufficiently slow for elements to remain in the general focus.
- **Reappearance** of forgotten elements.

## Design Principles

1. **Continuous probe of relevance**
2. **Adaption to relevance: logarithmic decay**
3. **Random re-introduction**

## Motivation: Tag Clouds

- **Lightweight** visualization method for information retrieval of tags.
- Very popular and intuitive to use.

## Algorithm

```
FOR ALL x SET relevancyOfX=1; //indicates relevance of element
SET alpha=0.8; //factor for decay
SET dateOfLastDecay; //date of last
IF element X is clicked THEN
  relevancyOfX + 1; //increase relevancy
  relevancyOfX * alpha; //decay
  IF dateOfLastDecay > 24hours THEN
    FOR ALL x relevancyOfX * alpha; //decay for all elements
  FILTER elements to list l WHERE relevancyOfX = 1;
  CHOOSE one element y from l; //choose random element
  SET relevancyOfY=biggestValueInList/2; //increase its relevancy
GENERATE tag cloud;
```

## Evaluation: Methodology and Results

- We chose five arbitrary concepts from the Proton ontology and reflected a decreasing distribution of importance by printing 100, 70, 49, 35, 21, and 14 cards of the concepts.
- Set of 144 cards
- Go through the stack of cards in order to find and click each concept once in the tag cloud (1st round) and once in a list (2nd round)

Table 1. Results

ID	Gender and education	Average Reaction Time	Time Sediment Metaphor	Time Alphabetical List	Experiences
A	Female, Master in computer science	0.22	09:59:02	18:14:04	Intuitive to use, very handy
B	Male, Bachelor in computer science	0.21	08:38:19	16:25:05	Much faster
C	Female, Student of medicine	0.23	10:49:01	20:13:27	First time to use a tag cloud, better than list
D	Female, PhD in history	0.21	07:56:34	16:57:07	Much more efficient
E	Male, Student	0.28	09:18:09	18:23:14	Good, even for very small elements in cloud
		Ø 0.23	Ø 9:20:13	Ø 18:02:35	