Archiving Data Objects using Web Feeds

Marilena Oita and Pierre Senellart

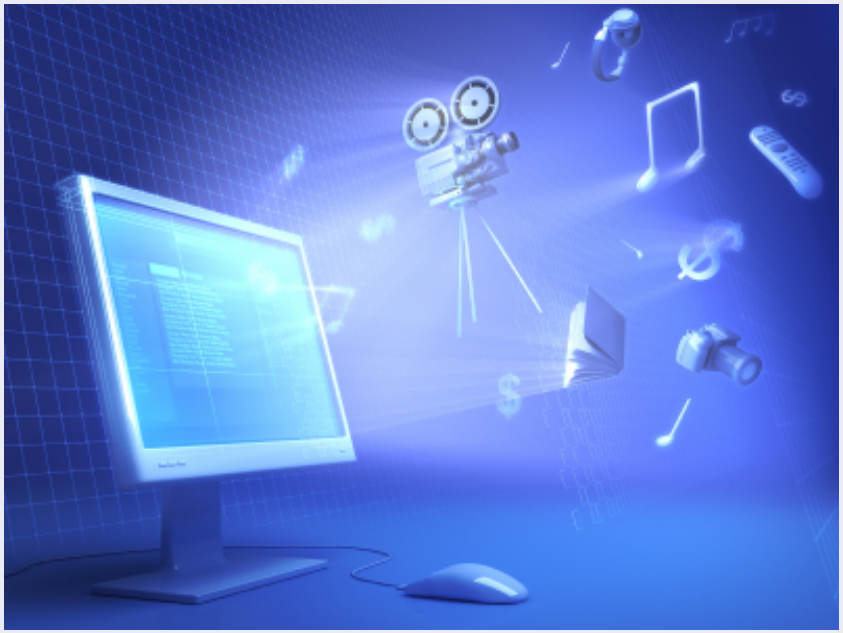
Outline

Valuable digital resources

to be preserved

from factual

..to digital

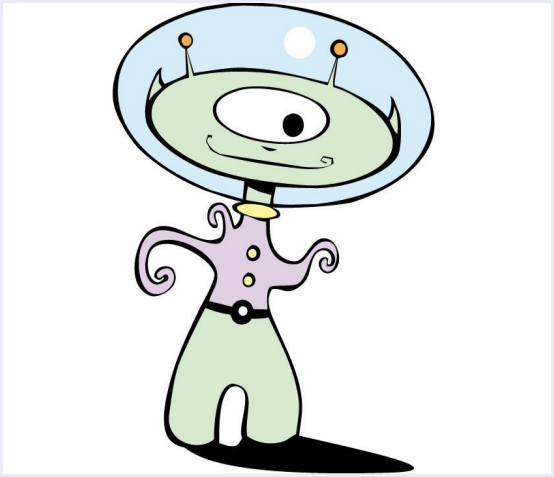


Scenario

motivating context

AIM:

search a digital archive



for Web data rooted in the past

in a specific domain of interest

Ephemeral Data

the volatile nature of the Web

The Web is fastest growing knowledge base
a consequence of the explosion of Web 2.0 tools

Difficulty to keep track of:

1. new Web pages added each day
2. frequently updated data
   –> causes:
   - user interactivity (ex: comments, forums)
   - inherent dynamics (ex: news, events)

data coming from a continuous process
which has an immediate value for a typical user

Importance of this data

in the archiving context

1. as it changes rapidly, at a certain point will be lost if not archived
2. represent the reflection of human impacting events and activities in:
   blogs, news...

characterize a certain period of time, from variuos points of view
therefore useful for future generations

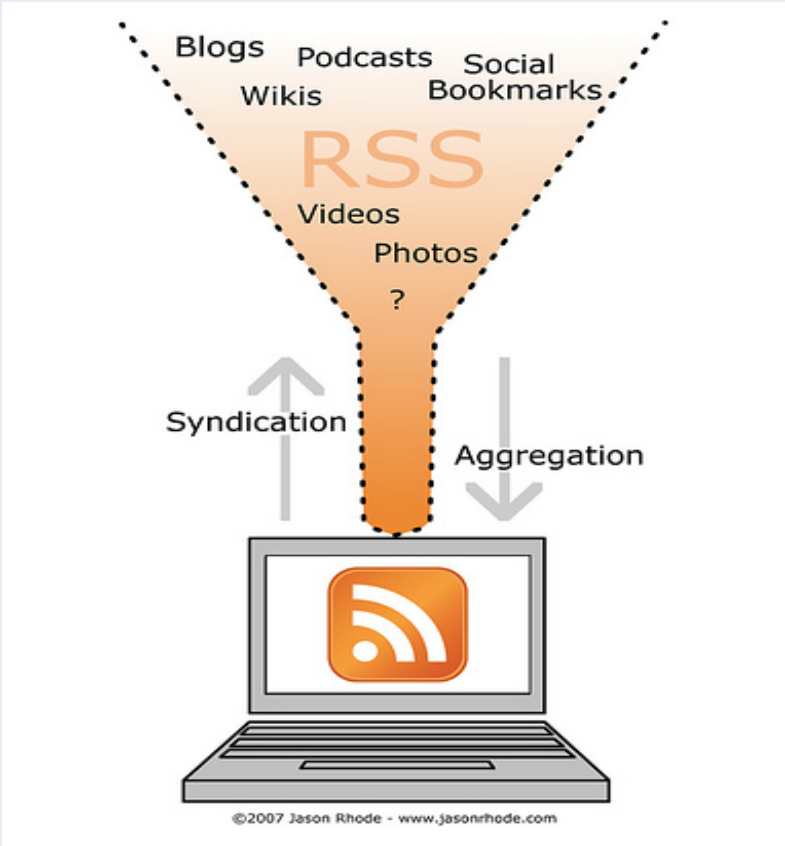
RSS, Atom

XML-based syndication formats

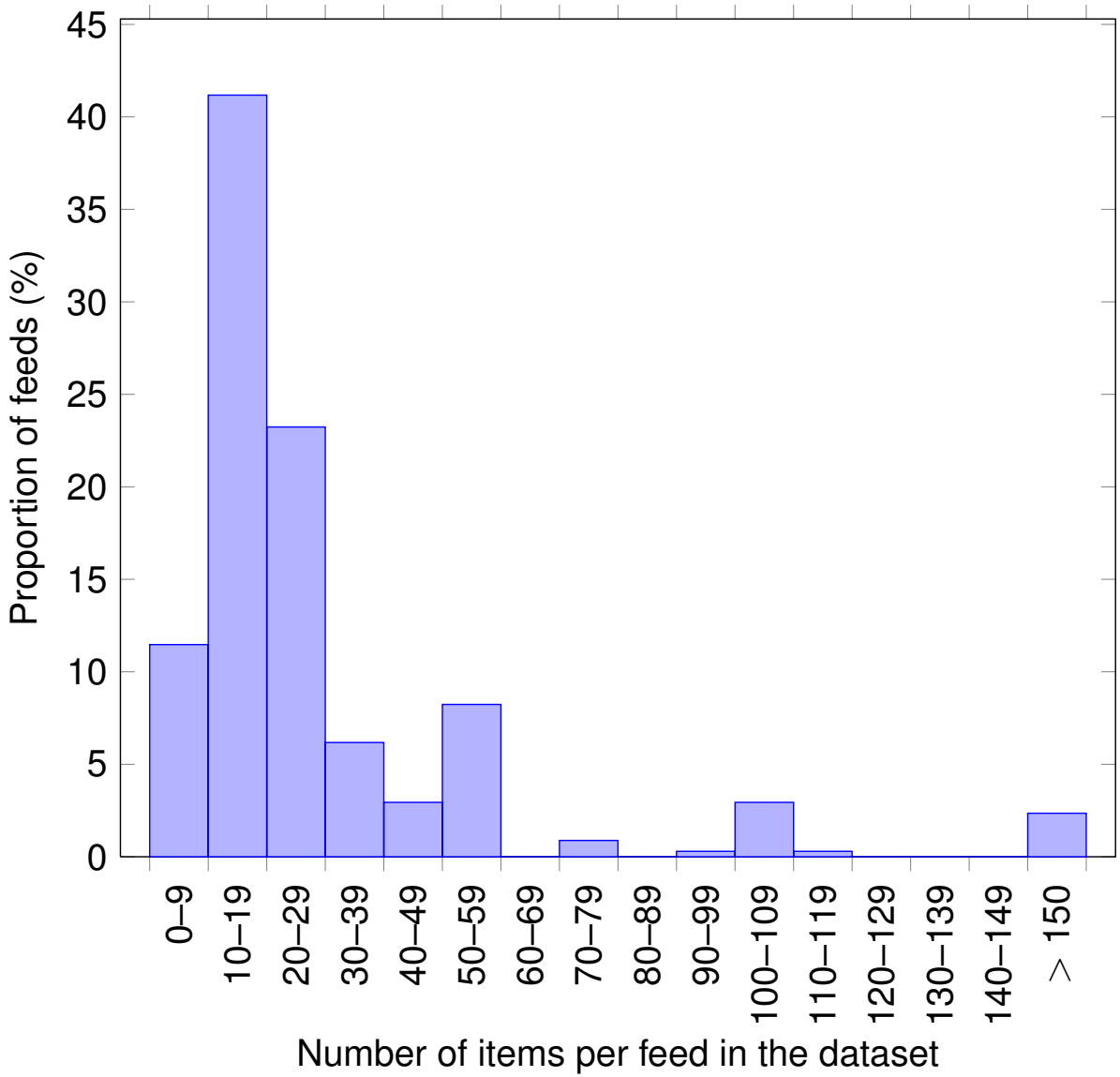
include specific metadata

- inform about the change occured
- describe the new resources published

about dynamic content



Statistics on Web Feeds



Statistics on the frequencies of update of Web Feeds

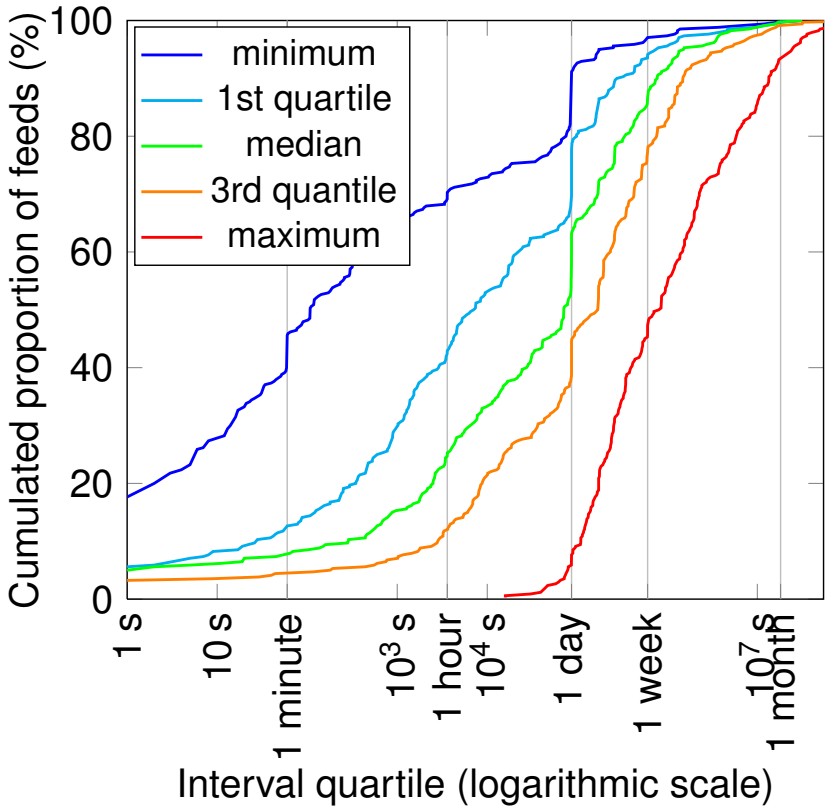


Figure: Cumulated proportion of feeds with a given quartile value of interval between updates

Uniformely querying a collection

of *Web Data Objects*

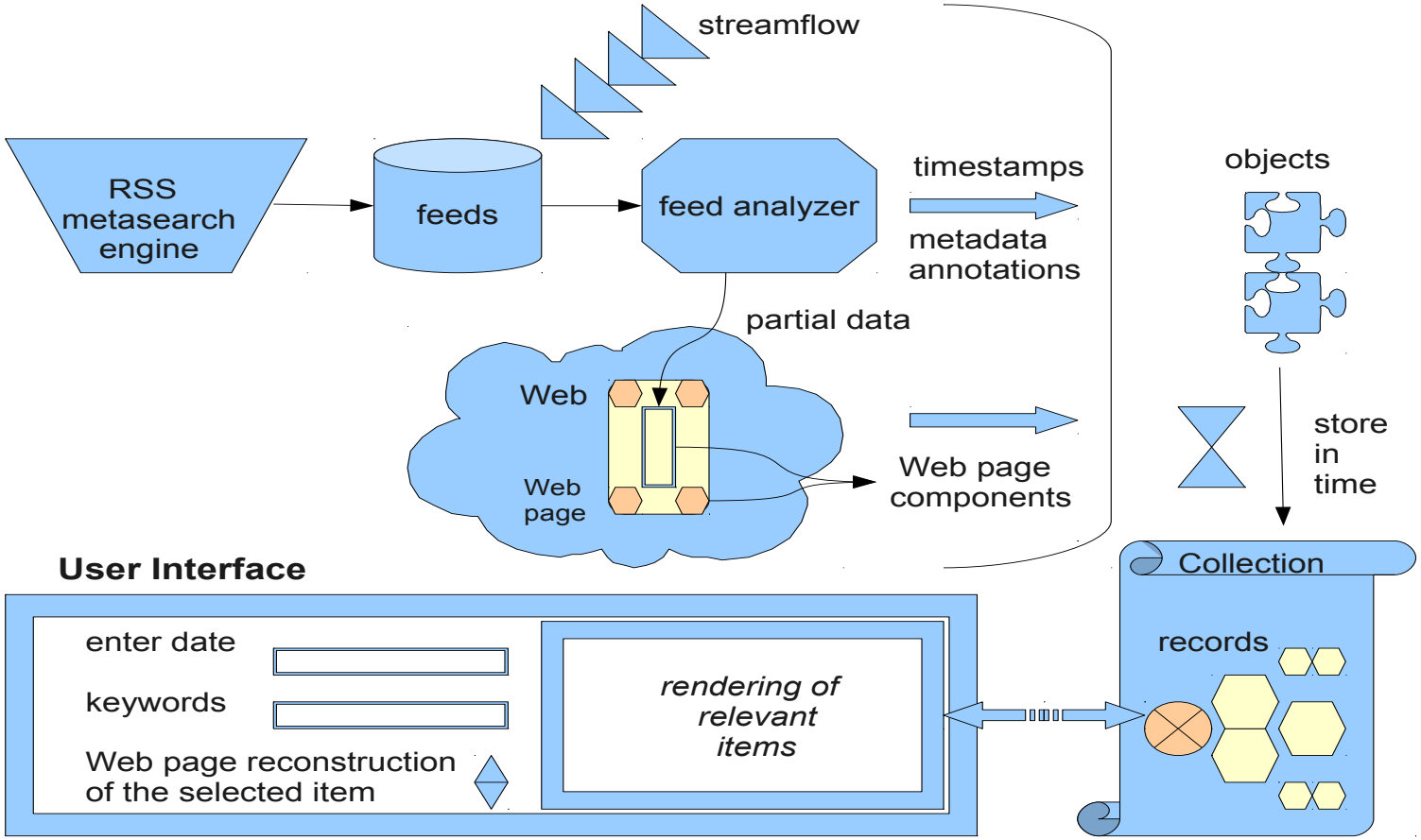


Figure: A scenario

Web feeds elements

and their signification

1. channel : publication hub of a Web site
2. item: a Web article, a status, a Wiki entry, a comment etc...

How can we use Web feeds in the archiving context?

- identify the article (text and references)

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- use the item metadata to enrich the semantics of the extracted article
- encapsulate the result and store it in a timely manner: use of the temporal dimension

The correspondence between the item

and the Web page

```
<item>
<title>A study on how to study </title>
<link>http://feedproxy.google.com/r̃/CosmicVarianceBlog/3̃/-uatEVOIO0g/</link>
<comments>http://blogs.discovermagazine.com/
cosmicvariance/2010/09/07/a-study-on-how-to-study/#comments </comments>
<pubDate> Wed, 08 Sep 2010 03:16:54 +0000 </pubDate>
<dc:creator> daniel </dc:creator>
<category> <![CDATA[Advice]]> </category>
<guid isPermaLink="false"> http://blogs.discovermagazine.com/ cosmicvariance/?p=5353
</guid>
<description> <![CDATA[One of the most delightful aspects of being a scientist is that
you&#8217;re always learning. Your colleagues teach you things. Your students teach you things.
Journal articles teach you things. You sit quietly at your desk and figure things out.
You&#8217;re perennially a student. But how to be a better student? This morning the New
York [...]]]> </description>
<content:encoded><![CDATA[<p>One of the most delightful aspects of being a scientist is that
you&#8217;re always learning. .../>]]> </content:encoded>
<wfw:commentRss> http://blogs.discovermagazine.com/cosmicvariance/
2010/09/07/a-study-on-how-to-study/feed/ </wfw:commentRss>
<slash:comments>6 </slash:comments>
<feedburner:origLink> http://blogs.discovermagazine.com/cosmicvariance/
2010/09/07/a-study-on-ow-to-study/ </feedburner:origLink>
</item>
```

Figure: The Feed Item corresponding to the previous Web page

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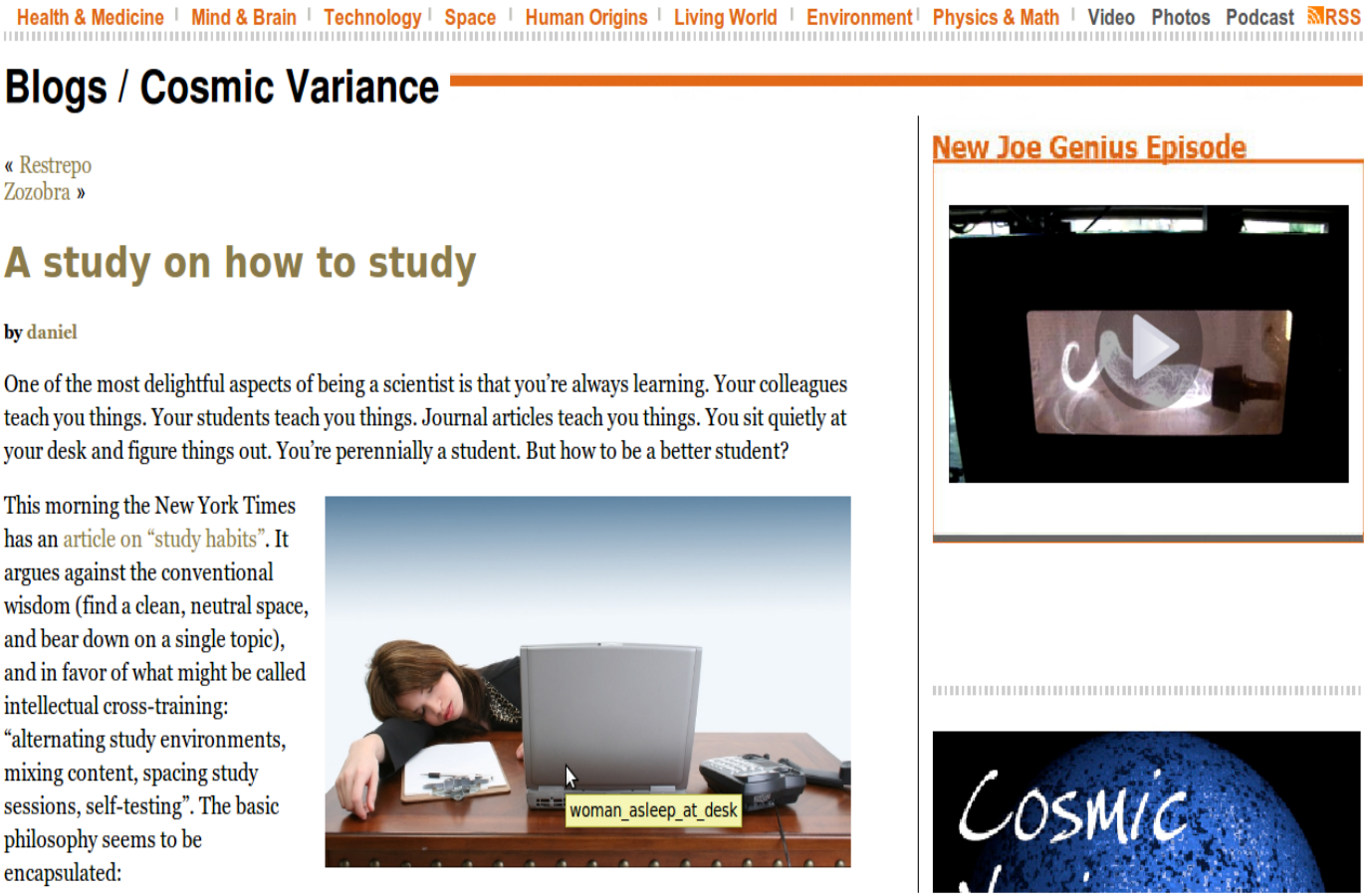


Figure: A typical Web article

What is a data object?

in our context

A data object is a resource uniquely referenced by a feed through the item URL.

1. has some special metadata associated: 'significant' properties
2. can be simple or compound: a comment vs. a commented article
3. can contain multimedia: imgs, videos,...
   and embedded code
   – we manage only references for the moment

The extraction technique

semantic acquisition

Parse the feed items and extract their

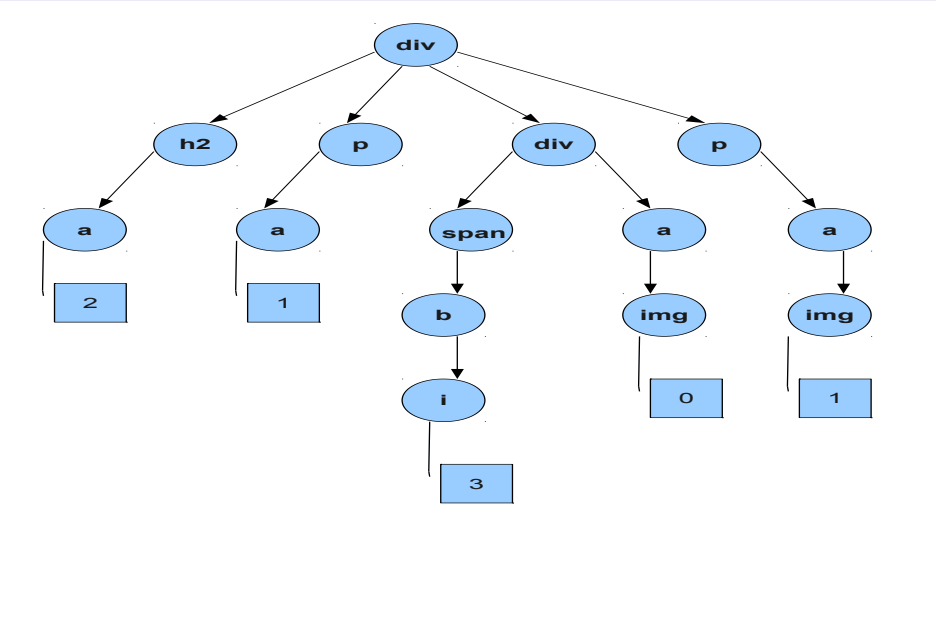
signifiers from the title and description of the item:

1. concepts: tokenize, stem and do a frequency analysis => a bag of relevant 'tags'
2. n−grams: sequences of *n* words, taken as they appear in the title and description

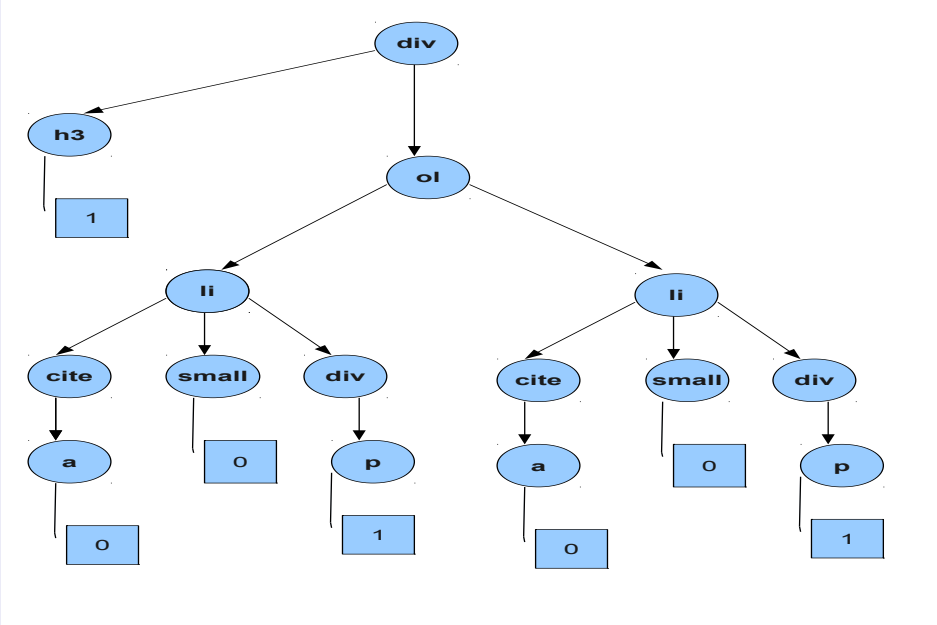
The extraction technique

operating at DOM level: bottom-up strategy

the block node of the article



comments'zone



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2. filter the leaf nodes which contain at least one signifier

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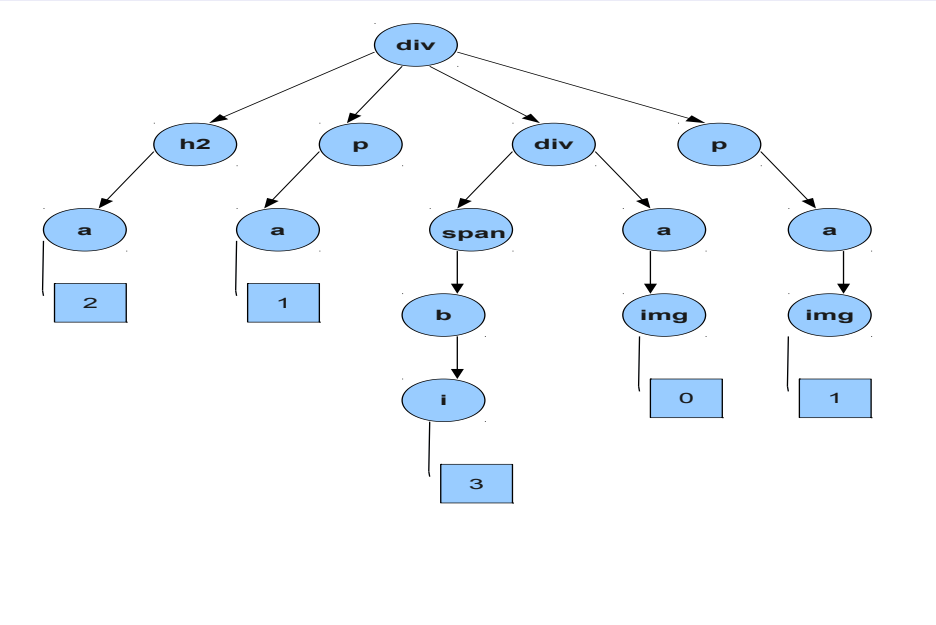

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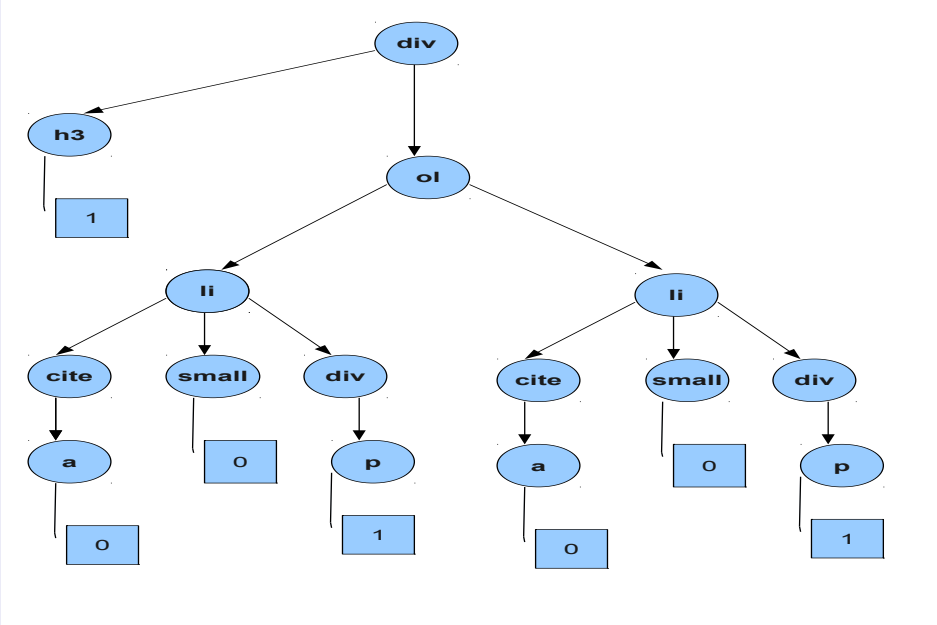

1. clean the Web page using HtmlCleaner
2. filter the leaf nodes which contain at least one signifier : conceptual nodes

The extraction technique

semantic density measure

1. group different conceptual nodes by their lowest block-level common ancestor
2. chose the one which has the largest value for the measure:

$$semanticDensity = \sum_{n=1}^{nbConceptualNodes} \frac{cnode.nbOfSemanticMatches}{cnode.textualLength}$$

Observations

on the technique of extraction

Advantages

1. identifies the semantic zones in a Web page
2. extracts the main content referenced by the feed items (text and references)
3. constructs a set of semantic terms + timestamp of a versioned data object

Drawback

the feed needs to be crawled on time:

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a consequence of entries' ephemerality

Conclusions

Contributions:

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Contributions:

- statistics on feeds to assert their value in the archiving process
- a way of archiving highly dynamic pages: using Web feeds
- a step forward concerning the archiving at another level of granularity
- the first algorithm that uses the semantics to extract articles from Web pages and filter the boilerplate
- a way of reconstructing the context (a cleaned version of the authentic Web page)

Further Work

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- analyze the impact of the variation of parameters in our algorithm
- studying data object change using a measure of similarity on the content and properties that we have extracted
- further study the semantic zones (their types and purpose) and the relation between them

Thank You

Questions?