

# Superimposing Conceptual Models with SPARCE

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\*Picture courtesy of Prof. James Pankow, Dept. of EBS, OGI

## Annotating\*



- Mark up paper
- Place sticky notes on the paper
- Write on 3x5 cards and leave pointers to relevant portions
- An annotation might not capture all the information we need. We sometimes examine *context* to reconnect

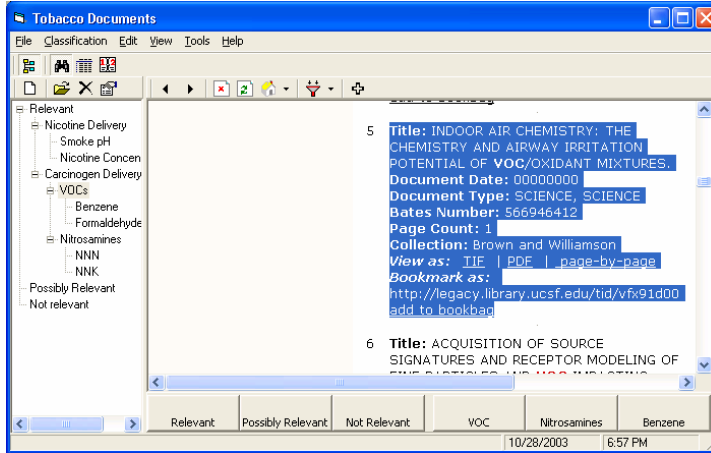
## Observations

- People often *superimpose* new interpretations onto existing information
- They like to combine existing information and their interpretations (in some meaningful way) to get “their” view

## Tasks Influence Models

- Environmental scientists at OGI intend to study nicotine and carcinogen delivery in mainstream tobacco smoke
- Main information source: tobacco industry documents
  - The Legacy Tobacco Documents Library (Univ. of California, San Francisco) has over 6 million documents

# Initial Classification

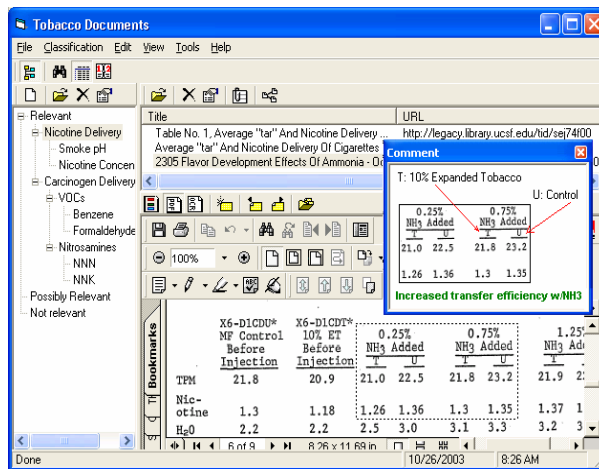


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# Detailed Classification and Annotation

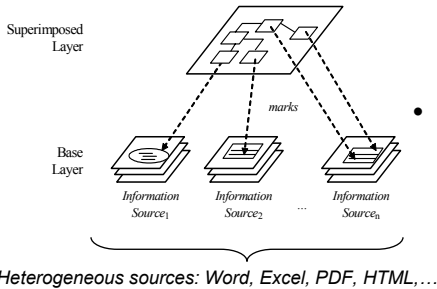


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# Superimposing Information



- Overlaying new information on top of existing information
  - Add new data
  - Impose new schema and model
- Benefits
  - No replication of existing information
  - Preserve context
  - Make new connections between parts of existing information
  - Flexible (multiple) organization
- Abstractions: Mark, Context

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## Goal

- Develop middleware architecture to facilitate superimposed information management (at sub-document granularity)
- The *Superimposed Pluggable Architecture for Contexts and Excerpts (SPARCE)* is our middleware architecture

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## Outline

- Motivation and goal
- Superimposed applications and conceptual models
- SPARCE overview
- Related work
- Future work and conclusion

## Superimposed Applications


- These are applications that manipulate superimposed information
- They are free to choose display and data models based on their needs
  - They need to accommodate marks and contexts
- A user can *activate* a mark to navigate to the base layer or *examine context* without expressly navigating to the base layer

# Superimposed Applications for the US Dept. of Agriculture, Forest Service

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United States  
Department of  
Agriculture

Forest  
Service

Deschutes National  
Forest

1645 Highway 20 East  
Bend, OR 97701

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**File Code:** 1570 **Date:** 11/5/01

**Subject:** RJD (Records, Information, Documentation)  
Transmittal Letter Road 18 Caves Project Appeal  
(Access Fund Appeal)  
Appeal No. 02-06-001-15

**To:** Regional Forester/Reviewing Officer

Link to a document  
↓

This is my transmittal letter of the project record for the Access Fund appeal of the August 30, 2001 decision to implement the redesign and location of several parking areas, installation of bat gates and an information kiosk, and public use restrictions within the Road 18 Caves Project area.

The appellant was contacted on October 18, 2001 to offer an informal request for disposition of the appeal points. The offer was accepted and a conference call is set for November 1, 2001. In summary, the conference call was amenable in the sense that the Access Fund better understood my rationale for the Decision made in regards to this EA. The Access Fund was not fully aware of the significance placed on the caves by the Confederated Tribes of the Warm Springs (CTWS). However, the Access Fund did not want to drop the appeal until they had a chance of discussing directly with the CTWS any potential to allow climbing in Hidden Forest Cave. It was agreed at the conclusion of our conference call that the Forest would continue to respond to the Region and go through the appeal process. Concurrently, the Access Fund would contact the CTWS and discuss climbing concerns with them directly. The District would address any potential to allow climbing in Hidden Forest Cave as a result of the CTWS and Access Fund discussion if that becomes a possibility.

The format of this letter states the issue (in *italics*) from the appeal letter under the "Summary of the Argument" followed by supporting quotes representing a general class of comments (where appropriate also in *italics*).

**Mark** →


**Excerpt** →

*A. "A critical problem with the Decision is that while the DNF (Deschutes National Forest) prohibited climbing based on religious reasons, it said nothing about other recreational activities such as caving and hiking which remain permitted uses: inexplicably, caving and hiking do not also violate the sacred status of the Road 18 Caves."*


**Excerpt contains a mark!** →

**Response:** The Decision to restrict climbing and to remove bolts from Hidden Forest Cave is based directly on the comments received from the Confederated Tribes of the Warm Springs (a Federally recognized tribe) during the 30-day EA comment period (letter dated June 29, 2001; Attachment Mc). Specifically, they identified these sites as "spiritual" and are held in "high regard by the CTWS." The comment letter went on to say that "by allowing individuals to climb on or near these sites is offensive..."

The Tribe's letter further states that "by leaving the existing bolted routes and authorized climbing within the cave where potential harm can come to archaeology sites is a violation of 36CFR500, National Historic Preservation Act of 1966, as amended..." Direct detrimental effects had occurred to the pictographs at Hidden Forest Cave through the placement of chalk



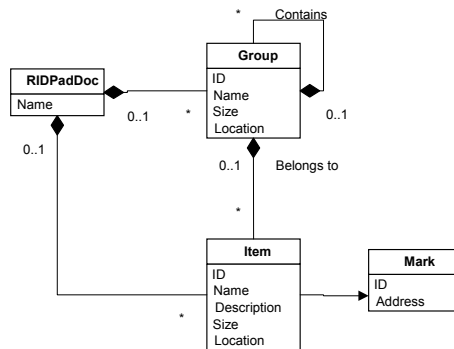
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# RIDPad

- A superimposed application an editor might use to collect and organize information for a RID letter

## RIDPad's Information Model



Groups

Items

Uses Word Mark

decision\_notice2 - Microsoft Word

for the Environmental Assessment and Preferred Alternative public comment was published in The Bulletin on Jun

**Finding of No Significant Impact**  
Based on the site-specific analysis documented in this EA, I have determined that this decision does not constitute a major Federal action, individually or cumulatively, that will significantly affect the quality of the human environment, therefore, an Environmental Impact Statement will not be necessary.

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## Schematics Browser

- A superimposed application Forest Service personnel might use to review past appeal decisions
- A superimposed schematic is a ER schema over base information
- Superimposed information is stored in a relational database

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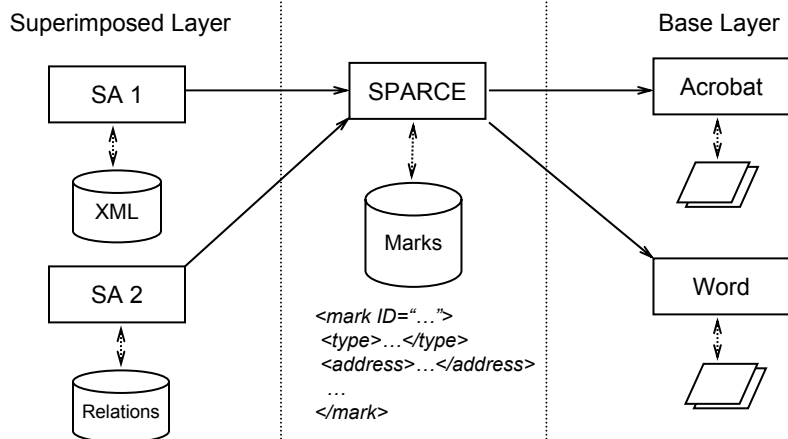
# SPARCE: Superimposed Pluggable Architecture for Contexts and Excerpts

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## Overview



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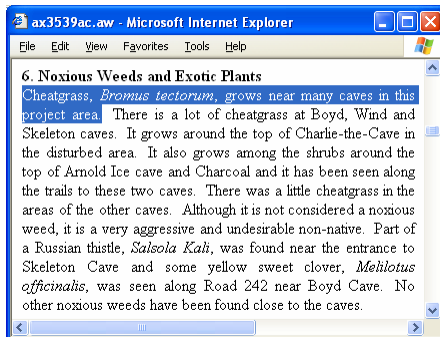
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# Marks

- A *Mark* is a reference to a base-layer element
  - Several mark implementations exist
  - Addressing scheme usually depends on the base type
  - PDF mark uses page no. + starting and ending word index; MS Word mark uses starting and ending character index
- Marks provide uniform interface across base types and access protocols

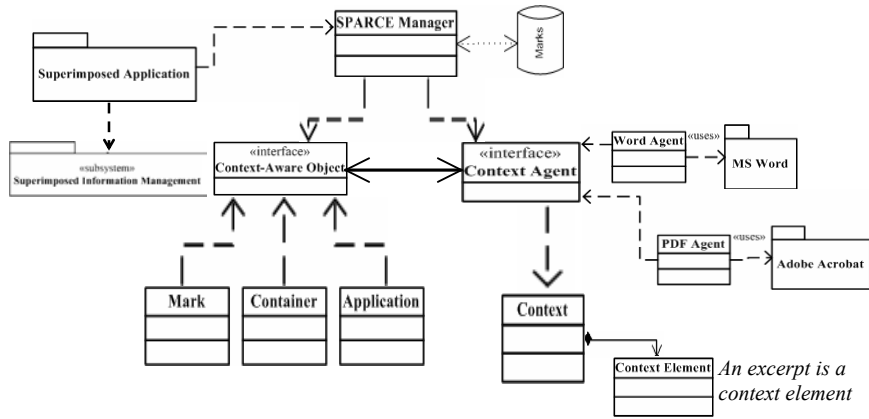
# Excerpts and Context



Name	Value
Excerpt	Cheatgrass, Bromus tectorum, grows near many caves in this project area.
HTML	Cheatgrass,&nbsp; <i>Bromus tectorum </i>, &nbsp; grows near many caves in this project area.
Section Heading	Noxious Weeds and Exotic Plants

- *Context* is information about a marked region
- *Context element* is one piece of context information
- Context definition varies across and within base types

## Architecture Diagram (Simplified)



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## Related Work

- Visions
  - Memex (1945), Evolutionary List File (1965)
- Hypertext
  - NoteCards, Intermedia, Dexter (1987-1994)
- Compound document
  - OpenDoc, OLE 2 (1994-95)
- Others
  - Multivalent Documents (1996)

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## Future Work

- Quantitative architecture evaluation
- Incremental superimposed modeling
- Representing context
- Other operations on marks and contexts
- Querying contexts
- Caching context
- Sharing superimposed information

## Conclusion

- SPARCE allows superimposing of different conceptual models over base information
  - Heterogeneous base types
  - No interference with base information
  - Sub-document granularity
- It allows development of new superimposed applications, and to support new base-layer types and contexts with minimal effort

*Contact me for a SPARCE demo*

# Questions?