

Exploring the use of Rhetorics for Generating Hypermedia Presentations

Introduction:

- Hypermedia presentations and their structure
- Automatic generation of hypermedia presentations

Presentation Constraints

- single vs. multi-dimensional constraints

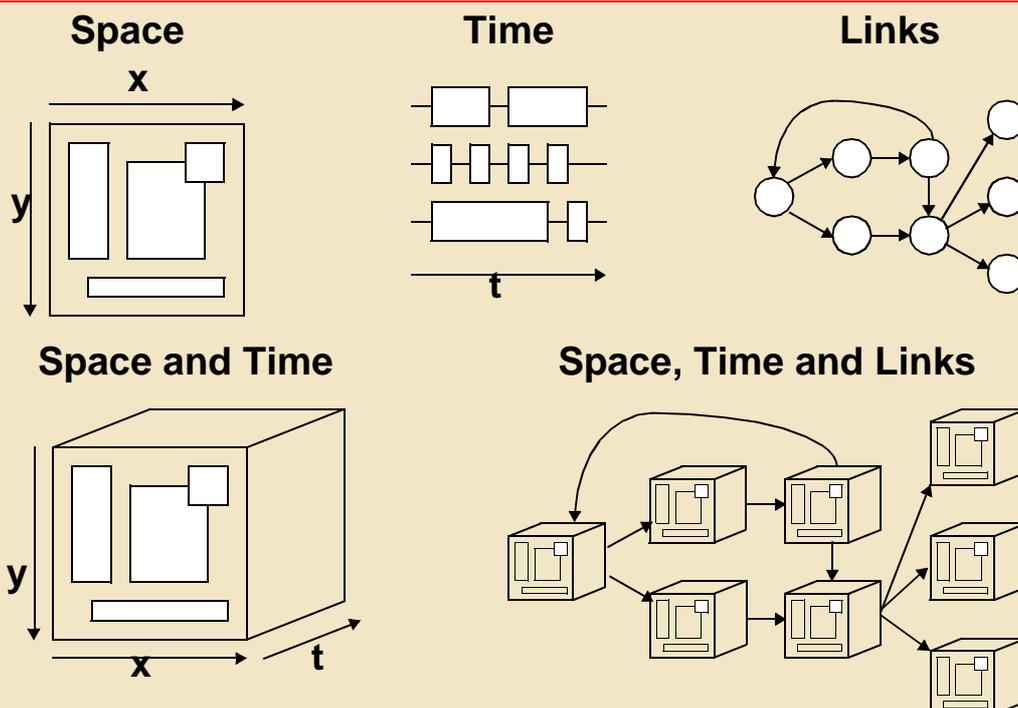
Rhetorical Structure

- Using rhetorics for generating hypermedia constraints

Example Application

- Electronic Program Guide (EPG)

Final Presentation Structure



Automatic Presentation Generation

Benefits

- Can be used when manual authoring is too expensive or time consuming
- Presentation adapts to wide variety of circumstances
 - different platforms (PC, palm-top, mobile phone, etc)
 - different users (different tasks, interests, level of expertise, etc)

Examples of current status

- Use of CSS
- Dynamically generated HTML e.g. news
- Search Engines

Objectives

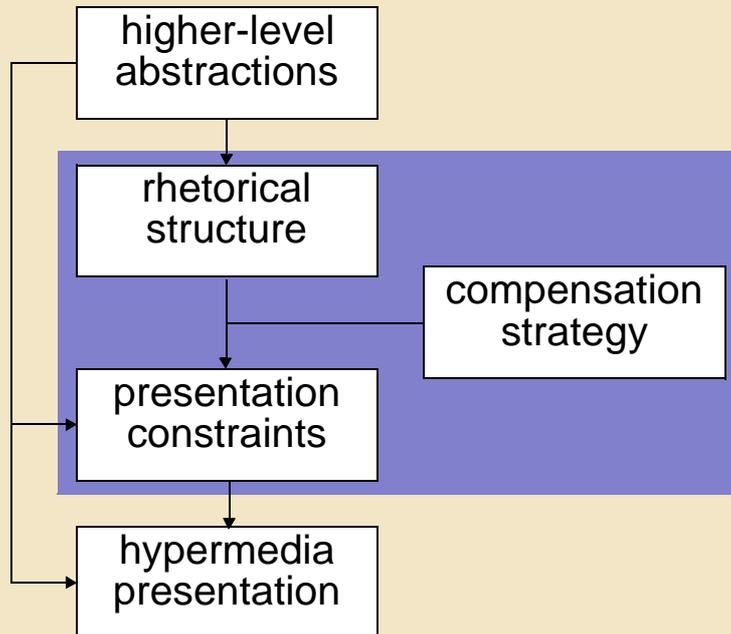
Improve upon current state of the art:

- Extend current techniques to generate *real* hypermedia presentations
 - go beyond list of results and HTML templates
- Increase variability of generated presentation structure
 - go beyond typical style/layout issues
 - adapt to platform and user preferences

Approach:

- Use of constraint-based presentations
- Rhetorical structure provides bases for constraint generation

Our Approach to Hypermedia Generation

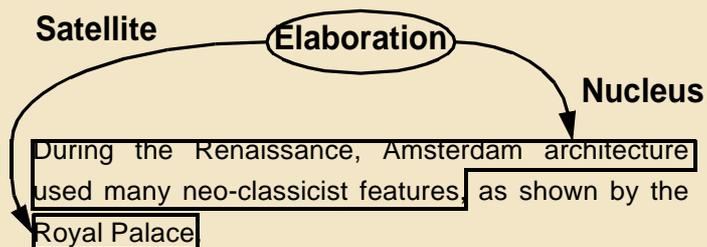


Rhetorical Structure

Rhetorical Structure Theory (RST, Mann & Thompson '89)

- Primarily used for text generation and analysis
- Rhetorical relations are used to build a tree structure of the text

Nucleus-satellite Relations				Multi-nuclear Relations
<i>Evidence</i>	<i>Justify</i>	<i>Non-volitional Result</i>	<i>Purpose</i>	<i>Sequence</i>
<i>Concession</i>	<i>Circumstance</i>	<i>Otherwise</i>	<i>Interpretation</i>	<i>Constrast</i>
<i>Elaboration</i>	<i>Background</i>	<i>Restatement</i>	<i>Summary</i>	<i>Joint</i>
<i>Motivation</i>	<i>Volitional Cause</i>	<i>Antithesis</i>		
<i>Condition</i>	<i>Non-volitional Cause</i>	<i>Solutionhood</i>		
<i>Evaluation</i>	<i>Volitional Result</i>	<i>Enablement</i>		



Rhetorical Structure Theory

Rhetorical Structure Theory (RST, Mann & Thompson '89)

- Primarily used for text generation and analysis
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Most Relations are Nucleus-Satellite Relations:

- evidence, summary, elaboration, etc...
- example of evidence relation: "Joe is guilty, they found his fingerprints"
nucleus: "Joe is guilty"
satellite: "they found his fingerprints"

Also a Few Multi-nuclear relations:

- sequence, contrast, joint
- example of sequence relation: successive steps in a recipe or technical manual

Examples Using Rhetorics for Generating Constraints

A sequence relation can be presented differently (order preserved):

- Spatial (order on page)
- Temporal (one after the other)
- Links (previous/next buttons)

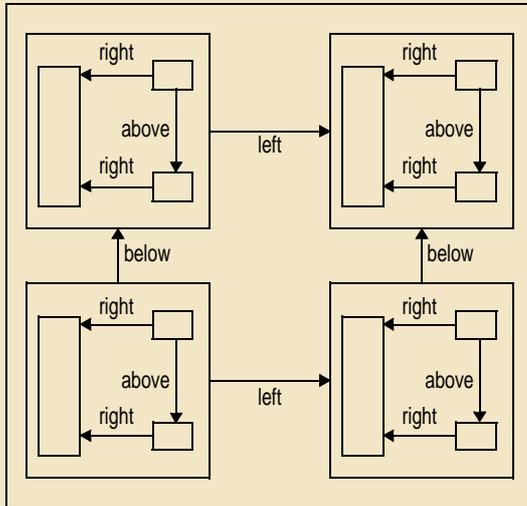
Strict and loose sequences

- Strict means user can only be presented them in order
- Loose means user can be presented them in any order
 - but order must be conveyed in presentations (e.g. menubar)

Nucleus-satellite relations in hypermedia presentations

- Presented with navigation links
- Presented by spatial proximity
- Presented by a specific temporal order

Example: Spatial Constraints



- Ensure that images remains a rectangle
 - Ensure that images maintains its width/height
 - Ensure that image is left of other image
 - etc.
-
- Similar for time and links

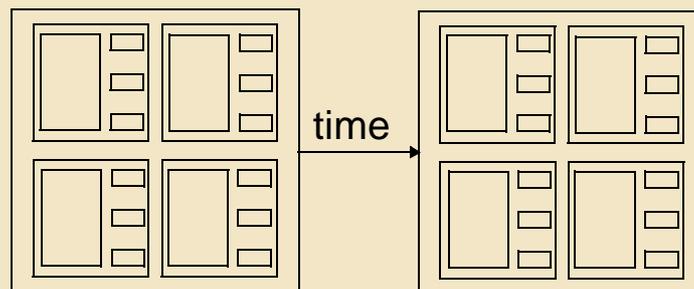
Single and Multi-dimensional Constraints

Single-dimensional Constraints

- Involve only one presentation dimension
 - "X left of Y" (spatial)
 - "X after Y" (time)

Multi-dimensional Constraints

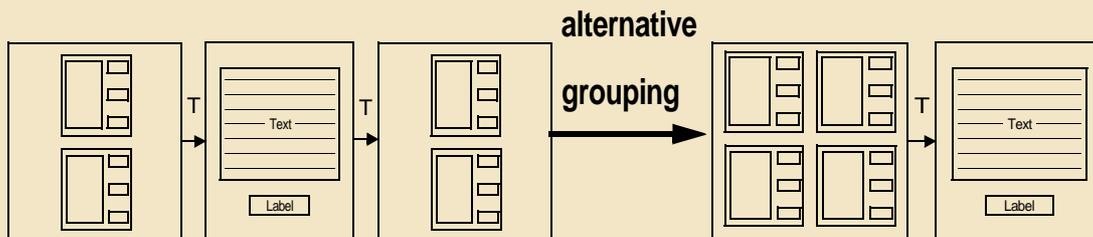
- Compensates failure of single-dimensional constraints using multiple dimensions
- Example: split group of 8 items in two groups of 4 items:



Overflow and Compensation

Grouping on semantic similarity is not sufficient:

- Balance both semantic and syntactical similarities
- Reasoning process might be knowledge intensive
- Example: group the 4 items that are visual similar



Example application: Electronic Program Guide (EPG)

EPG

Alien3 	userrating: 5.8 production: 1992 language: English duration: 110 certification: R	Amistad 	userrating: 7.4 production: 1997 language: English duration: 152 certification: R
Enemy of the State 	userrating: 7.6 production: 1998 language: English duration: 131 certification: R	Men in Black 	userrating: 7.0 production: 1997 language: English duration: 98 certification: PG-13

Next

Summary

Automatic Presentation Generation

- cost/time effective
- adaption to platform and user preferences

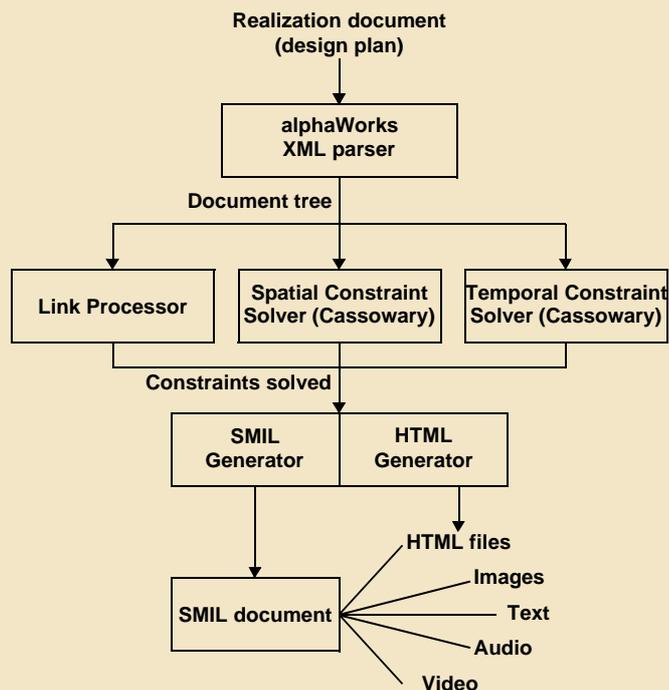
Presentation Constraints

- single dimensional constraints are not sufficient
- use multi-dimensional constraints for compensation

Rhetorical Structure

- can be used for generating constraints
- examples:
 - sequence (order by use of space, time or links)
 - nucleus-satellite (links, spatial or temporal proximity)

Processing Model of the Realization Layer Implementation



Current research directions

Short term

- Constraint software for space/time/link trade-offs
- Analysis of use of rhetoric in TV news

Medium term

- Architecture allowing incorporation of existing software:
MMBase <http://www.mmbase.org>
Planning software
- Generation of presentations for different end-user platforms/network bandwidths from single source document (beyond **switch** in SMIL)

Longer term

- Authoring tools at “storyboard” level
- Content management tools for authors (MMBase front end)
- Generation of narrative
- Investigation of annotations needed for generation process