Design Studies

Lecture 3 CPSC 533C, Spring 2004
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Design Study

describe task
justify solution
refine until satisfied

Design Study Definition

Design study papers explore the choices made when applying infopix techniques in an application area, for example relating the visual encodings and interaction techniques to the requirements of the target task. Although a limited amount of application domain background information can be useful to provide a framing context in which to discuss the specifics of the target task, the primary focus of the case study must be the infopix content. Describing new techniques and algorithms developed to solve the target problem will strengthen a design study paper, but the requirements for novelty are less stringent than in a Technique paper.

InfoVis03 CFP; [infvis.org/infvis2005/CFP]

Architectural Lighting, Glaser

Prototype 1: Space Series
  - Focus+Context
  - Explore massive data set
  - But some users rejected!
Fieldwork
  - Who, what tasks?
    - Architect, lighting designer, electrical engineer
    - Facility manager, daylight consultant
    - Daylight possibilities usually ignored
Prototype 2, User Studies
Prototype 3
  - LightSketch
  - Scythe and Sew
  - LIQUIID

Iterative design!

Space Series

full year
all day
unzoomed

spring day
zoom

[www.cs.berkeley.edu/~dcj/papers/iv03/iv03.pdf]

Space Series

one day
one hour
3 contig days
3 contig hours

[www.cs.berkeley.edu/~dcj/papers/iv03/iv03.pdf]
Space Series
- equinox/solstice
  - morning, noon, night


Architectural Lighting
- Space Series
  - Focus+Context
  - explore massive data set
  - but some users rejected!

- Fieldwork
  - who, what tasks?
    - architect
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Final Prototypes

Scythe and Sew
- lighting over surface at single time
- user-definable patterns
  - diff, other operators
- calendar of values over time at single point

Multilevel Call Matrices, van Ham
- large software project, implementation vs. spec
- link matrix vs. node network
  - matrix
  - force-directed
  - layered subset

Matrices
- uniform, recursive, stable
- subdivide by
  - total component count
  - visible subcomponent count

Zooming
- abstraction levels
- linear interpolation plus crossfade trajectories: will read van Wijk 03 in week 6
Additional Encoding

color: call allowed by spec

color: local region closest red

transparency: call density

histograms: size distribution

Tasks Successfully Supported

visual categorization
- i.e. libraries with mostly incoming calls

previous summary shown to be incomplete

spotting unwanted calls

determining component dependencies

Linguistic Networks, Munzner

data: MindNet query results

definition graph
- dictionary entry sentence
- nodes: word senses
- links: relation types

Semantic Network

definition graphs used as building blocks

unify shared words

large network
- millions of nodes
- grammar checking now, translation future
- global structure known: dense

probes return local info

Path Query

best N paths between two words

words on path itself

definition graphs used in computation
Task: Plausibility Checking

paths ordered by computed plausibilty
researcher hand-checks results
  - high-ranking paths believable?
  - believable paths high-ranked?
  - are stop words all filtered out?

Goal

create a unified view of relationships between paths and definition graphs
  - shared words are key
  - thousands of words (not millions)
special purpose algorithm debugging tools
  - not understand structure of English

Traditional Layout

avoid crossings
reason: avoid false attachments

ambiguity artifact salience

Top 10 Paths Kangaroo->Tail

Constellation Video

Information Visualization Approach

spatial position is strongest perceptual cue
  - encode domain specific attribute
  - plausibility gradient
**Constellation Semantic Layout**

- novel layout algorithm
  - paths as backbone, definition graphs attached
  - curvilinear grid
  - iterative design for maximum semantics with reasonable information density
- allow crossings for long-distance proxy links

**Selective Emphasis**

- highlight sets of boxes and edges
  - interaction
  - additional perceptual channels
- avoid perception of false attachments

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**Hidden State**

- avoid hidden state
  - change salience instead of toggle drawing
- why? closed world assumption
  - implicit assumption: if not visible, doesn't exist
  - easy to forget previous actions
  - draw false negative conclusions

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**Information Density**

- early prototype: poor

**Single vs. Multiple Word Instances**

- design tradeoff with visual salience
Information Density

grid adjustment

Task-oriented design

previous methods

Task-oriented design

task-specific methods