Casual InfoVis

CS 4460 – Intro. to Information Visualization
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Let’s start off with ideas and concepts from...

Casual Information Visualization:
Depictions of Data in Everyday Life

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Abstract—Information visualization has often focused on providing deep insight for expert user populations and on techniques for unlocking intelligence through conceptual manipulation via visual methods. This paper proposes a new paradigm for visual research that complements the focus on analytic tasks and expert use. Instead of work-oriented and analytically driven infographics, we propose Casual Information Visualization (or Casual InfoVis) as a complement to more formal information visualizations. Traditional infographics, techniques, and methods do not easily lend themselves to the broad range of user populations, from expert to novice, or from work tasks to more everyday situations. We present definitions, perspectives, and research directions for further investigation of this emerging subject. These perspectives build on interactive visualization [24], social visualization, and also from efforts work that visualizes information (TVCG). We seek to provide a perspective on infographics that are research agendas that integrate these research agendas under a common vocabulary and framework for design. We outline the following contributions. First, we describe the boundary of infographics by examining patterns that exhibit many of the building principles of those systems. Second, we present a common vocabulary that provides a common vocabulary and framework for design. We present a common vocabulary and framework for design. We present a common vocabulary that provides a common vocabulary and framework for design. We present a common vocabulary and framework for design. Third, we discuss design challenges for systems intended for casual audiences. Finally, we conclude with challenges for system evaluation in this emerging subject.

Index Terms—Casual information visualization, ambient infographics, social visualization, storytelling, design, evaluation.

1 INTRODUCTION
Much of the work in information visualization assumes a population of expert users who have knowledge and experience in analyzing problems in specific domains. Workers in widely varying domains from 5.

Are these types of tools really infographics? The question arises, where are the limits of infographics with respect to the everyday use of computational artifacts.
Casual InfoVis

- A complement to the majority of ‘central’ infovis; which is a focus on analytic tasks and analysts as the idealized user
- *Infovis for the everyday person*
- Spend some time looking at the ‘edges’ of the infovis domain

Definition

- *Casual Infovis* is the use of computer mediated tools to depict personally meaningful information in visual ways that support everyday users in both everyday work and non-work situations
Good Examples

![Graph showing ALSFRS-R progression of patients on lithium]

**ALSFRS-R Progression of Patients on Lithium**

This graph shows the ALSFRS-R scores of ALS patients in the patientslike.me system before and after they started taking lithium. It is an evolving prototype that we are developing to help understand if lithium, and ultimately other treatments, can slow ALS progression. Source: [http://www.patientslike.me/al-lium](http://www.patientslike.me/al-lium)

Filters: All patients taking lithium
Feltron


2014 Report
Changes to traditional notions

- The user population
  - Expand to include many more kinds of people and many more situations and scenarios
  - People who are not explicit or implicit analysts
  - Non-professionals in general
  - Low(er) motivation

- Usage pattern
  - New patterns of use that depart from the more traditional deep-dive explorations and sensemaking
  - In a word, more *casual*
  - Fleeting awareness and monitoring tasks
  - Could also include more substantial reflections
  - Mobile and ubiquitous, not just desktop
Changes to traditional notions

• Data types also change
  – Often personally relevant (about ‘me’)
  – Tight coupling between user and the data
  – Tight coupling gets at what is meaningful about the data stream... not always what is important. Sometimes the most minute and boring detail is still very meaningful.

Changes to traditional notions

• Insight
  – Gets at one of the fundamental questions of infovis
  – Examples on the edges show different kinds of insights
  – Maybe insights are not perfectly quantifiable in a way that’s rigorous
Areas to explore for today

• Artistic InfoVis
• Ambient InfoVis
• Social InfoVis

Artistic InfoVis
Artistic InfoVis

- Artistic expression using visualizations of data
- They are not just generative art – they still read data, represent it, and some are interactive
- Systems often depart from the central notion of infovis that first and foremost, a visualization should be easy to read
- Also can ‘problemitize’ the data...

Many examples
The Top Grossing Film of All Time, 1 x 1 2000

The worldwide top grossing film of all time (until 2010), Titanic, was digitized from video in its entirety and broken up into its constituent frames. Each of these was then averaged to a single color best representative of that frame and reformatted as a photograph mirroring the narrative sequence of the film. Reading from left-to-right and top-to-bottom, the narrative's visual rhythm is laid out in pure color.

http://salavon.com/work/TopGrossingFilmAllTime/

Wignell

Sorting (real time)

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Flags as infographics

In favor of war in Iraq
Against war in Iraq
Don't know where Iraq is

Foote, Cone & Belding
Flags as infographics

Banana export
Coffee export
Cocaine export

Live with less than 10 dollars/month
Live with less than 100 dollars/month
Live with less than 1000 dollars/month
Live with more than 100,000 dollars/month
Take frames from show
Decompose into 10 most
important colors
Use these color bands to
summarize all episodes
from all seasons
Scrollytelling webpage

http://fredhohman.com/a-viz-of-ice-and-fire/
Objectives

- Systems so far
  - What is their purpose or objective?
    - High-level purpose or task
    - Analysis, Exploration, Learning
- Are there other high-level tasks that infovis can assist with?
  - Awareness, monitoring
Central idea

- People interpret images well
- As they say, *a picture’s worth thousand words* ... so use visualization for information awareness

Calm Technology

- Mark Weiser
  - “A calm technology will move easily from the periphery of our attention, to the center, and back.”
Ambient Displays

- Conveys low- to medium-priority information to people, while residing in the periphery of their attention
- Other terms sometimes used
  - Peripheral display, notification system

Ambient Displays

- Purpose:
  - Information awareness, perhaps monitoring
- Focus:
  - Aesthetics
    - Visually pleasing enhancement to surroundings
**Ambient InfoVis**

- InfoVis off the desktop
- Still visually encoding information, but not for analytic purposes
  - Presenting the information in places where you’re not doing “desktop computing”

- Let’s look at some examples of ambient displays or ambient information visualizations

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**Dangling String**

- Plastic spaghetti wire hanging from ceiling
- Hangs from motor in ceiling
- Electrically connected to ethernet cable so bits going by cause it to jiggle
- Created by artist Natalie Jeremijenko
**Ambient Room**

- Use variety of physical objects in office to communicate the state of relevant information
- Hiroshi Ishii’s group at MIT

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**Karlsruhe Projects**

- Web awareness

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Wisneski et al  
CoBuild ’98

Gellersen & Schmidt  
Personal Technologies ’99
Lumitouch

- Touch one picture frame, the other lights up

Information Percolator

- Fish tank with bubble controller
- Various messages can be sent in bubbles
Busmobile, Weathermobile

Mankoff et al
CHI '03

Ambient Trolley

II Lab

https://www.cc.gatech.edu/gvu/ii/trolley/
**Ambient Orb**

Monitor stock market data, weather, etc.

www.ambientdevices.com

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**Information Visualizations?**

- Well, they are visually presenting information

- But perhaps not an emphasis on the *information*
  - More about peripherality, calmness, aesthetics
Trade-off

Aesthetics                           Utility

Informative Art

- Electronic paintings—Flat panel LCDs hung on the wall
- Abstract art in which aspects of the picture change to signify underlying data values
- From Future Applications Lab, Viktoria Institute, Sweden

Redstrom et al  
DARE ’00

Skog et al  
InfoVis ’03
Design Criteria

- Communicate useful information
- Blend in with surroundings and be appealing to look at
- Minimize animation – Don’t want to draw the eye too much

Example

Mondrian
Example

Andy Warhol

Cans gradually change from asparagus soup to tomato soup to signify upcoming event

InfoCanvas

- Information Art—Similar approach as in Viktoria project
- Electronic painting deployed on LCDs in the environment
- Focus: User-driven views
- II group at Georgia Tech

Stasko et al
Ubicomp '04
Revisit Trade-off

Aesthetics

Informative art

Utility

InfoCanvas
Objectives

- Personalized
  - Display individual’s personal information
- Flexible
  - Variety of info sources and representations
- Consolidated
  - Present multiple data items on one display
- Accurate
  - Be clear, and highlight uncertainty
- Appealing
  - Fun to use, aesthetically pleasing

Hardware

LCD – bezel + picture frame
Theme

Visual elements
Transformations

- Slider
- Image swapper
- Appearance
- Scaler
- Populater
- Projector
Other Example Themes
Implementation

- Java application
- Data harvester classes
- Painting specified through XML file
- System establishes data->visual mapping and polls data sources to maintain current representation
Lessons Learned

- Ubiquitous computing technologies can operate effectively in the field
- Consolidating information is valuable
- Abstractness/symbolism can be beneficial
- “Push” technology merits reconsideration
- Personalization is important
- Better customization tools are needed

Social InfoVis

- Another growing area... let’s just scratch the surface today.
Definition

• Social Visualization
  – “Visualization of social information for social purposes”
    ---Judith Donath, MIT
  – Visualizing data that concerns people or is somehow people-centered

On-line Communities

• PeopleGarden
  – Visualization technique for portraying on-line interaction environments (Virtual Communities)
  – Provides both individual and societal views
  – Utilizes garden and flower metaphors

Xiong & Donath
UIST '99
Particulars

- Who – Anyone visiting online community
- Problem – Help someone gain a more rapid understanding of the community as a whole and the individual participants
- Data – Postings from past

Data Portrait: Petals

Fundamental view of an individual

His/Her postings are represented as petals of the flower, arranged by time in a clockwise
Data Portrait: Postings

Time of Posting

New posts are added to the right
Slide everything back so it stays symmetric
Each petal fades over time showing time since posting
A marked difference in saturation of adjacent petals denotes a gap in posting

Data Portrait: Responses

Response to posting

Small circle drawn on top of a posting to represent each follow-up response
Data Portrait: Color

Initial post vs. reply

Color can represent original/reply
Here magenta is original post, blue is reply

Garden

Combine many portraits to make a garden

Message board with 1200 postings over 2 months

Each flower is a different user
Height indicates length of time at the board
Alternate Garden View

Sorted by number of postings

Interpreting Displays

Group with one dominating person

More democratic group
In Sum...

• Different kinds of ‘insight’
  – Analytical insights (more traditional concept)
  – Reflective insights
  – Awareness insights
  – Social insight

In Sum...

• Info Vis is moving into lots of life, not just desk work and data analysis by experts
  – News, commerce, story-telling, sociality
  – Self-reflection
  – One way to help manage information overload
• Requires a change to evaluation techniques (what matters is changing)
• Opens new design spaces
Learning Objectives

• Explain and cite examples of "information art"
• Define ambient display
• Describe characteristics of ambient display
• Cite examples of ambient displays
• Explain how casual infovis changes notions of traditional infovis along four dimensions
  – User population, usage pattern, data types, insights

P5

• Make progress
• No notion of "sufficient"
  – Your call on how much to do
• Show more data
  – Think InfoVis mantra
• The “Excel test”
Upcoming

• Thanksgiving Break

• Time series data

• Visual analytics

References

• Thanks to Zach Pousman for contributions to the lecture