

Info 424

Projects & Grading
 Introduction to Perception
Show Me the Numbers (ch 6)

Sit near the front: some demos are small

Today's lecture

Channeling Few
 Projects
 Schedules & grades
 Intro to Perception
 Vis Critiques

Learn to think like Few

For the mini-midterm
 For part I of the project
 As a basic skill

Few is Applied Tufte

Graphical Excellence

- Interesting data (complex ideas, multivariate)
- Clear, precise, concise presentation (data-ink ratio)
- Accurate communication (lie factor)

Graphical Integrity

- Present value relationships accurately
 - Size matches data
 - Avoid area and volume encodings
 - Adjust currency values for inflation, etc.
- Label carefully and clearly
- Present data in context

Few's Toolbox

Easy to describe, hard to apply

	Points	Lines	Points & lines	Bars
Nominal comparison				
Time-series				
Ranking				
Part-to-whole				
Deviation				
Distribution				
Correlation				

See *Show Me the Numbers*, page 87 for details

Practice, Practice, Practice

Design a graph

- Scenario
- Data
- What graph and why?
- Sketch or create

Few's exercises

- After chapter 5
- After chapter 10
- On his website
- Answers are included

Fix the graph

- Bad graph
- Figure out message
- Say why graph fails
- Redesign

In lab Friday

Questions?

Course Roadmap

- Week 1
 - Overview & fundamental concepts
- Weeks 2-4
 - Quantitative visualization in depth
 - *Show Me the Numbers* & Tableau
- Weeks 5-8
 - *Envisioning Information*
 - Interactive visualization
- Weeks 9-11
 - Project
 - Design studies & guest speakers

Readings
7 assignments,
mostly tied to labs
Few take-home test

Project

Grading

Point system: 1000 points

- Class participation 100
- Project-related activities 500
- Assignments & labs 320
- Few take-home test 80

Individual: 680
Group: 320

[iSchool Guidelines](#)

Project

Design and simulate an interactive visualization system based on real data

Models a real-world visualization design task

Specifics

- Teams of 3-4 students
- Find your own data on a topic of interest
- Two phases, 7 milestones
- Feedback to other projects
- User-centered design

Project Examples

From last year

- Find the best place to go fishing
- Find the best place to search for a job
- Compare the performance of baseball players
- Compare GDP for different countries across time
- Evaluate web site performance
- Monitor and troubleshoot multiple PC's at once
- Compare the performance of Fortune 500 companies

Project Examples

Other ideas

- Find the best set of flights for a trip, balancing cost, convenience, and reliability
- Find the best place to live in Seattle, balancing cost, commute time and safety
- Evaluate the impact of airline deregulation on airline performance
- Demonstrate the impact of global warming on the Puget Sound region
- Compare over space and time: climate, plant and animal populations, crime rates, airline safety, etc.
- Capstone project data?

www.kayak.com

Project Phases

Phase I (3 weeks) 160 points

- Select, analyze and present your data
- Uses Few's principles and Tableau
- Goal: Establish data and tasks

Phase II (5-6 weeks) 340 points

- Design interactive demonstration
- Uses brainstorming, user-centered design
- Design phase and "implementation" phase
- Present last week of class
- Goal: Apply user-centered design to visualization

Final report due Wednesday Dec 12

Phase I

P1: Select Teams, Data and Topic

P2: Individual Data Visualization

P3: Group Data & Task Visualization

PF: Individual Feedback to P3

Timeline:

Thursday 10/11 to Thursday 11/1 (3 weeks)

Phase II

P4: Project Design Presentation

PF: Individual Feedback

P5: In-lab Usability Testing

P6: Final Presentation

PF: Individual Feedback

P7: Final Write-up

Timeline:

Friday 11/2 to Wednesday 12/12 (5-6 weeks)

Phase I

To create an interesting visualization, you need interesting data related to an interesting task

Goal: Demonstrate you have a suitable topic with non-trivial goals plus data to support it.

Phase I

P1: Select Teams, Data and Topic

- Topic of interest
- Think about possible tasks
- Find data in a form you can read into Tableau
- May need multiple datasets to explore
- Create a website for the project

P2: Individual Data Visualization

- Goal: understand your data
- 3-5 visualizations using Tableau
- User, task, what makes it effective
- Non-trivial, useful for project goals
- Feeds into P3

Phase I

P3: Group Data & Task Visualization

- Goal: Summarize your data and tasks
- 5-7 visualizations
- Users, tasks and insights

PF: Individual Feedback

- Two other projects (we assign)
- Demonstrate your "viz critique" skills
- Help the other project

Phase II

Now that you have tasks and data, design and storyboard an interactive visualization

Goal: Apply a user-centered design process to create an effective interactive visualization with a clear purpose

Phase II

P4: Project Design Presentation

- Goal: Explore your design space
- Brainstorm designs and scenarios
- Select two distinctly different ones to refine
- Post on website

PF: Individual Feedback

- Same 2 projects as before
- Help projects refine their choices

Now you're ready to implement

Phase II

P5: In-lab Usability Testing

- Let your fellow students test your prototype
- Fine-tune, or apply to P7

P6: Final Presentation

- In-lecture demonstration of your system
- 3-5 detailed scenarios, visuals for each step

PF: Individual Feedback

- Vis Critique of P6

P7: Final Write-up

- Summary of process and self-analysis

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 OCTOBER	3	4	5	6 Tableau 1	
7	8	9	10	11 Today	12 Tableau 2	13
14	15	16 Lab Due	17	18	19 P1 Topic, Team Dataset(s)	20
21	22 Test Due	23	24	25 P2 Data Analysis	26 Maps	27
28	29	30 P3 Data & Task Vis+Maps	31	1 PF NOVEMBER	2 Trees	3
4	5	6 Lab Due	7	8	9 P4 Design Presentation	10
11	12	13 PF	14	15	16 Project Meetings	17
18	19	20	21	22 Thanksgiving	23 Thanksgiving	24
25	26	27 Vis Critique	28	29	30 P5 Usability Testing	1 DECEMBER
2	3	4 P6 Presentations	5	6 P6 Presentations	7 Wrap-Up	8
9	10 PF	11	12 P7 Write-up	13	14	15

Assignments

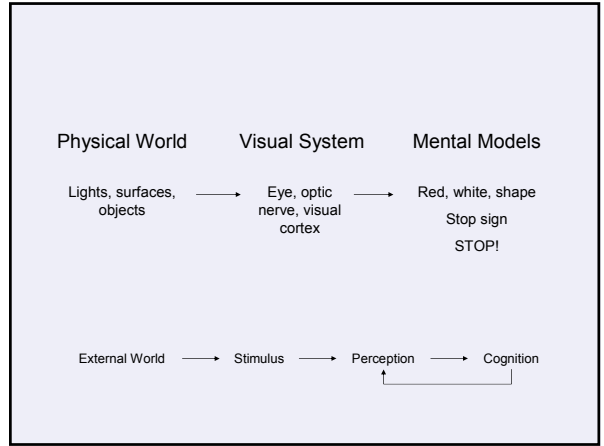
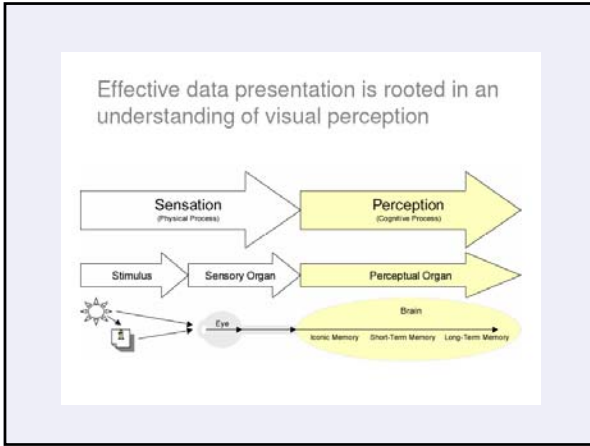
General

- Analyze and critique visualizations
- Use Tableau to explore, refine and visualize real-world data
- Explore and compare visualization systems
- Summary assignment (mini-midterm)

Project related

- Use Tableau to explore, refine and visualize project data
- Analyze and provide feedback on classmates' projects

Questions?



Visual System

Light path

- Cornea, pupil, lens, retina
- Optic nerve, brain

Retinal cells

- Rods and cones
- Unevenly distributed

Cones

- Three "color receptors"
- Concentrated in fovea

Rods

- Low-light receptor
- Peripheral vision

From Gray's Anatomy

Cone Response

Encode spectra as three values

- Long, medium and short (LMS)
- Trichromacy: only LMS is "seen"
- Different spectra can "look the same"

Sort of like a digital camera*

From A Field Guide to Digital Color, © A.K. Peters, 2003

Eyes vs. Cameras

Cameras

- Good optics
- Single focus, white balance, exposure
- "Full image capture"

Eyes

- Relatively poor optics
- Constantly scanning (saccades)
- Constantly adjusting focus
- Constantly adapting (white balance, exposure)
- Mental reconstruction of image (sort of)

<http://www.usd.edu/psyc301/ChangeBlindness.htm>

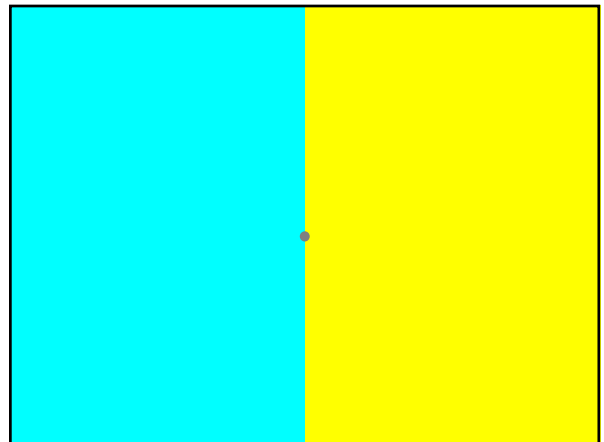




Image courtesy of Mark Fairchild

Visual perception is not just camera work

Square A is darker than B, right?

Visual perception is not just camera work

Square A is darker than B, right?

Color is relative

Simultaneous Contrast

Bezold Effect

Crispening

Perceived difference depends on background

From Fairchild, *Color Appearance Models*

Affects Scale Distribution

Spreading

Spatial frequency

- The paint chip problem
- Small text, lines, glyphs
- Image colors

Adjacent colors blend

Redrawn from *Foundations of Vision*
© Brian Wandell, Stanford University

We even perceive the written word differently than you probably think

Aoccdnig to rscheearch at Cmabridge Uinervtisy, it deosn't mtttaer In what oredr the ltteers in a word are, the olny iprmoatnt tihng is that the frist and lsat ltteer be at the rghit pclae. The rset can be a Total mse and you can still raed it wouthit problem. This is bcuseae the huamn mnid deos not raed ervey lleter by istlef, but the word as a wlohe. amzanig huh?

Interference

RED
GREEN
BLUE
PURPLE
ORANGE

Call out the color of the letters

Interference

PURPLE
ORANGE
GREEN
BLUE
RED

Call out the color of the letters

Why do we care?

Exploit strengths, avoid weaknesses
Optimize, not interfere

Perception/cognition alone is rarely enough
User-centered: Person, task, attention

Attention

<http://viscog.beckman.uiuc.edu/grafs/demos/15.html>
http://viscog.beckman.uiuc.edu/djs_lab/demos.html