

Class 4 CS545

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Roadmap

- Simplicity
- Paper prototyping
- Tidwell
- Descriptive (mostly) Statistics and Graphing
- The Project
- Readings this class: Laws of Simplicity, <http://lawsofsimplicity.com/>, Tidwell Chapter 2
- Readings next class: Tidwell Chapter 3

Schedule

- ~~Labor Day, September 2nd – no class~~
- ~~Good, bad or ugly web site evaluation September 9th next class, in class~~
- ~~Project topic selection and team due September 9th~~
- Tuesday, October 9th lecture class instead of Monday, October 15th
- Mid Term, October 21st in Moodle no Hoboken Class
- Project report every session in class starting Sept 16th
- moodle class November 25th
- Project reports Dec 2nd
- Missing schedules will result in grade deduction unless a prior arrangement has been made - I am flexible but ...

My Log



LoS

- Reduce
- Organize
- Time
- Learn
- Difference
- Context
- Emotion
- Trust
- Failure
- The one
 - Away
 - Open
 - Power

Simplicity

- <http://lawsofsimplicity.com>
- Reduce
 - How simple can you make it <-> How complex does it have to be
- Organize
- Savings in time feel like simplicity
- Knowledge makes everything simpler
- Simplicity and complexity need each other

Simplicity - 2

- What lies in the periphery of simplicity is definitely not peripheral - context
- More emotions are better than less
- In simplicity we trust
- Some things can never be made simple!
- The One
 - Simplicity is about subtracting the obvious and adding the meaningful

How simple can you make it

REDUCE!

How complex does it have to be

- Easiest way to simplify is to reduce
- SHE
 - **S**hrink - small is good and comforting
 - **H**ide - most used controls, interface code - hide complexity - perceived sense of control
 - **E**mbody - what shows is of quality

Organize

- Organization makes a system of many appear fewer
- SLIP
 - Sort - the items
 - Label - the categories
 - Integrate - combine similar groups
 - Priority - combine highest priority into single set: 80/20 rule
- “Humans are organization animals.”

Card Sorting

How can you make
the wait shorter

Time

How can you make the
wait more tolerable

- Savings in time feel like simplicity
- Best interface may be to automate (no interface)
- Indicate time remaining
- Rarely exclude time!

Learn

- “knowledge makes everything simpler”
- Professor or student BRAIN
 - *Basics* are the beginning (tacit): feel confident
 - *Repeat often* simplicity and repetition are related
 - *Avoid creating desperation* - gentle, inspired start to learning: feel safe
 - *Inspire* with examples
 - *Never forget to repeat*: instinctive

Learn 2

- Good Design
 - Eases process of understanding (form with function)
 - Provides sense of instant familiarity
 - Surprises!
 - Cell phone, digital camera, car and instruction manuals
- “In the beginning of life we strive for independence, at the end of life it is the same”

Differences

- Simplicity and complexity need each other
- Complexity provides an even greater appreciation for simplicity

Context

- Laser beam or light bulb?
- “What lies in the periphery of simplicity is definitely not peripheral”
- White space
 - Web pages
 - My home
- “Given an empty space or any extra room technologists would invent something for the expanse”
- Nothing is an important something - focuses on the something

Ambience

How directed can
I stand to feel

<->

How directionless can
I afford to be

EMOTION

- MORE!
- Simplicity looks cheap
 - Individual differences
- “Form follows function and feeling follows form!”
- Email and :-) -> ☺
- Blinging (marking) nude electronics
 - Protection - enlarge or protect simple surfaces



<http://www.decalgirl.com>



nvouspc.com

<http://www.letscrysalit.com/>



alienware.com

EMOTION 2

- Animism, anthropomorphism - naming of cars, computers (Shintoism & Miyazaki)



imdb.com



<http://movies.lovetoknow.com/wiki/Fantasia>

Emotion - 3

- “Perhaps this is the fundamental distinction between pure art and pure design. While great art makes you wonder, great design makes things clear.”
- “Achieving clarity isn’t difficult. ... The true challenge is achieving comfort.”
- ROE - Return on Emotion

TRUST

- The best interface is none
 - TiVo Suggestions
 - Social filtering
 - Expert filtering - chef's discretion
- The power of undo
- The fear of "trust me" - trust but verify :-), opps that was EMOTION!

HOW MUCH DO YOU
NEED TO KNOW
ABOUT A SYSTEM?



HOW MUCH DOES
THE SYSTEM
KNOW ABOUT YOU?

FAILURE

- ROF - return on failure - even when you fail to simplify, you learn – value to the journey

Ten – The One

- **Away**: More appears like less by simply moving it far, far away
- **Open**: Openness simplifies complexity
- **Power**: Use less, gain more
 - Axiom of Design: More constraints, better solutions are revealed

What's on your shelf?

Reduce
Organize
Time
Learn
Differences
Context
Emotion
Trust
Failure
The One

Away
Open
Power

Simplicity is about
subtracting the
obvious and adding
the meaningful

Now back to regularly
scheduled programming

Paper Prototyping

- Nielsen: Biggest improvements in user experience comes from getting usability data as early as possible
- Software engineering, cheaper to make changes earlier in the process
- Norman: a usable interface becomes invisible
- This technique will last – not subject to the latest technology

Paper Prototyping - 2

- “Paper prototyping is a variation of usability testing where representative users perform realistic tasks by interacting with a paper version of the interface that's is manipulated by a person "playing computer" who does not explain how the interface is intended to work.” –Carolyn Snyder
- Paper is not just shown to the users, they *interact* with it
- Aka low fidelity prototyping
- Online survey on paper prototyping of 172 usability professionals 30% essential, 56% additional useful, rest marginal

The Process-1

- Choose type of user who is audience
- Determine some typical tasks
- Make screens shots or hand sketched versions of all windows, messages, menus, dialog boxes, pages, data, pop up messages ... Needed to do these tasks

The Process - 2

- Bring in representative user and ask them to interact with it "click" buttons and type by writing
- One or two folks play computer
- Facilitator runs session (purpose of session how to interact, gives tasks
- Other members of the team observe

The Process - 3

- 4 roles: user, computer, facilitator and observer
- -computer practices task
- -list issues it will cover eg transitions to other tasks selection of tasks

What it is not

- Comps, pix of web sites
- Wireframe, page layout of the web site, what goes where
- Storyboards, flow chart with pix, cartoon like
- All can be transformed to do so

Benefits

- Benefits:
- Substantive user feedback early
- Rapid iterative development
- Establishes communication with dev team and dev team and users
- Requires low tech skills
- <http://paperprototyping.com>

Simple Statistics

- Mean, median & mode
- Frequency distributions - pareto
- Standard deviation
- Linear regression
- Correlation
- Student's T test
- Non parametric

Measures of Central Tendency

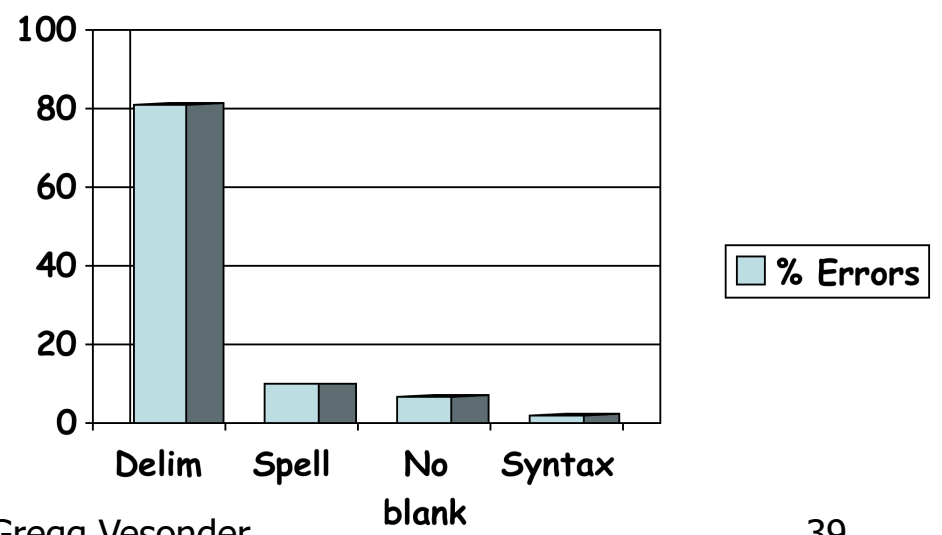
- Measures of central tendency are a summary of a whole distribution of events or measurements.
 - Mean (aka average) just add and divide by number of scores: $8, 5, 5, 4, 3, 2, 2, 1 = 31/8 = 3.75$
 - Median is the middle value when scores are sorted in order
 - What happens if you have an odd number of scores, even number of scores?
 - Answer to above is 3.5
 - Mode is the number that occurs most frequently - what is the mode for the series above?

Why 3 Measures of Central Tendency?

- Mean is the most common
- But if there are outliers – one, or a relative few, very high or very low numbers they will influence the mean and the median is a better choice
- For categorical data (non numeric), e.g., colors the mode, most frequent, is the obvious choice, but also can be instructive on numerical data – bi-modal

Frequency Distributions

- Pareto charts, used in quality control, bar chart from highest source of defects to lowest
- Originally derived from Vilfredo Pareto's work. He discovered 80% of the land in Italy was owned by 20% of the people - expanded to other relationships



Measures of Dispersion

- Range - difference of largest and smallest, 8, 5, 5, 4 , 3, 2, 2, 1: range = $8-1 = 7$, but it is best to also show the range 1-8
- Mean deviation - calculate mean get absolute difference of each number from mean (3.75) and divide by number of scores: $(4.25+1.25+1.25 +.25 + .75+1.75+1.75+2.75)/8 = 1.75$
- Standard deviation is square root of the variance, variance = $\Sigma(x-\mu)^2/n-1 =$, std dev = 2.252
 - If I added more variability in the data 12, 5, 4, 3, 2,2,1,1, even though mean is same, standard deviation is 3.6154 and mean deviation is $(8.25 + 1.25 + .25+ .75 + 1.75 + 1.75 + 2.75 + 2.75)/8 = 2.438$

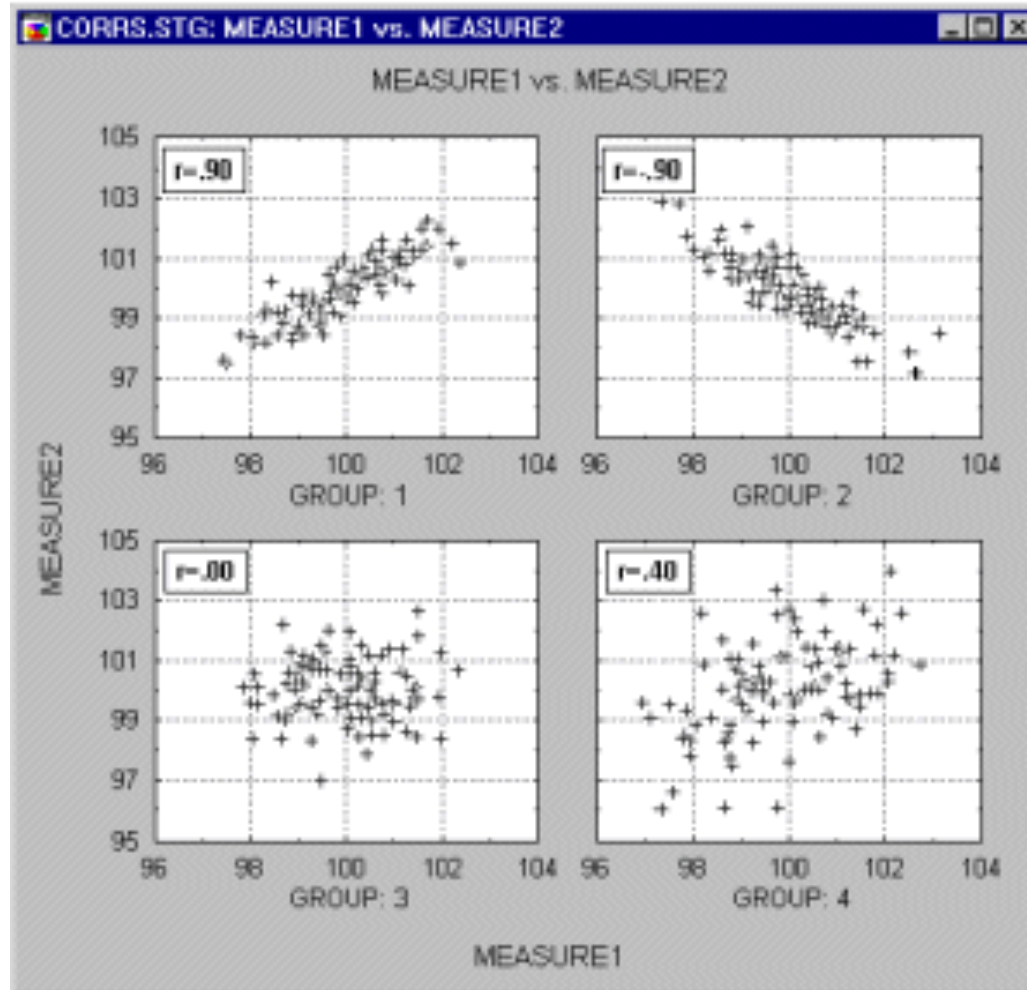
Correlation

$$r = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{n}}{\sqrt{(\Sigma X^2 - \frac{(\Sigma X)^2}{n})(\Sigma Y^2 - \frac{(\Sigma Y)^2}{n})}}$$

- Correlation coefficient,
- Data set 1: (1, 8) (2, 15) (3, 20) (4,25) $r = .996$
- Data set 2: (10, 5) (20, 3) (30, 2) (40, 1) $r = -.982$
- “inferring causality from simple correlations is an extremely dangerous pastime!”- Underwood

Examples of Correlations

<http://www.statsoft.com/textbook/stbasic.html>

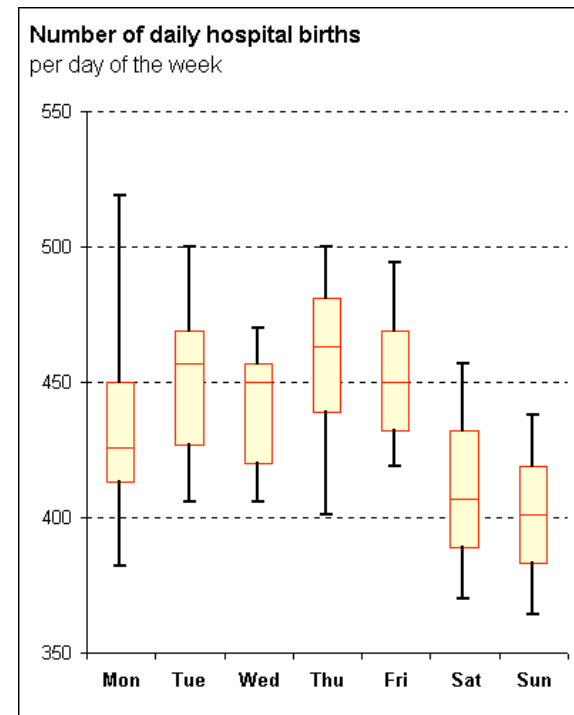
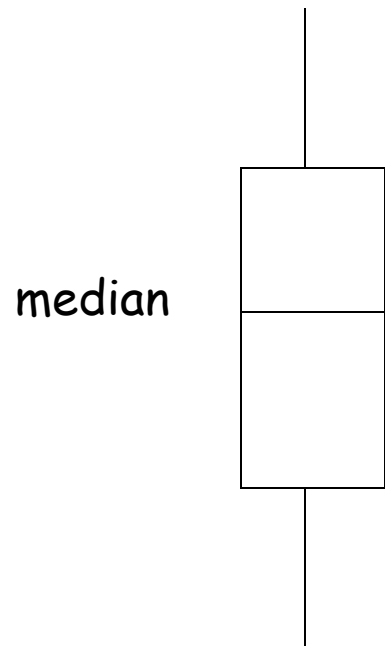


Linear Regression

- Fitting a line to data, get to $y=mx+b$..
Beyond the scope when you get into regression, but it does form a predictive model.
- First data set $y = 5.6x + 2.9$
- 8.5, 14.1, 19.7, 25.3

Simple Box Plots

- A method for combining descriptive statistics



t-test

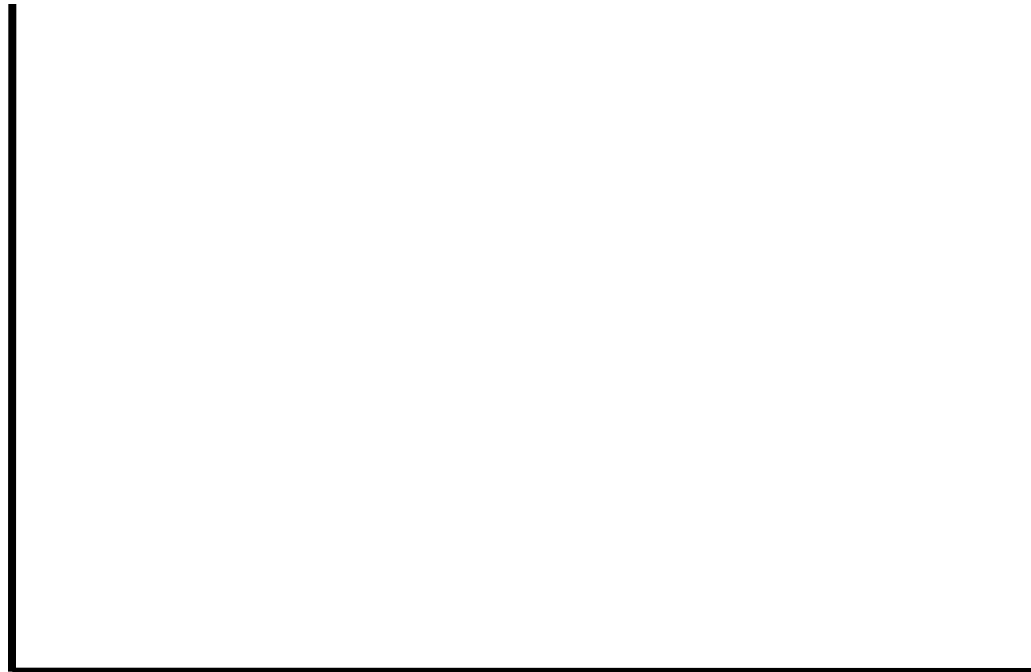
- Inferential statistics, null hypothesis no difference.
- Test for 2 independent means, 2 different groups
 - Experimental and control
 - Men and women
 - Degrees of freedom $n_1 + n_2 - 2$
 - One versus two tailed
- Test for related measure
 - Before and after manipulation (say training)
 - Matched subjects
 - Degrees of freedom, $N-1$ where N is the number of *pairs* of scores

Mann Whitney U Test

- Suspicion or knowledge that data is ordinal and interval is not consistent
- More conservative than t-test
- Used in same situations as independent mean t-test
- When in doubt consult Bruning and Kintz

Graph Conventions

Dependent
Variable



Independent Variable
(discrete:continuous::bar:chart:line)

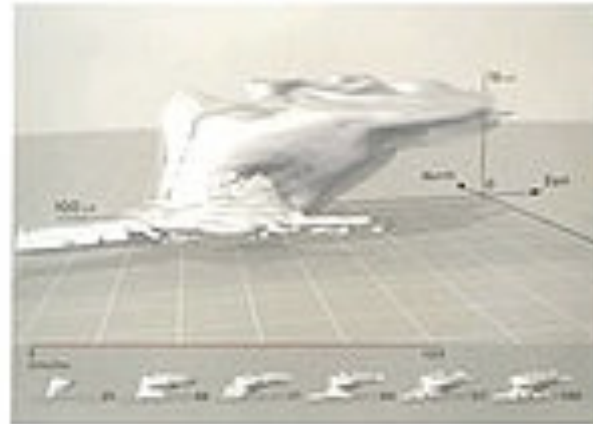
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Visual Depiction

- Tufte is the master

EDWARD R. TUFTE

VISUAL EXPLANATIONS



IMAGES AND QUANTITIES. EVIDENCE AND NARRATIVE

Chapter 2 – The Big picture

- Show 1 single thing
- Show a list of things
- Provide tools to create a thing
- Facilitate a single task

Chapter 2 Patterns

- Feature search and browse
- News stream
- Picture manager
- Dashboard
- Canvas plus palette
- Wizard
- Settings editor
- Alternative views
- Many workspaces
- Multi-level help

Current State

- Select topic, Target E's
- HCI development report
- Industry + questionnaire + ? data -> persona
- Begin thinking about collecting your first bit of data

Today

- Dev report

Projects

TEAM	TOPIC	MEMBERS
KiddieCity	Educational location based app on cities	Liangyu Xiao, Thoka Alowaid, Weijing Zhao, Chia-Wei Chiang, Wan-Ting Chang, Jingying Wang
Wordcraft	Learn words, social media, multiple languages	Meng Wang, Ruixiang Chu, Jingzhe Tian, Praneeth Ammineni, Srihari Natarajan, Alexander Gurski
Stevens Yard Sale	Make friends, sell goods within Stevens COmmunity	Cheng Liu(wc), Jingjing Lan, Nan Xie, Ruo Jia, Rui Ma, Xintong Wang
OurMall	Mall directions + social media	Madhura Kamat, Muath Khawaji, Swati Mittal, Himabindu Chaturvedula, Richard Sass, Aakash Yatish,
iHouse	Intelligent house with energy conservation	Xiaoran Liu, Ke Lei, Miao Li, Shanmiao Liang, Zhoushuo Wang , Mengyi Gong,
iCrib	Find a place to live	Krzysztof Jordan, Zachary Smith, Michael Peleshenko, Dane Pilcher, Ryan Phillips, Guanyi Li, Jing Yang
My Travel	Share travel planning with friends	Guangji Wang, Zhengfei Duan, Xiao Han, Hao Wu, Tingxue Li

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