Speculative Design Meet-up San Francisco April 7, 2016

Vision Data Sets: Speculating on a New Type of Prototyping

Hugh Dubberly Slides available at http://presentations.dubberly.com/vision_data_sets.pdf

By definition, prototypes are speculative they propose a future. But what is the origin of prototyping? How has prototyping evolved from the past? How might prototyping evolve into the future? How might we prototype prototypes?



Before the industrial revolution, designing was often 'unselfconscious', an integral part of making.

Context drove Form directly.



—after Christopher Alexander

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Actual world

As planning became separated from making, designing became more 'self conscious'.

Context drove mental models, which drove Form less directly.



Mental picture

Actual world

As the designer and maker became different people, they needed plans to coordinate their mental models—and their work.

Context drove mental models, which drove physical models—prototypes—which ultimately drove Form.



—after Christopher Alexander

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Formal picture of mental picture

Mental picture

Actual world

Models have long been a part of architecture; Christopher Wren built this 'great model' of the new St Paul's.

CI Designing St Paul's Cathed ×

The model is designed so that viewers can enter.

DESIGNING ST PAUL'S CATHEDRAL



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Made largely of oak, with some plaster elements, it was originally painted white to represent Portland stone with a blue dome, to represent lead.

The inside of the model is as detailed as the outside.

DESIGNING ST PAUL'S CATHEDRAL



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Made largely of oak, with some plaster elements, it was originally painted white to represent Portland stone with a blue dome, to represent lead.



London, Published as the Act directs, by Alex! Hogg, at the Kings Arms . Nº16, Paternoster Row

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assperty way finds

and fin



The whole cathedral.





Often with several versions.

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Wren and his office also drew sections.

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ALL DECEMBER OF THE PARTY OF TH

And elevations.

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Exterior

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Interior

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The models, plans, details, elevations, and sections had to sell the client before building could begin. The process took nine years.

King Charles II, by John Riley, 1680

Bishop Henry Compton, head of the committee

Product design prototypes are similar to architectural prototypes.



Movies prototype story, character, scene, movement, and timing.

"… film-making is important to software design.

A director integrates all the effects of a film, chooses among many ways to create a specific virtuality....

The reason that software is still generally lousy is that nobody's directing.

All the little pieces are done independently and not integrated."

— Ted Nelson, the inventor of hypertext

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"At its heart, software design is about creating virtual worlds—worlds in which software users work, learn, and play.

Virtuality has two aspects:

1. Conceptual structure—the ideas and how they unfold, connect, and lodge in the mind

2. Feel—how things look and the sensations we experience (crude or slick, bumpy or smooth, warm or cool)."

— Ted Nelson, the inventor of hypertext

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So: How do you prototype software? How do you prototype virtual worlds?

- User scenarios
- Storyboards
- Wire-frames
- Application flow maps
- Personas
- Journey maps
- User conceptual models

In 1987, Apple released a technology forecast 'vision video' titled *Knowledge Navigator*.





Knowledge Navigator involved several people:





Bud Colligan

Randy Field

Mike Liebhold

Doris Mitsch

Alan Kay John Sculley

Knowledge Navigator spawned several sequels within Apple.







HyperCard: 1992 1987

Project 2000 1988

Grey Flannel Navigator 1988

High School 2000 1988

Healthcare 2008 1988

Knowledge Navigator owes a debt to NASA's 'artist's concept renderings.'



Knowledge Navigator owes a debt to science fiction films.











THX 1138 George Lucas, 1971

Star Wars George Lucas, 1977

Star Trek Robert Wise, 1979

Blade Runner Ridley Scott, 1982

Back to the Future Robert Zemeckis, 1985

Knowledge Navigator owes a debt to several books.

DREAM MACHINE

New Freedoms Through Computer Screens — a Minorith Report

This is the Hip sile of Guipher Life.







The Architecture Machine Nicholas Negroponte, 1970

Dream Machines Ted Nelson, 1974

Neuromancer William Gibson, 1984

True Names Vernor Vinge, 1984

Knowledge Navigator owes a debt to MIT.



Jeep Repair Manual Andrew Lippman, 1978

Aspen Movie Map Andrew Lippman, 1978

Put That There Richard Bolt, 1980

The Media Lab Stewart Brand, 1987

Knowledge Navigator also owes a debt to Douglas Engelbart and his famous 1968 demo.

Knowledge Navigator was a specific future vision; it was also a new kind of prototype—for designers.

Unlike Engelbart's demo and the Arch Mach demos, *Knowledge Navigator* had zero lines of working code. None.

And because Apple 'published' it, making a demo with no working code became acceptable.

Most major tech companies followed with their own vision videos:



More vision videos can be found at http://www.idemployee.id.tue.nl/g.w.m.rauterberg/videos.html



Hewlett-Packard *1995*, 1989

Sun Microsystems *Starfire*, 1992

AT&T *Connections*, 1993

Hewlett-Packard *Synergies*, 1994



Intel *Step Into Tomorrow,* 2007

Samsung *Changing the future*, 2010

Microsoft *2019 Vision for the Future*, 2010

Corning *A Day Made of Glass*, 2011

Video prototyping—'exploratory experience design' has become a standard design method.

New York

now

10:34

ok glass

— Google Glass introduction

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Do you wa get coffee

And each spring, design students from around the world produce many excellent video prototypes.

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However, technology continues to change and as a result, we need new prototyping methods.

Sensors are being printed—like micro-processor chips; quantities are increasing; prices are dropping.

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Data prototyping has begun. One example is *The New York Times* interactive 'Mariano Rivera 2009 Pitch Database.'





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2009 pitches









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Cutter to Nate McLouth Swinging strike



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Mr. October, Mr. November, Mr. Rivera

Yankees closer Mariano Rivera is one of the most dominant postseason performers in baseball history. He has allowed only 2 home runs, has 42 saves, and has a 0.72 e.r.a. over 92 postseason games. A batter-by-batter look at his playoff career. Related Article »



Published: May 5, 2012

How Mariano Rivera Compares to Baseball's Best Closers

Mariano Rivera tore his right A.C.L. while shagging fly balls on Thursday, possibly ending his career. Considered the best closer in baseball history, Rivera has more saves than any other pitcher. Below, the cumulative saves of the pitchers with 100 or more.



The closers who broke new hundredsave milestones:

Firpo Marberry (101)

The first reliever to get to 100 cumulative saves, done at a time before relief pitchers were commonplace. (Marberry also started 186 games.)

Hoyt Wilhelm (227)

In addition to being the first pitcher to break the 200 save mark, Wilhelm pitched a no-hitter against the Yankees in 1958.

Rollie Fingers (341) Known for his handlebar moustache, Fingers was the second relief pitcher inducted into Baseball's Hall of Fame.

Lee Smith (478)

Rollie Fingers (341)

From 1983 to 1995, Smith averaged 35 saves a season, saving no fewer than 25 in any season.





Trevor Hoffman (601)

Hoffman was the first to break the 500 and 600 save marks, despite a 1994 shoulder injury that forced him to change his pitching style.

Mariano Rivera versus everyone else

Where Rivera ranks among 125 pitchers with 100 saves or more.



Sensors will be ubiquitous

- at checkpoints
- logging everything you do online
- all around you
- on you
- in you



Relevance

Community

Conversation

Actions

Information + Tools + Coaching

What does this mean? Massive data collecting organized into a taxonomy of personal identity



Hobbies Media Performances [×] Sports

Create/Participate Curate/Coach Comment Consume

Grooming + Prevention Body Systems Emotions + Affect Exercises + Diet

Drilling into a sub-categories shows the potential for detail;

today lab tests can measure over 150 analytes; more tests are in development.



(nyarocortisone)	
17 Hydroxyprogesterone * See also: ovaries	Man, normal: .06–3 mg/L Woman (follicular phase), normal: .2–1 mg/L
Angiotensin- converting enzyme (ACE)	Normal: 23–57 U/L
Growth hormone	At peak: 5–45 ng/mL Between peaks: < 5 ng/mL
Follicle-stimulating hormone (FSH)	Prepubertal: < 1 – 3 IU/L Adult male: 1–8 IU/L Adult female (follicular & luteal phase): 1–11 IU/L Adult female (ovulation): 6–26 IU/L Post-menopausal female: 30–118 IU/L
Adrenocorticotropic hormone (ACTH)	Normal: 20–80 pg/mL
Prolactin	Female, normal: < 20 ng/mL Male, normal: < 15 ng/mL
Blood Glucose	Hypoglycemia: < 3 mmol/l Normal: 3.6–5.8 mmol/l Normal, post-meal: <10 mmol/l Hyperglycemia: > 7 mmol/l (chronicly)
Luteinizing hormone (LH)	Female (peak): 20–75 IU/L emale (post-menopausal): 15–60 IU/L
Insulin absorption	
Plasma osmolality	Normal: 275–295 mOsm/kg
Total cholesterol	

Pituitary gland

Blood: lipids

Robert Wood Johnson Foundation Family caregiving pilot study



14 households



with 20 participants



with 21 chronic illnesses



× 2 environmental sensors



× 2 wearable sensors



measured 3 factors

Acceleration X, Y, Z (Average Motion*) **Blood Volume Pulse** (Heart Rate*) **Electro Dermal Activity**

* calculated 2 derivative factors



over 36 hours (over 6 months)



yielding 5 GB of data or nearly half a billion data points

× interviewing + observation

× self reporting

measured 5 factors



turned into 237 diagrams

Sensors

SmartSense Motion Sensors



Empatica E4

.........

SmartSense Presence

SmartThings Hub

STAPLES () HB



Data visualizations



Comparing individual data sets.



Comparing across individuals.



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Care networks

Study 7 – Ida's Household



Study 1 – Ana's Household



Study 2 – Chantal's Household



Study 3 – Fay's Household



Study 4 – Gabrielle's Household



Study 5 – Hanna's Household



Study 6 – Fernando's Household



Study 8 – Nadine's Household



Study 9 – Odette's Household



Study 10 – Nate's Household





Study 11 – Sally's Household



Study 12 – Tammy's Household



Study 13 – Teddy's Household



Study 14 – Omar's Household



Floorplans

Study 7 – Ida's Household



Study 1 – Ana's Household



Study 2 – Chantal's Household



Study 3 – Fay's Household



Study 4 – Gabrielle's Household



Study 5 – Hanna's Household



Study 6 – Fernando's Household



Study 8 – Nadine's Household



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Study 11 – Sally's Household



Study 12 – Tammy's Household



Study 13 – Teddy's Household



Study 14 – Omar's Household



Health



Appliances



Computer + Entertainment



Electrical



Plumbing



Gas



HVAC



Privacy



Security



Transportation



Processed satellite images shows crop growth in central lowa from March 29 to October 23 in 8-day increments.



Daily weather in central lowa: precip, temp, wind, snow, and clouds.



Designers lack tools for grappling with the 10x or 1,000x or 1,000,000x increase in data that will become the new normal. What's missing are large data sets that can be explored and on which prototypes can be built.

Imagine a prototyping data set containing all the data collected for one individual for one day twenty years from now.

Special thanks to Phil Martin Jennifer Cooper Iris Latour Eric Knudtson Ryan Reposar

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Presentation posted at http://presentations.dubberly.com/vision_data_sets.pdf