

# The Promise of Zoomable User Interfaces

Intro

Applications

Discussion

Unused  
Section  
Space 3

Unused  
Section  
Space 1

Unused  
Section  
Space 2

Unused  
Section  
Space 4

Unused  
Section  
Space 5

Unused  
Section  
Space 6

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# The Promise of Zoomable User Interfaces

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# Problem: Show More Than Fits

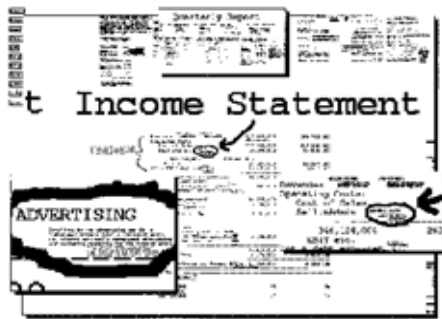
on the screen

Rough solution types:

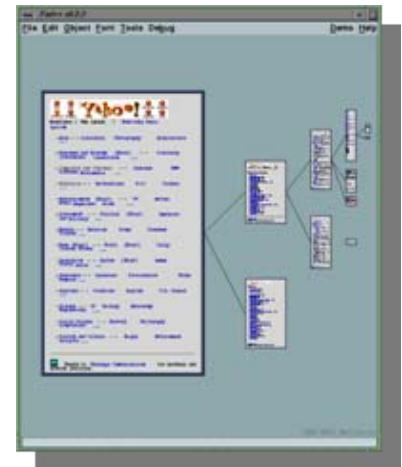
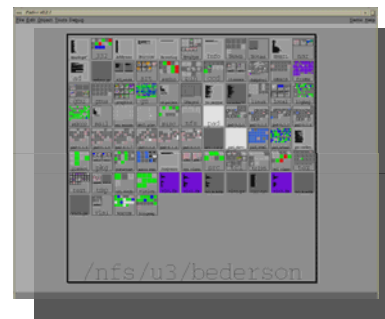
- Scroll
- Multiple pages (tabs, link, search ...)
- Denser displays (info vis)
  - Fisheye
  - Zooming

Is always a problem – and worse on small screens

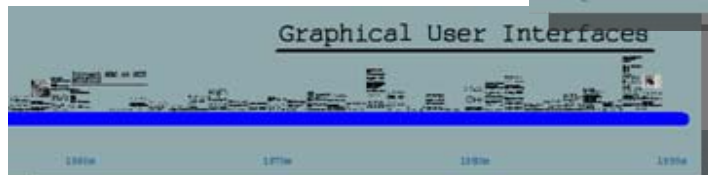
# Some early ZUIs



Pad 1993



Pad++ 1994



Pad3D 1993

# Partial Timeline

Apps

PadDraw

PadPrints

PhotoMesa

PPTPlex

KidPad CounterPoint

Prezi

GMaps

Pivot

ZoomCanvas

Space-Scale Diagrams

Geometric Scaling

SDAZ

Semantic Zooming

Portals

Lenses

Approaches

Platforms

Pa3D

SVG

.NET

Java2D

Sea Dragon

Pad

Pad++

Jazz

Piccolo

Cocoa

WPF

iPhone

92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10

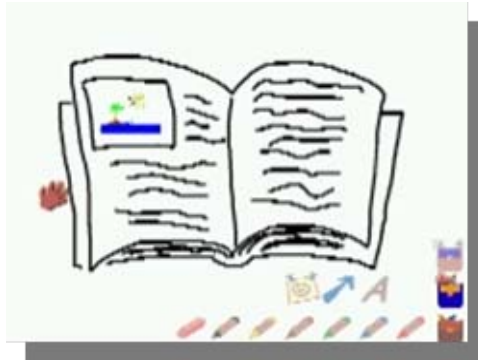
# Philosophy: What is a ZUI?

- Single vs. multiple documents
- Indirect vs. direct manipulation navigation
- No single view comprehensive

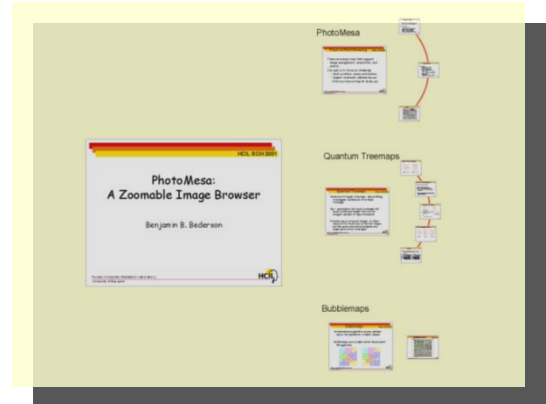


⇒ **End Goal: Slide/print or interaction?**

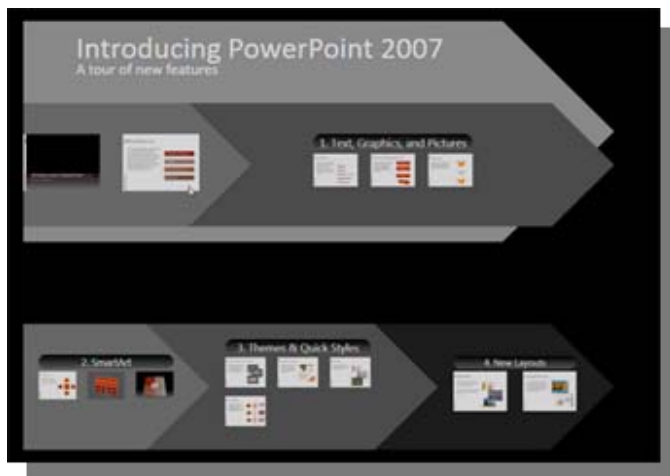
# Animated Presentations



KidPad - 2001



CounterPoint - 2001



Microsoft PPTPlex - 2008



Prezi - 2008

# Navigation Controls

Early work focused on navigating **space**:

- Specialized devices (i.e., Spaceball)
- Click left/right to zoom in/out
- Click left/right and hold to zoom in/out
  - Zooming point follows mouse
  - Zooming point fixed at mouse down
- Click and drag to zoom in/out (one button)
- OrthoZoom combines 1D scroll/zoom
- “Zliding” uses stylus with pressure for zoom
- Specialized keyboard controls



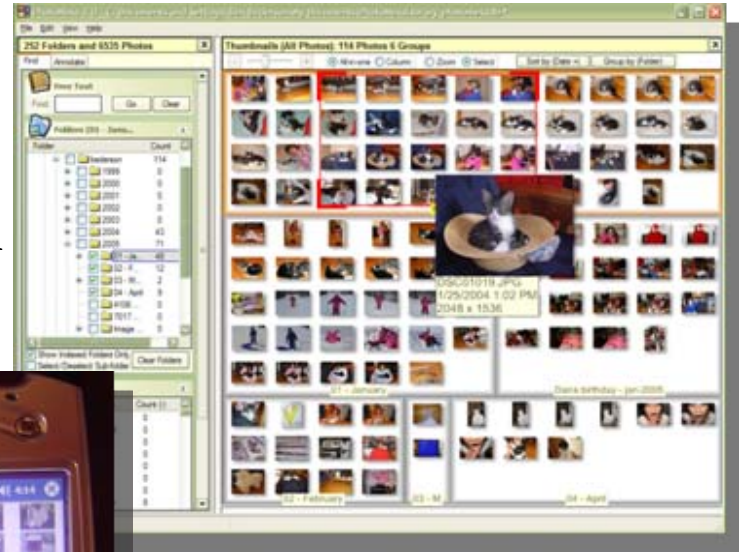
All the above can result in desert fog and imprecise destinations  
Later work focused on navigating **content**:

- Object-based zooming (i.e., PhotoMesa and pptPlex)
- Hyperlinks

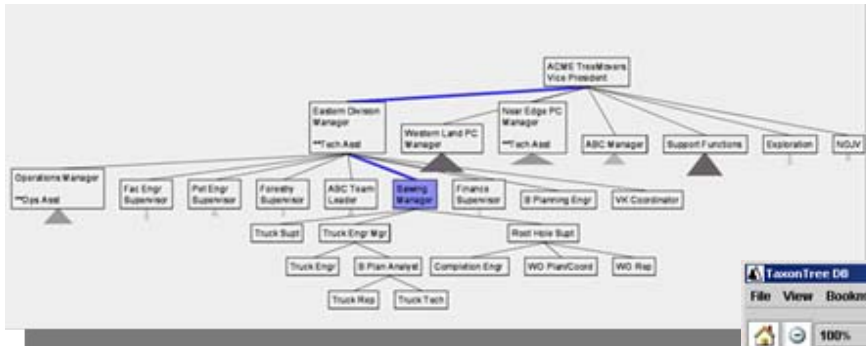


# PhotoMesa

- First attempt at building polished consumer ZUI
  - Object-based zooming
  - Domain-specific navigation
  - Domain-specific semantic zoom
  - Auto-layout
  - Perf tricks
  - Metadata & search
- Mobile version

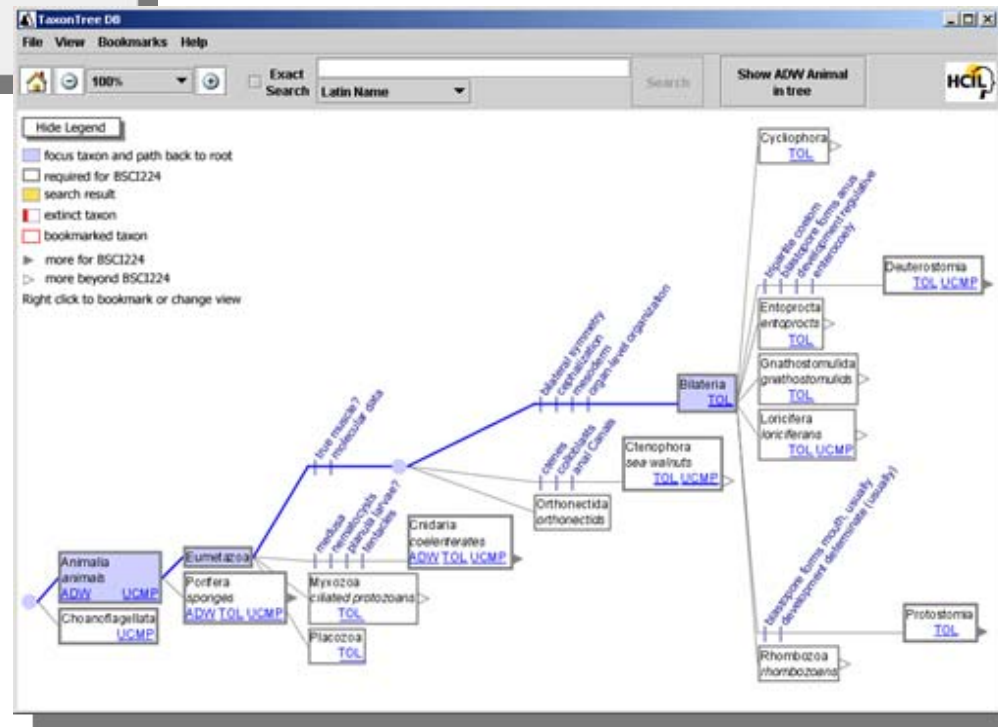


# Zooming for Overview

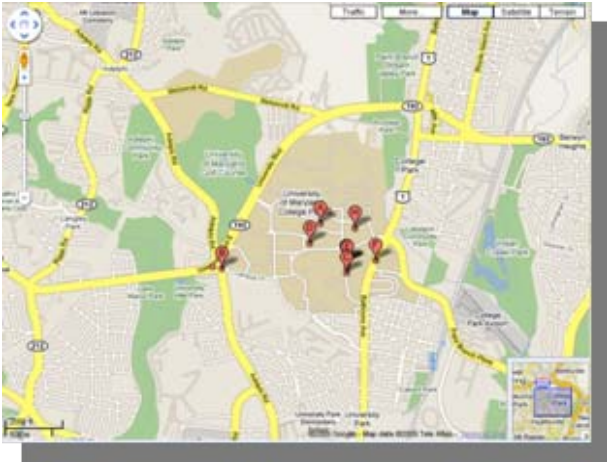


SpaceTree - 2002

TaxonTree - 2004



# Some Modern ZUIs



Google Maps



Seadragon



Canvas for OneNote



Zoomorama

# Walls, Mobile, Surface



[Squidy](#)



# LaunchTile & AppLens

One-Handed Thumb Use on Small Devices

Amy K. Karlson  
Benjamin B. Bederson  
University of Maryland

John SanGiovanni  
Microsoft Research



Microsoft  
**Research**



[Karlson, Bederson & SanGiovanni, CHI 2005]

# Zumobi ZoomCanvas



# Benefit

- Engaging
- Feels natural
- Probably improves some task performance
- Probably hurts other tasks
- More creative potential
- Overviews
- Animation & structured content

# Challenges

- Hard to scale
- Hard to author
- Temporal separation requires STM to integrate multiple views
- Spatial memory & spatial navigation limited
- Navigation controls non-standard, tricky



# Design Guidelines

- Need small visual representation of object
- Small representations shouldn't change aspect ratio
- Spatial layout consistent
- Spatial layout meaningful
- Spatial layout scannable by human eye
- Breadth over depth / Don't zoom too deep
- Simple and consistent navigation mechanisms

**See full paper – abstract in your handouts**  
**Come to my iPhone programming tutorial tomorrow!**