



3D User Interfaces

2.5D and beyond

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TAT Introduction

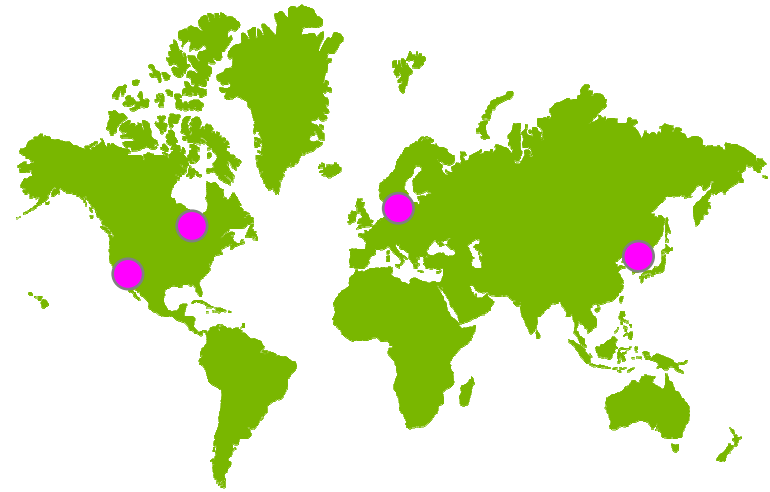
Leading provider of mobile user interface technology and design

Supplier of top OEMs, leading Operators and Internet actors

Released in more than 240 million units worldwide, 2008 >10% of all phones

140 employees

Offices in Sweden, US, and Korea



design ♥ technology



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What makes a UI feel 3D?

3D UIs convey a sense of *depth*. Ways to achieve this include:

Depth of field (camera focus)

Light and shadow effects

Zoom & overview (changing amount of detail)

Automatic movement of camera (e.g. wiggle) or objects

User-generated movement, e.g. through touch, motion sensor or eye-tracking

Design clues, e.g. recurring shapes, converging lines

Different images to left and right eye (stereoscopic)



Demo: Head tracking UI

<http://www.youtube.com/watch?v=7SImOIMcMlk>



But what's the point?



3 Pillars of 3D Qualities

Flexible Information Visualization

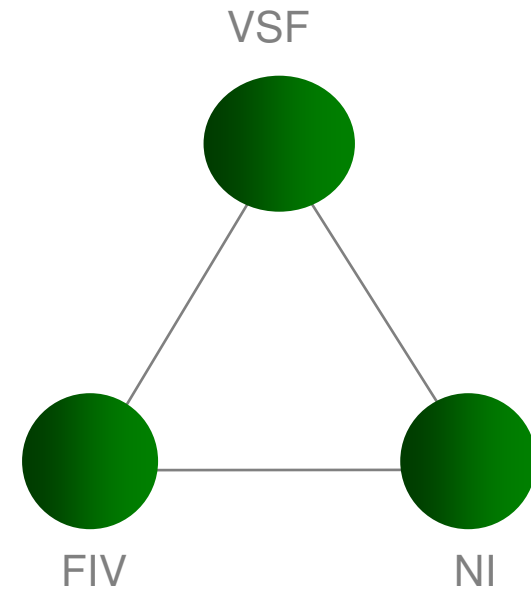
Naturalized Interaction

Visual Style & Feedback



Analyzing and using 3D in mobile user interfaces

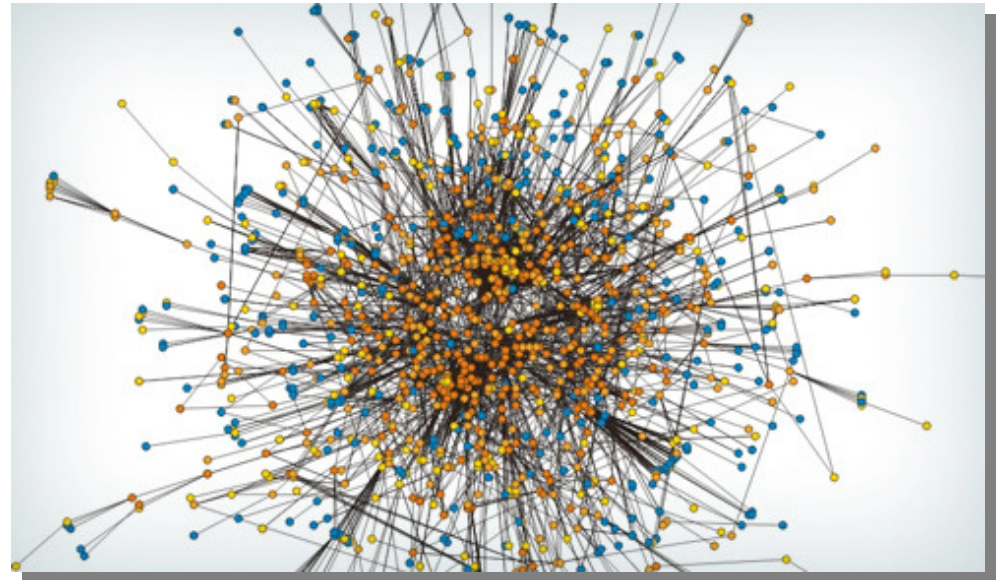
- Flexible Information Visualization (FIV)
 - Scalable UIs to organize data-sets ranging from small to endless amounts (e.g. connected, cloud UI:s)
 - 3D UIs can be used to create more extensive overviews and exploit various navigational metaphors.
 - Content as UI
- Naturalized Interaction (NI)
 - Build on human understanding of space and physical materiality of objects
 - More meaningful and easy recognized interaction possibilities.
 - Cognitive load of the user is reduced, and the use and learning of an application or interface is more intuitive.
- Visual Style & Feedback (VSF)
 - The WOW factor – a stylistic element
 - Product differentiation and an enriched visual language that offers both functional and astethic appeal.



Flexible Information Visualization (FIV)

Flexible Information Visualization (FIV) describes the elements of 3D which allow a UI to better display **large amounts of data**, like playlists, in interesting ways relevant to the user and to the application being used.

FIV provides the possibility of **scalable and pliable UIs** to organize data-sets ranging from small to endless amounts. In contrast to 2D UIs which thrive by displaying small amounts of data or utilizing search functions, 3D UIs can give scalable overviews and exploit various navigational metaphors.



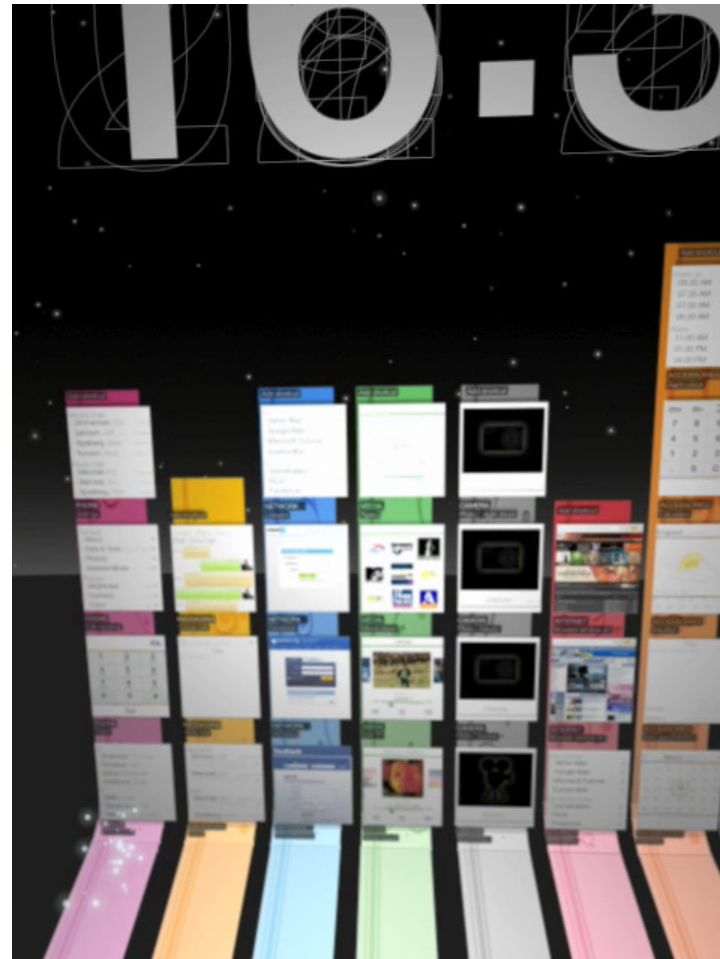
Focus Declutter

Optimize Zoom & Overview

Relationships



Demo ribbons



Naturalized Interaction(NI)

Naturalized Interaction (NI) describes the elements of a 3D UI which **minimize how much a user needs to think** about how they're using an application, and allows them to simply use it.

Using 3D for representations that builds upon innate human understanding of space and physical materiality of objects to offer a set of meaningful and easily recognized interaction possibilities. By using 3D to support these tacit understandings, the cognitive load of the user is reduced, and the use and learning of an application or interface is more intuitive.

Reduce Cognitive Load

Show Options

Show Affordances

Flatten Learning Curve



Demo: 3D Cylinder



Visual Style & Feedback (VSF)

Visual Style and Feedback (VSF) describes how 3D can add a “**wow effect**” to a product and better differentiate itself from competitors.

As a stylistic element, 3D offers the possibility of **product differentiation** and an enriched visual language that offers both functional and aesthetic appeal.



Wow Effect Visual Immersion
Feedback Holistic & Seamless
Relationships



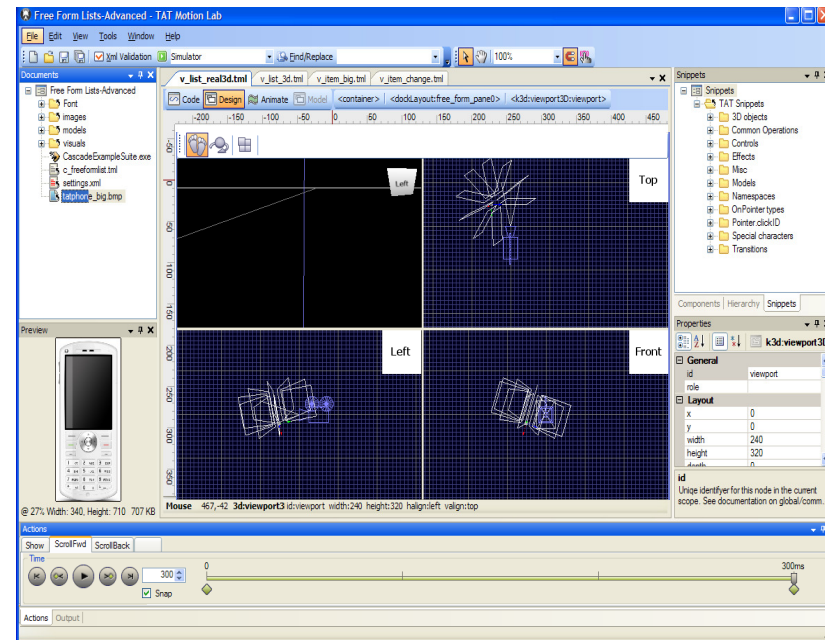
Why do we see so few real 3D UIs?

Interaction designers have a long tradition of making 2D UIs

- No best practice
- Harder to get a good interaction from 2d input methods

UI tools does not support 3d design as much as 2d design

- All (?) UI toolkits have some kind of list, how should we do a list in 3d?
- What new components do we get to replace to list?



Going from 2D to 2.5D

Rigid objects, based on simple geometric forms are easy to understand

Using rigid objects, camera or object movements are clear

Rigid objects risk becoming boring in the long run

2.5D is convenient for presenting and navigating 2D content with some of the benefits of 3D (FIV, NI etc)

Can reuse much interaction from 2d components (list scroll etc.)

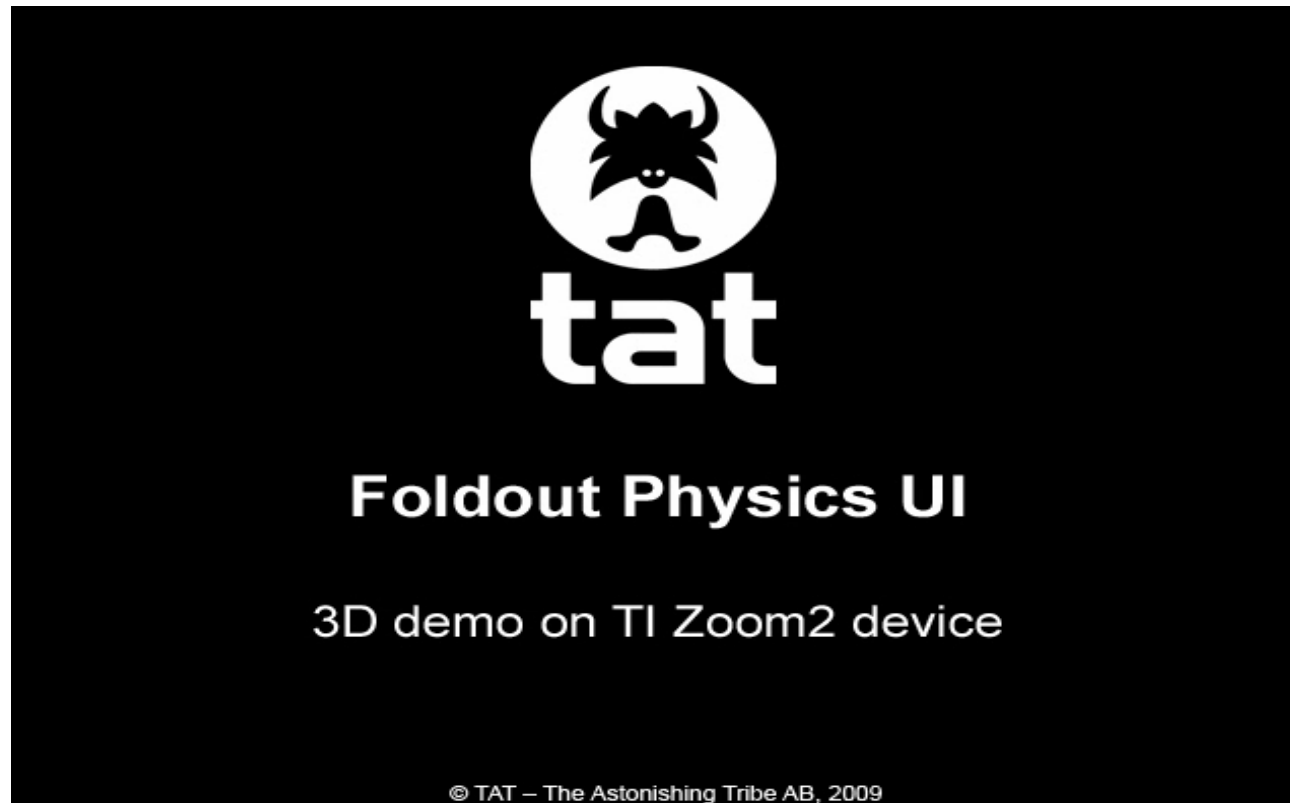


image: www.whitevoid.com



Demo: Foldout Physics UI (MWC 2009)

http://www.youtube.com/watch?v=FtR_zA9elrM



Creating new widgets for 3D

To help interaction designers we should create new widgets to give new "battle proven" building blocks.
Widgets should include interaction, interaction becomes very dependent on visual representation for complex widgets.
Shader parameters that can be used by the widget/default set of shaders.
Need new (detail based) backends for new types of data.

Still no standard set of widgets for 3d.



Interaction with 3d components

Indirect input

- Keypad
- 6d pin
- Softkeys (on screen buttons/sliders)

Direct input

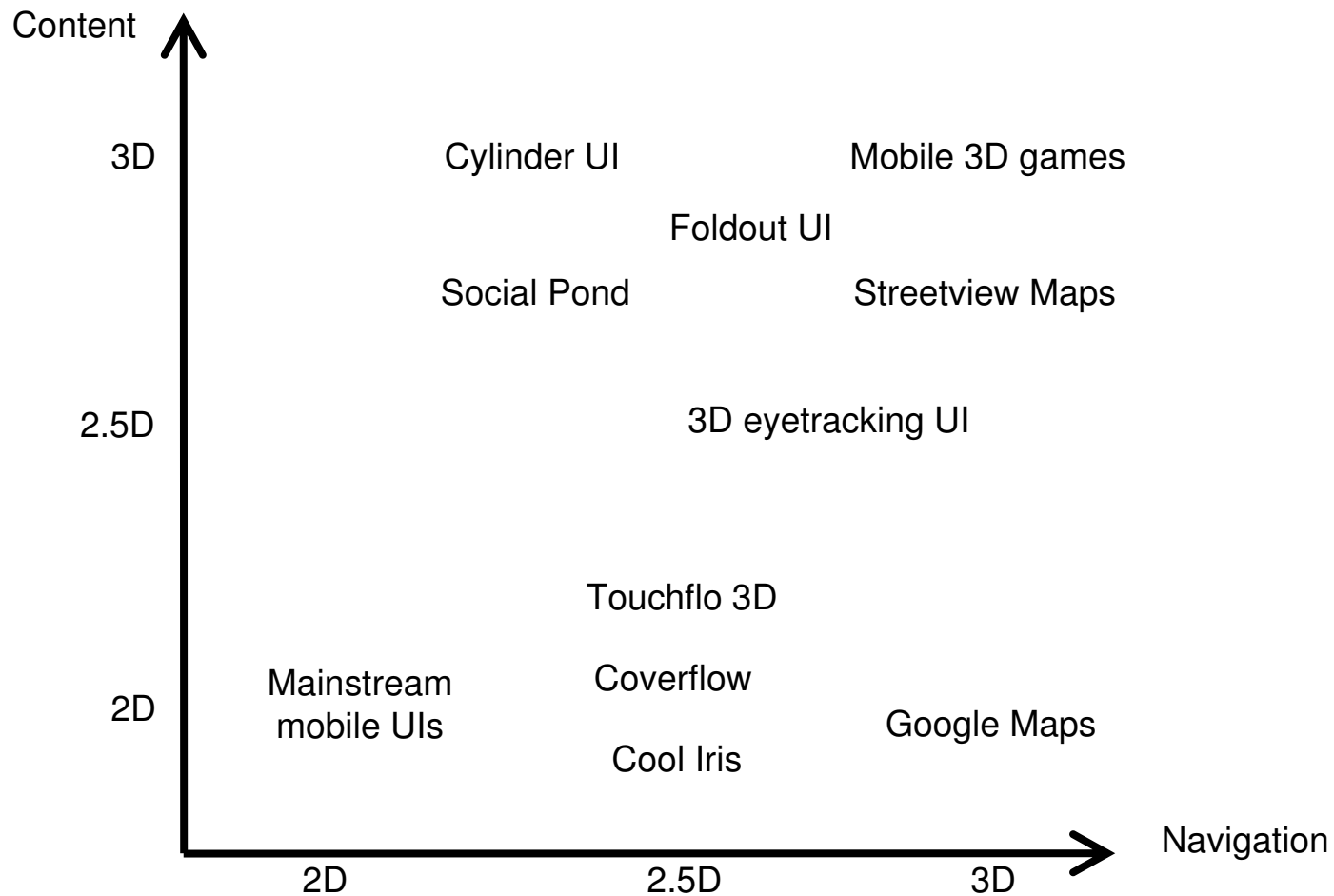
- Touchscreen (2d)
- Accelerometer/head tracking (3d)



Camera movement
Moving content
Zooming
Drag & drop
...



From 2D to 3D – content and navigation



Complementing technologies

Mobile UIs are no longer just about button input and visual output
New input paradigms require new approaches to output, for example:

Touchscreen input -> usability need for **haptic** and/or **sound** feedback

Gesture input (via touchscreen or motion sensor) -> expectation of visual output that follow gestures realistically, e.g. through **physics modeling**

3D aesthetics and realism -> increasing expectations that UIs should mimic the real world, e.g. by including **sound** and **haptics**

In a well designed device, output is closely linked and matched to user input
Changing one part of a UI will affect other aspects



Summary of Qualities

3D is not a solution or a goal in itself

What it offers us is an opportunity to expand our toolkit. The tools it offers us can be complex and nearly endless, as they get closer to representing the real world.

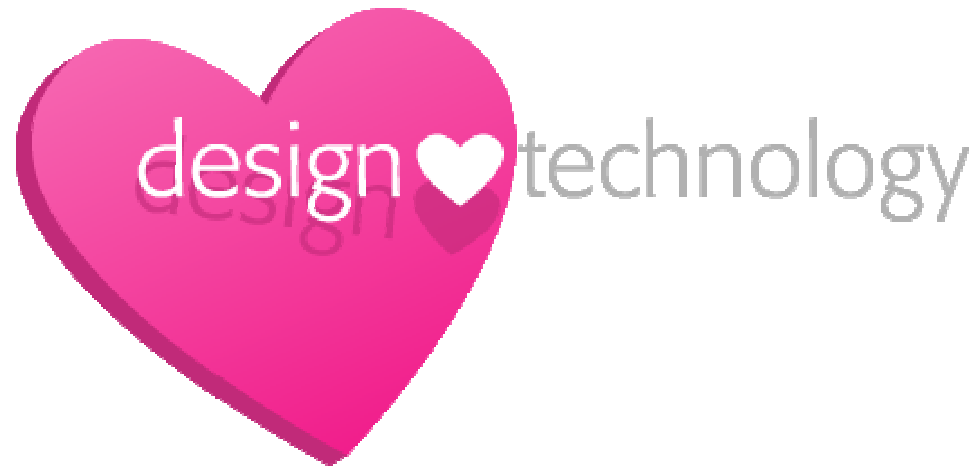
Understanding 3D

In the mobile world, 3D is still new ground, and most fall back on old tricks. What is needed is to understand what the different tools of 3D will specifically mean to the user experience.

Using the Framework

The framework of FIV, NI, and VSF are a beginning to gaining this understanding, and represent a broader understanding of the benefits of 3D in the UI.





THANK YOU!



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