Is 'Iron Man 2' Right? Re-Investigating 3D User Interfaces

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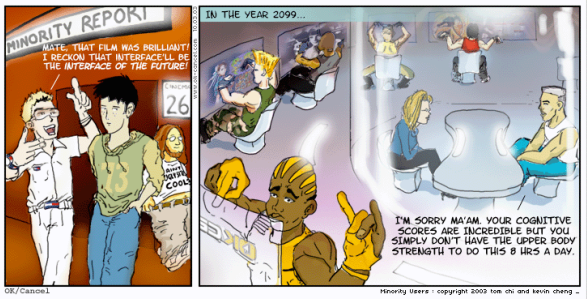
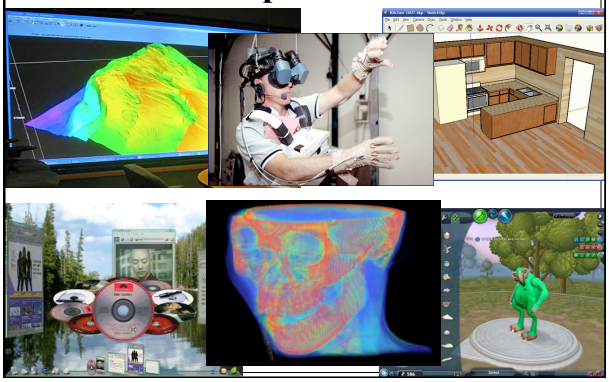
3D UI in 'Iron Man 2'

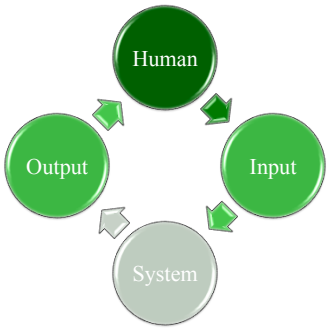
OK/Cancel on Minority Report



Real Examples for 3D UI's

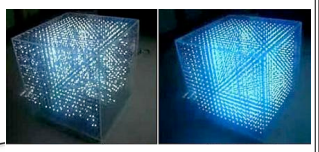


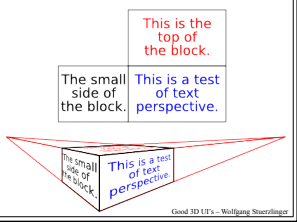
3D UI Cycle



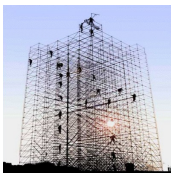
Input

Output

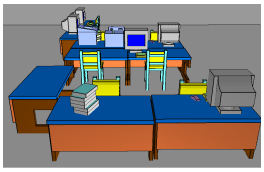




Spatial Navigation/Manipulation



Comparative User Study



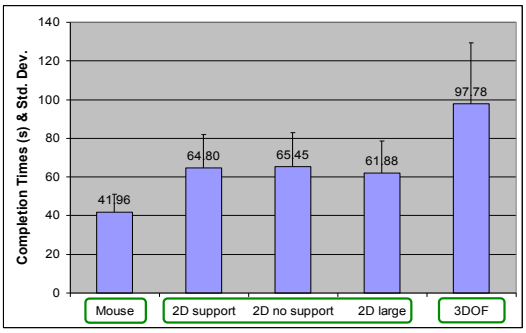
Input Device Study Design

Five conditions:

- Mouse
- Tracker as mouse, on desk
- Tracker as mouse, in air
- Tracker as mouse, on desk, large
- Tracker in 3D (with collision avoidance)

2D input with 3D tracker

Results



Discussion

Confirmation: "smart" 3D faster than "full" 3D

- Controlling more "D" is harder

Surprise 1

- No significant effect of support (air vs. desk)

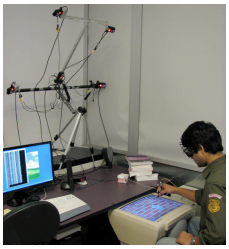
Surprise 2

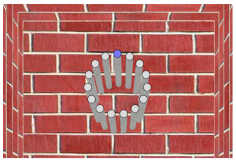
- Mouse < Tracker
  - Follow-up study attributes this to *latency*

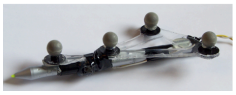
2D & 3D Input for 3D Pointing

Compare in Fishtank VR system

- Effective throughput, ISO 9241-9

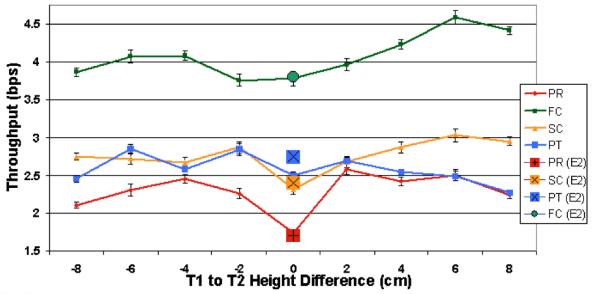






Results

PR=Ray, PT=Touch, FC=Mouse at top, SC=Sliding



New Ideas for 3D UI's (1)

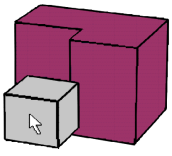
"Smart 3D": contacts, no collisions, no breakage

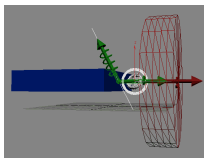
New Ideas for 3D UI's (2)

"Smart" 3D: perceptual issues

New Ideas for 3D UI's (3)

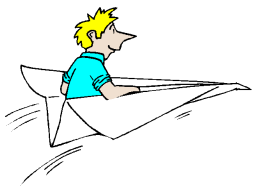
"Smart" 3D: constraints



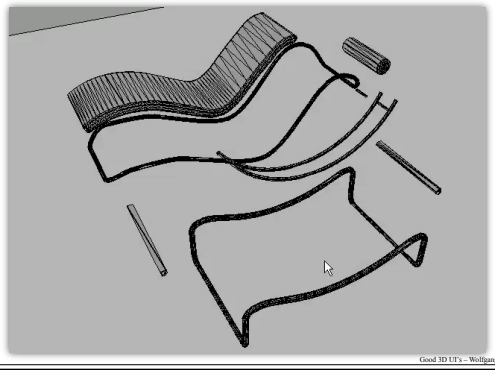


New Ideas for 3D UI's (4)

"Smart" 3D: 2.5D instead of 3D



SESAME Sliding Video

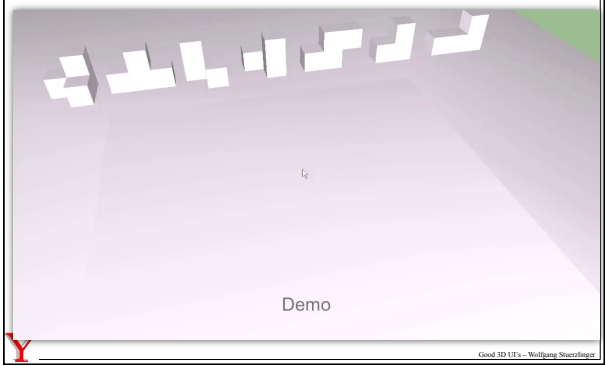


(Basic) SESAME Sliding technique

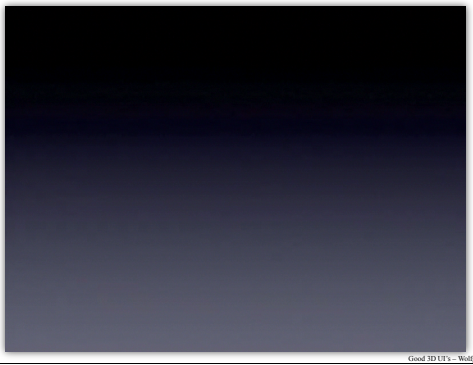
Find contact behind area of moving object

1. Render background (z- & item-buffer)
2. Render back-faces of moving object
3. Identify min z-distance & find polygons
4. Use geometry to position object
5. Do collision detection (graphics hardware)
6. If collision, go to 2.

Puzzle Task Video



Depth-popping video



End

Thanks to my grad students

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- …

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