

Human Computer Interaction

4. Fundamental of Vision-based Interfaces (C)

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Goal

- Primitive vision-based 3D interaction
- Example: VisionWand, Proc. UIST'03

DOF of your control

- Thinking about degrees of freedoms of your controls.
 - Translation, orientation, etc.

- How about Wii remote controls?

DOF of your control

- Using key-color balls
 - One ball
 - Two balls
 - Three balls
 - More

VisionWand:

Interaction Techniques for Large Displays
using a Passive Wand Tracked in 3D

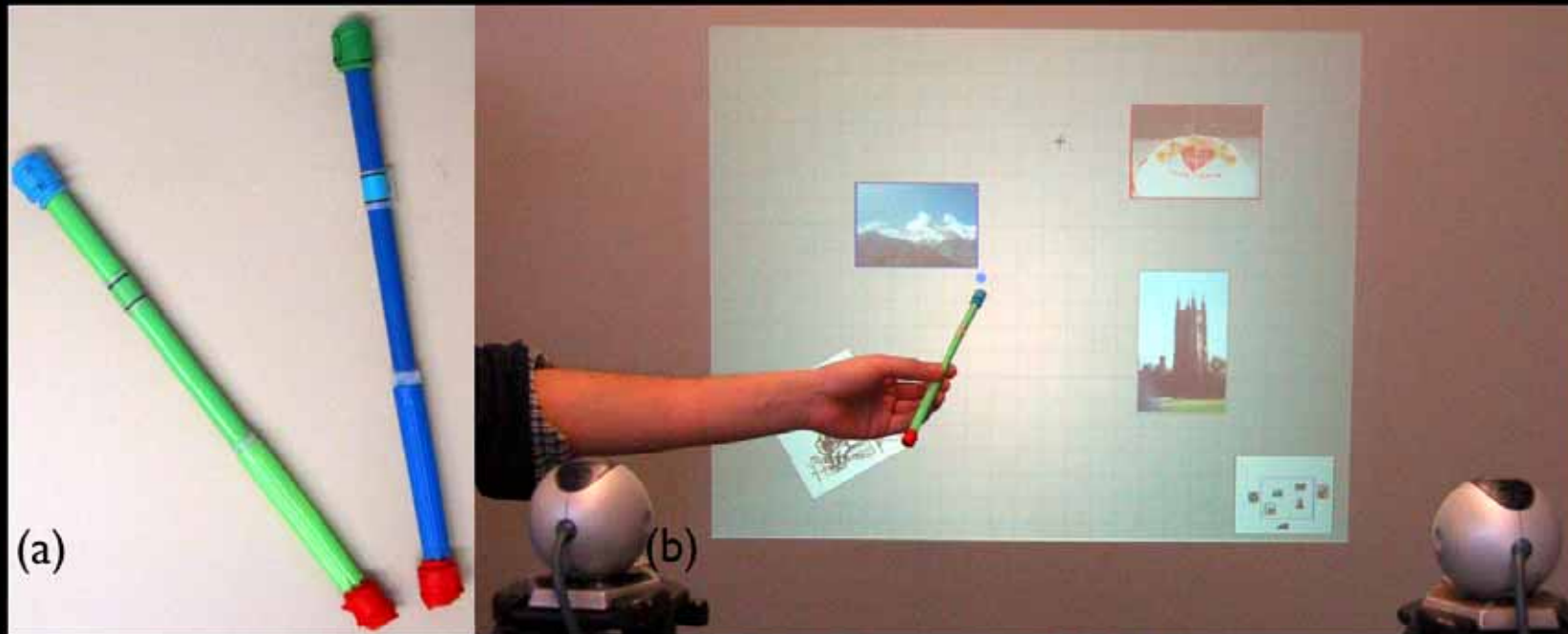
Proc. UIST'03

Xiang Cao, Ravin Balakrishnan
Dept. of Computer Science, Univ. Toronto

VisionWand

- A passive wand tracked in 3D.
- Without any keyboard, mouse, or button.
- Developing a set of postures and gestures to track state and enable command input.

VisionWand (cont.)

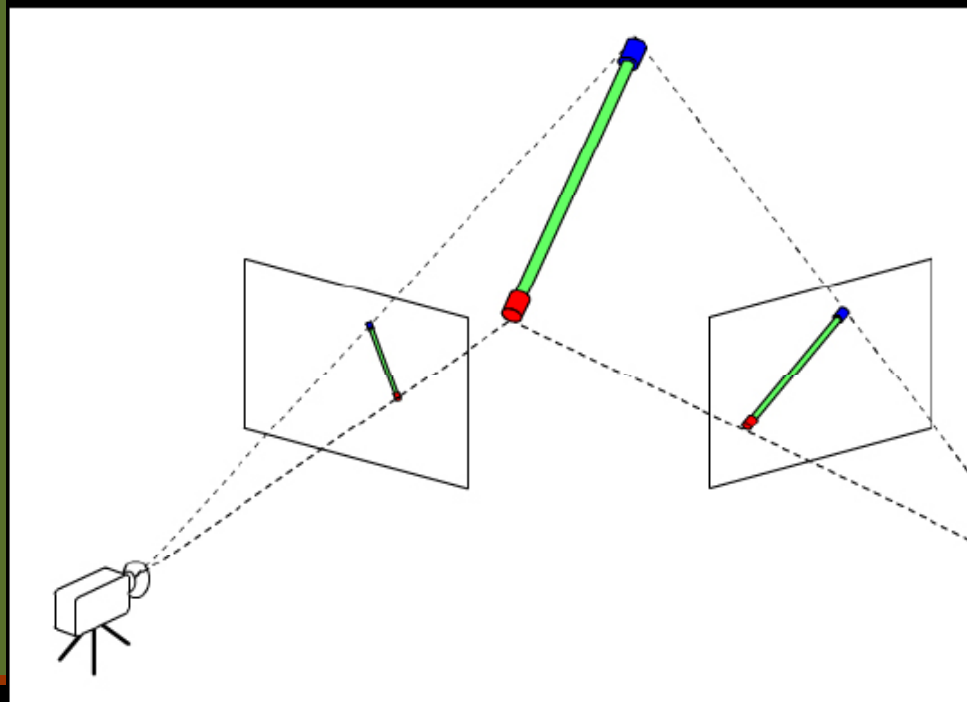


(a)

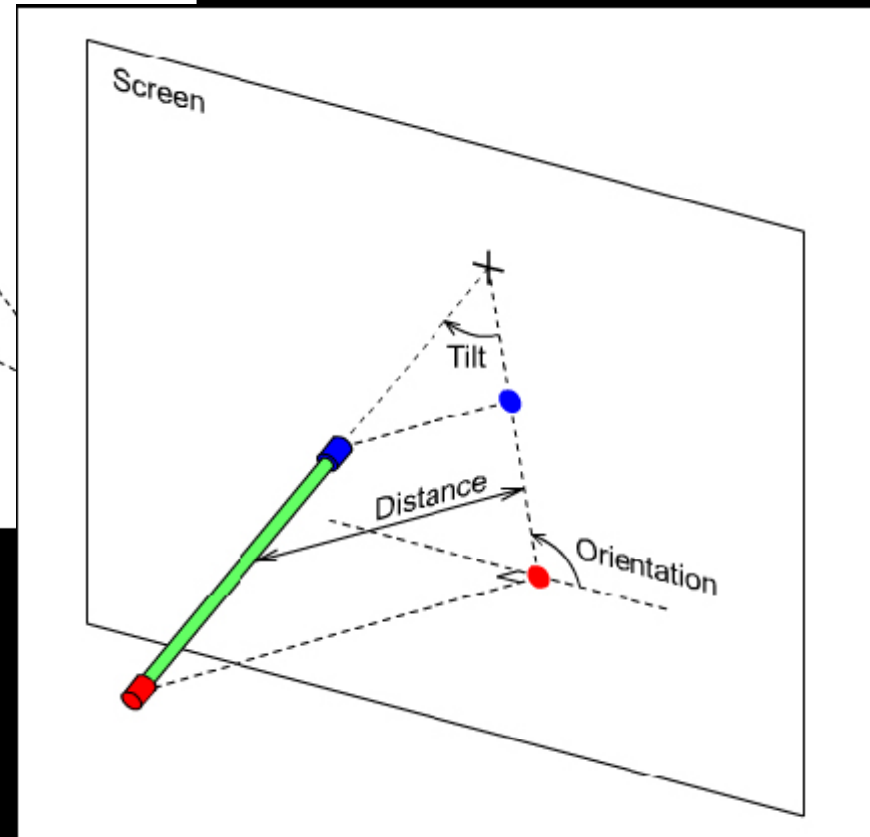
(b)

(a) The wands (b) system setup

The system



3D reconstruction and control parameters



Design principles

■ Inferred actions

- Postures: the position and orientation of the wand in space
- Gestures: the dynamic characteristics of the wand's movement.

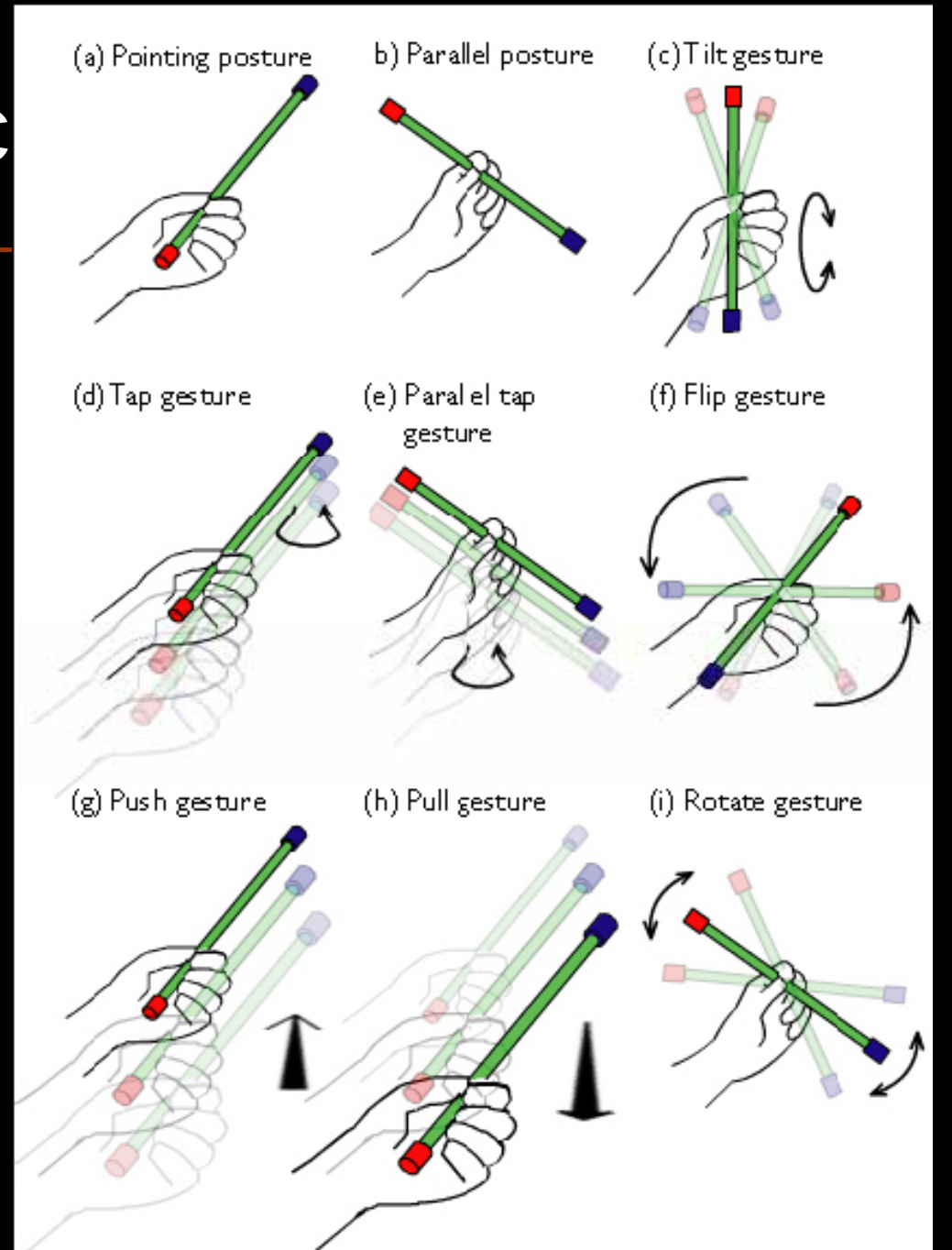
■ Easily understandable actions

- Limit the number of possible actions to a small set
- Provide appropriate visual feedback to aid in the comprehension of those actions.

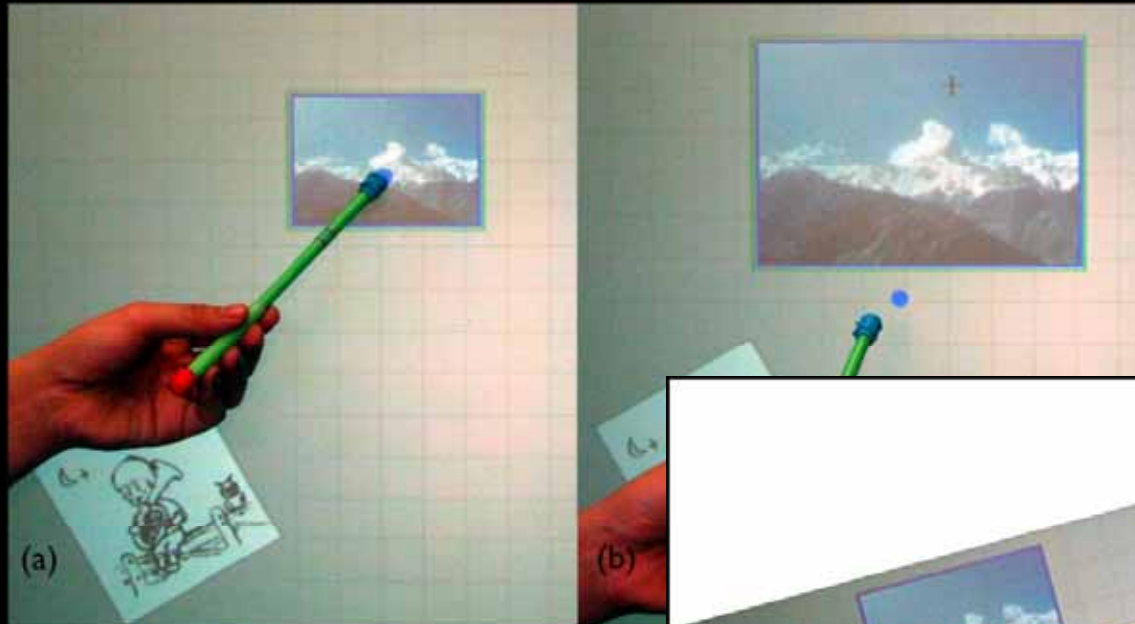
Design princ

- Leveraging haptic memory
 - Allowing for essentially eyes-free operation after sufficient practice.

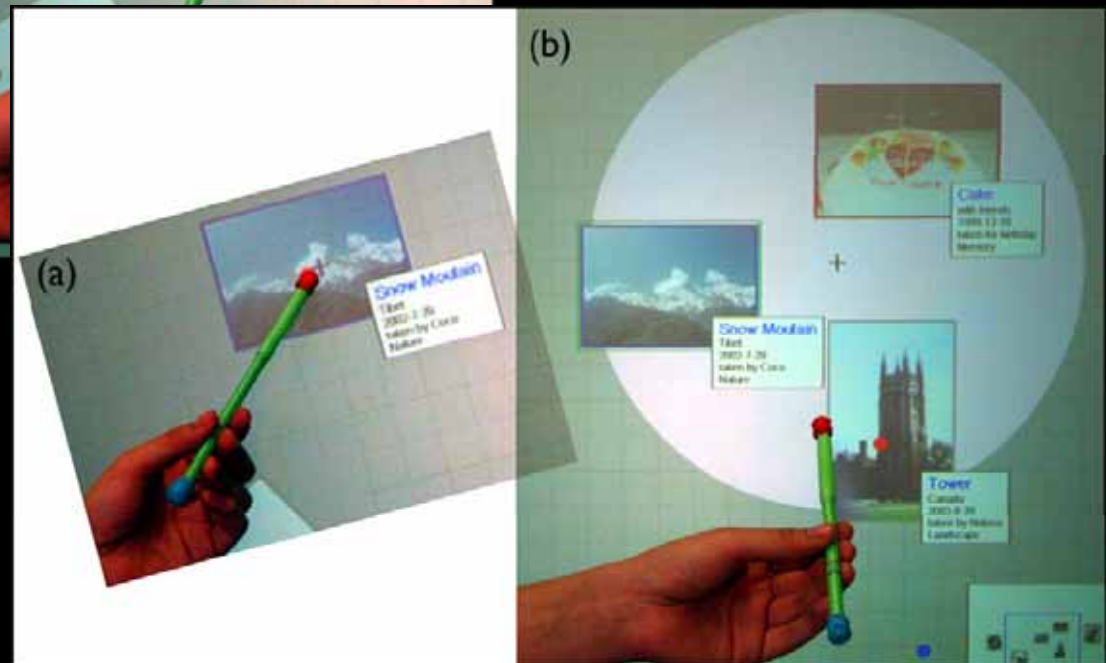
Posture and gesture



Interaction

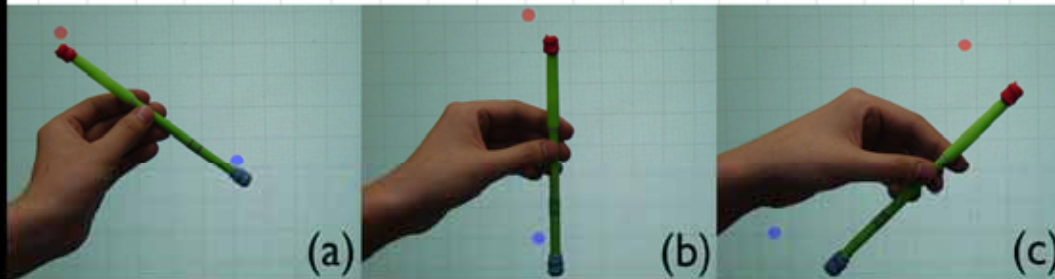
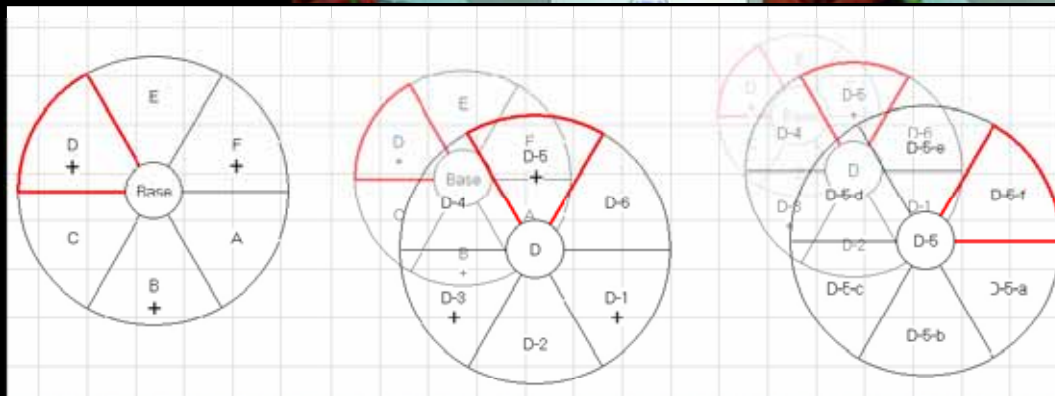
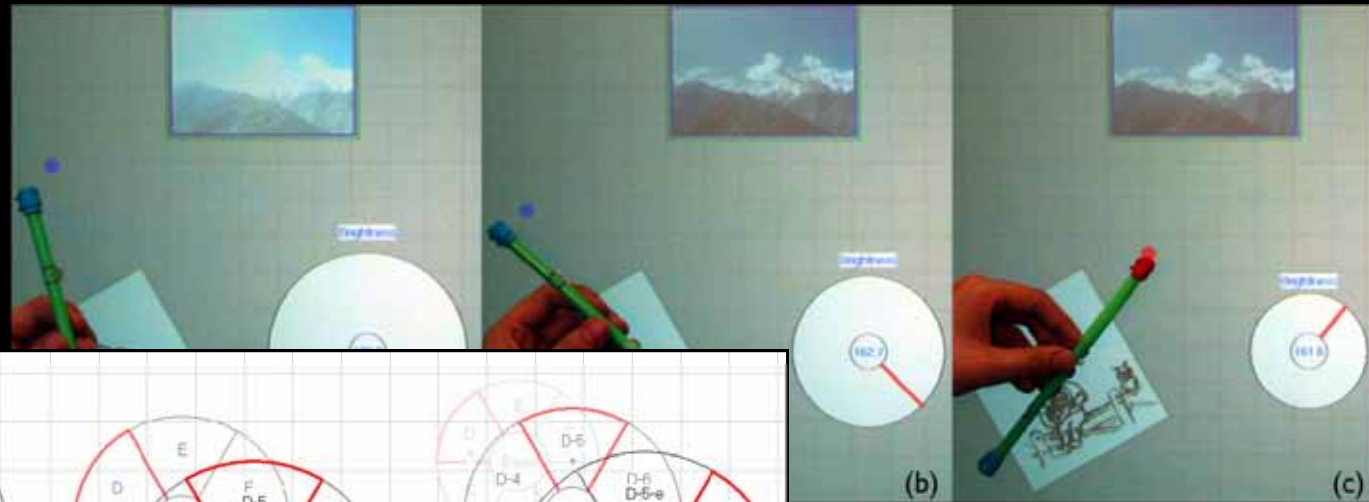


Moving and scaling



Pointing and selection

Interaction (cont.)



Discussion

- Held in different ways Different functionality.
- Compared to standard 2-dof devices, the wand has 5 degrees-of-freedom.
 - Problem: simultaneously using multiple DOFs.
- Keeping gesture/posture set small and simple to avoid recognition problems.

Discussion (cont.)

- How about more dynamic gestures or actions?
- Where to use this kind of interfaces?