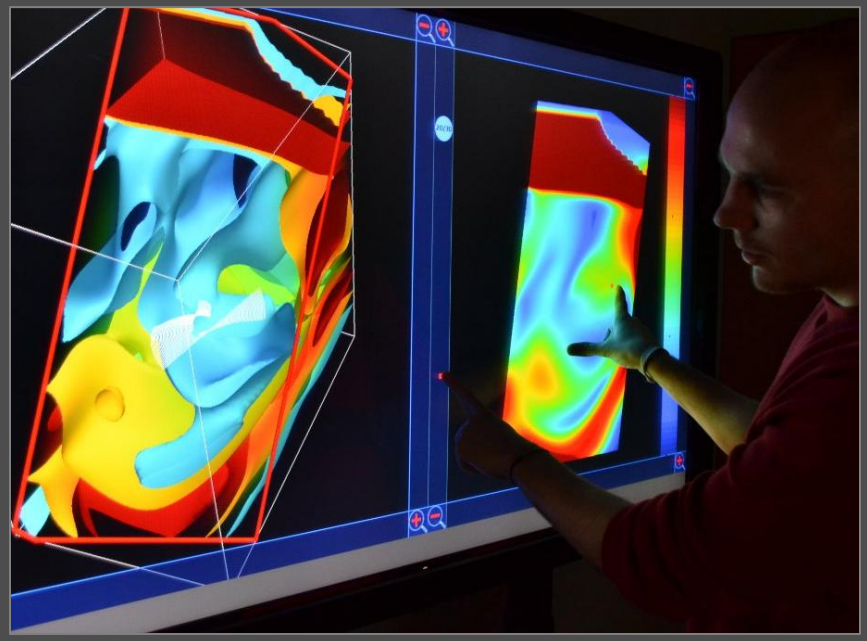
Gestures vs. Postures: 'Gestural' Touch Interaction in 3D Environments

Tobias Isenberg

Mark Hancock



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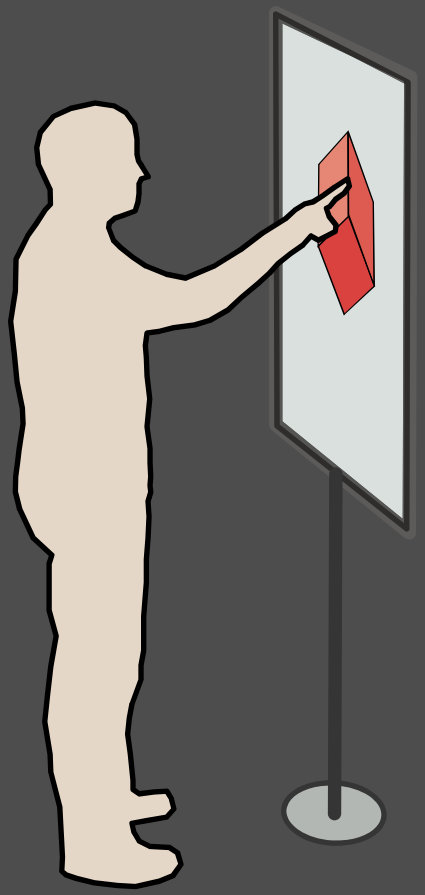
Context: Control of Environment w/ Touch



Touch-based Interaction in General

- primary interaction vocabulary quite limited:
  - touch down
  - touch move
  - touch release
- need to specify diverse set of interactions, powerful interfaces
- use of *'gestural' interaction*
  - to specify modalities
  - to provide input values
- But what is a 'gesture', really?
- typically an implicit notion of a 'gesture'

the "pinching gesture":

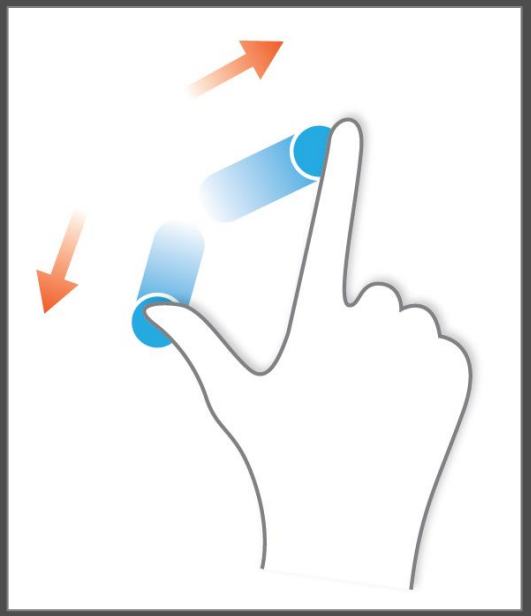


image by Wikipedia user GRPH3B18

‘Gesture’ Definitions

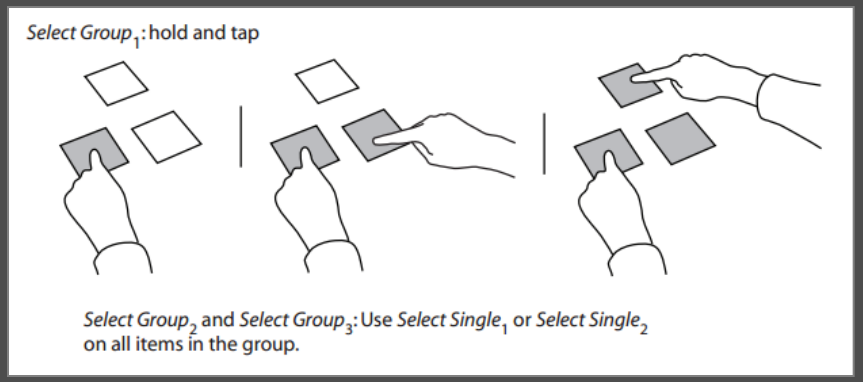
- gesture definitions in communications studies
  - gesture as *act* & as *symbol* (e.g., Nespoulos & Lecors [1986])
  - semiotics of gestures

- Baudel & Beaudouin-Lafon [1993]:
  - start & end configurations
  - emphasis on dynamic motion

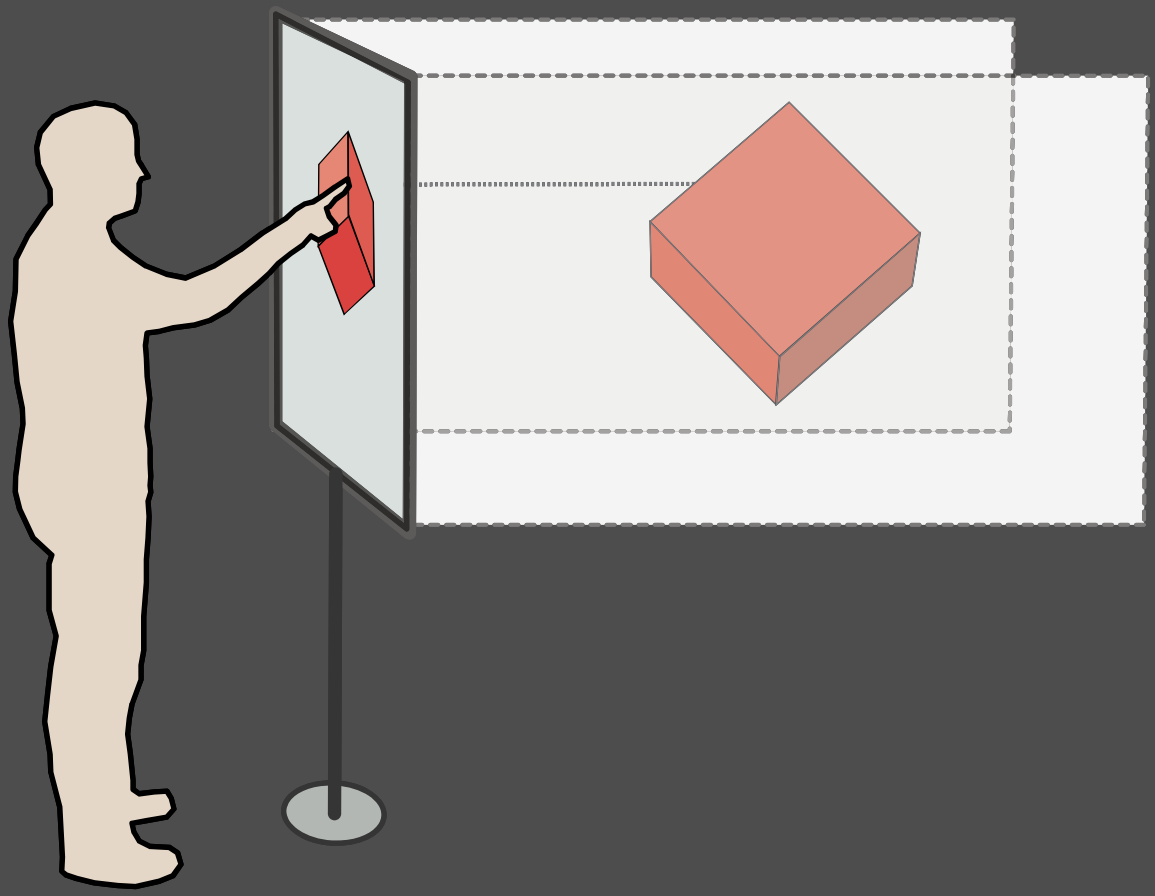
‘Gesture’ Definitions

- Wu et al. [2006]:
  - design principles of *registration* & *relaxation*
  - *posture* to start the ‘gesture’
  - motion as integral part
  - *continuous* & *discrete* ‘gestures’

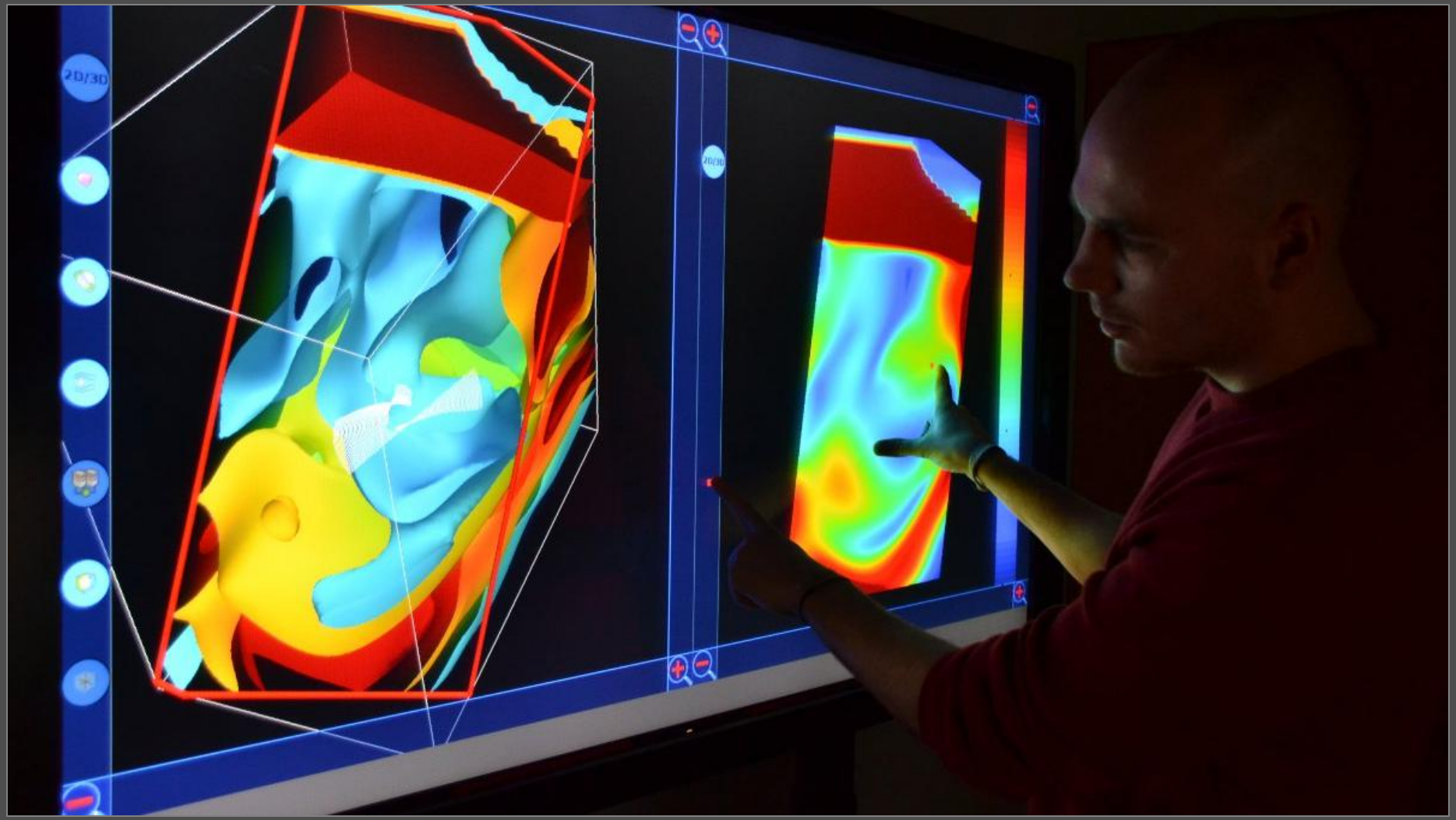
- Wobbrock et al. [2009]:
  - taxonomy: form, nature, binding, and flow
  - form & flow about dynamic (or static) characteristics



“Touching” the Third Dimension



Touch Interaction with SciVis?



EuroVis 2012, with T. Klein, F. Guéniat, L. Pastur, & F. Vernier

Touch-based Interaction with SciVis

- specific constraints for scientific visualization:
  - multiple different exploration techniques such as data navigation, data manipulation, data selection, cutting plane placement and manipulation, data probing, seed particle placement, etc.
  - techniques need to be integrated within the same single input space

- most techniques: not only switching statuses but **parameterizing** the data exploration as a part of the intuitive interaction

A definition of a touch *gesture*

A touch ***gesture*** is:

- a way to invoke **manipulations** in a direct-touch environment
- that is **started** by touching the surface in a **well-defined initial configuration**
- and that is **continued** for some time in a **well-defined motion pattern** (incl. the null motion)
- during which the configuration may change.

A definition of a touch posture

A touch **posture** is:

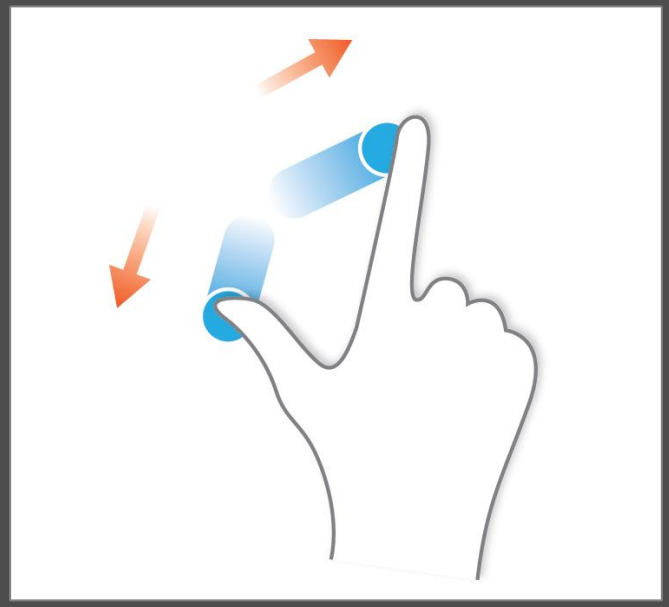
- a way to invoke **manipulations** in a direct-touch environment
- that is **characterized** by touching the surface in a **well-defined initial configuration**
- whose effect can be **parameterized** by a **subsequent dynamic action**.

A definition of a touch quasi-posture

A touch **quasi-posture** is:

- a touch **posture**
- whose initial configuration is augmented with a **brief initial dynamic action**
- but where this action's continuation is also used to **parameterize** the effect.

Why do we care? Let's look at examples…



images by authors as cited in the table;
first image by Wikipedia user GRPH3B18

technique	*gesture*	posture	quasi-posture
2D pinching		✓	
3D RST (Reisman et al., 2009)			
shallow-depth (Hancock et al., 2007)			
sticky tools (Hancock et al., 2009)			
surface physics (Wilson et al., 2008/09)			
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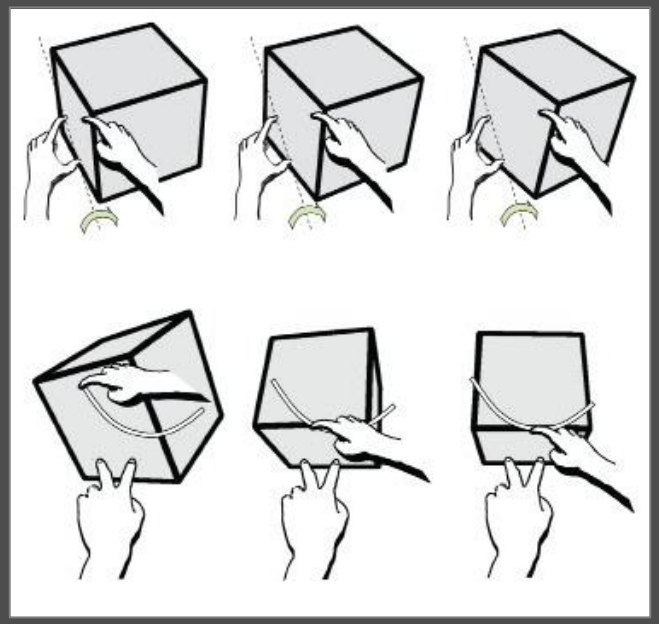

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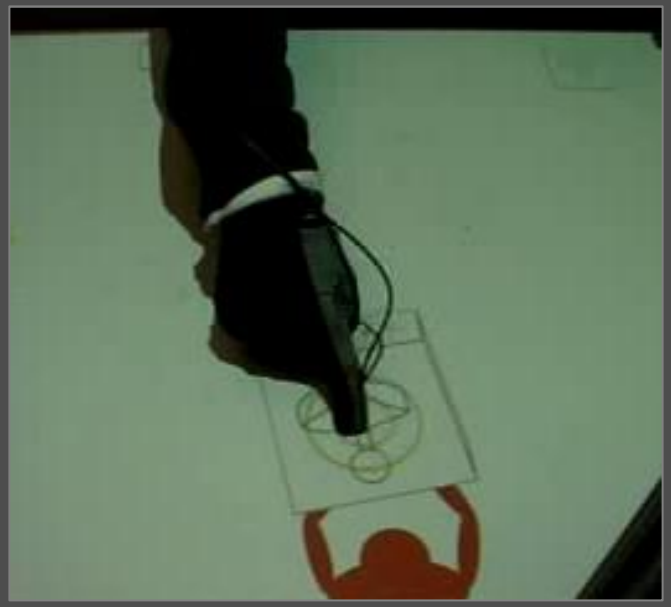

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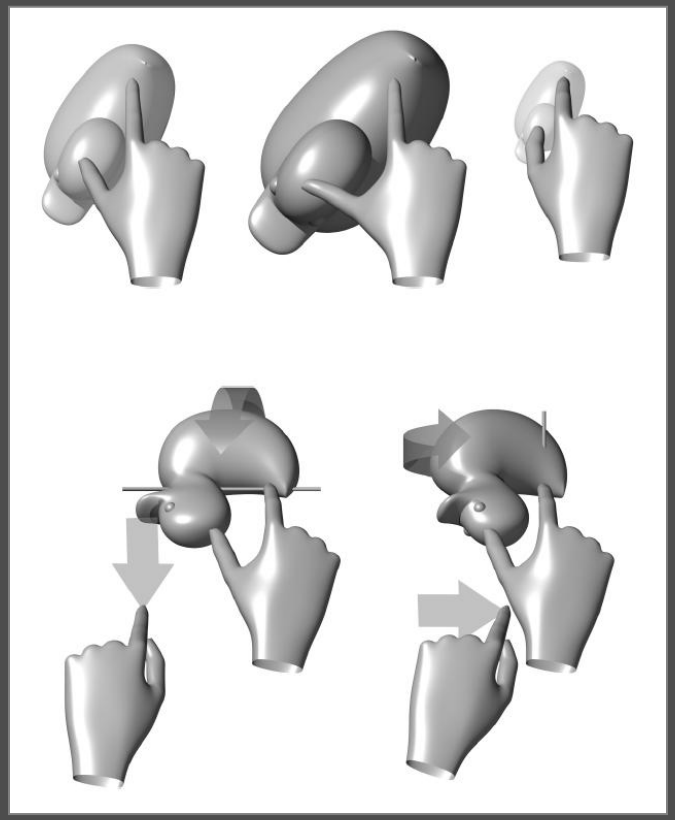

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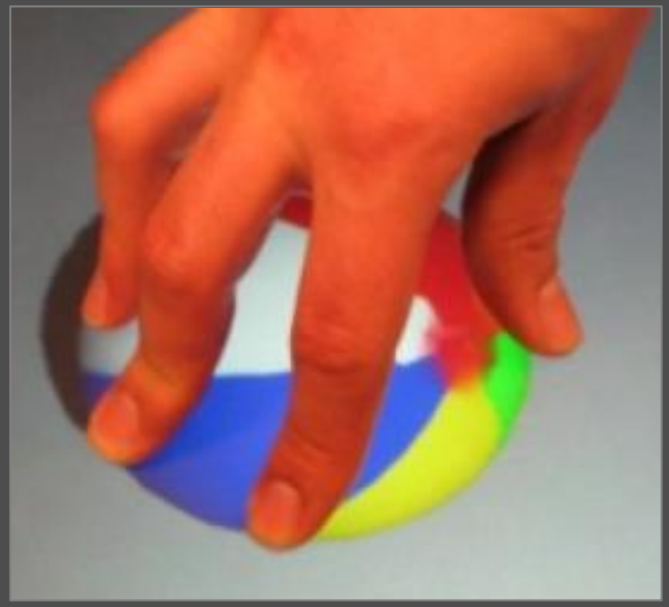

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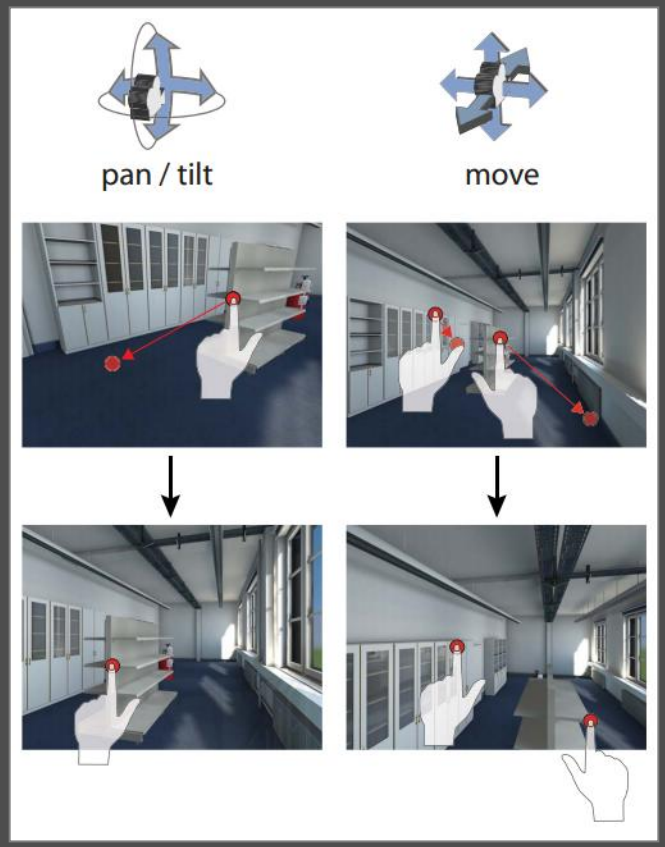

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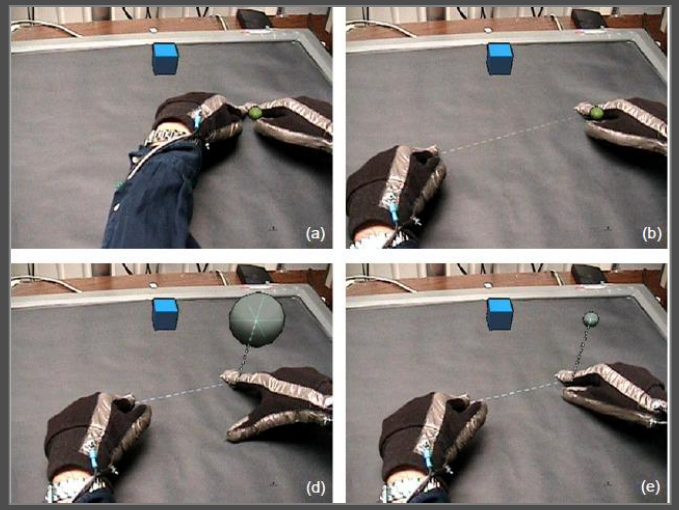

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* tapping *gesture*			

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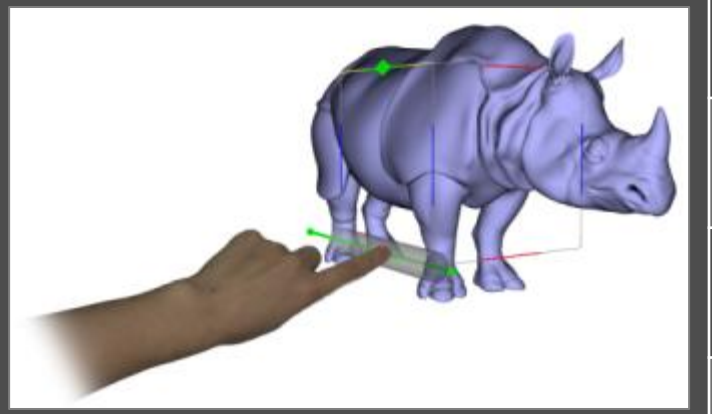

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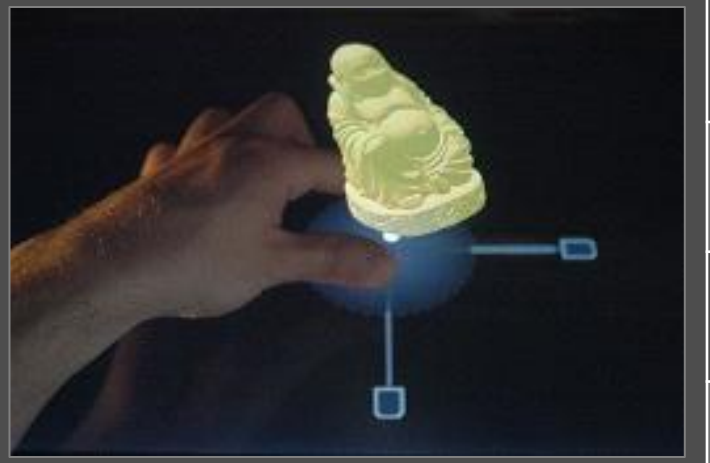

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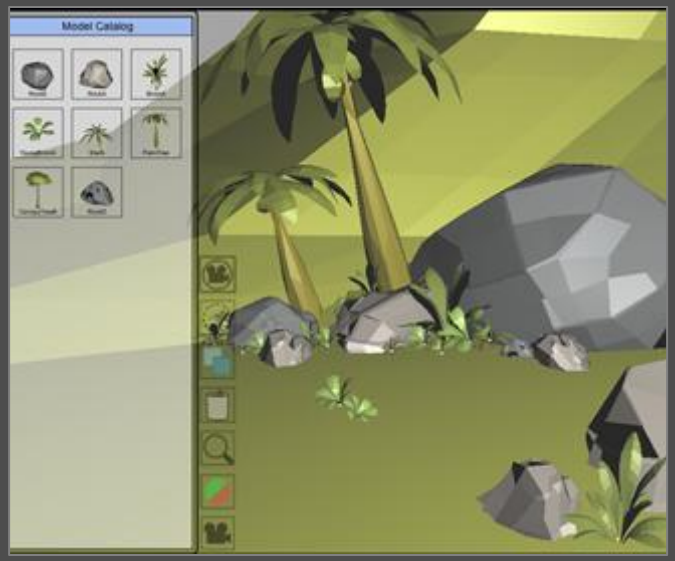

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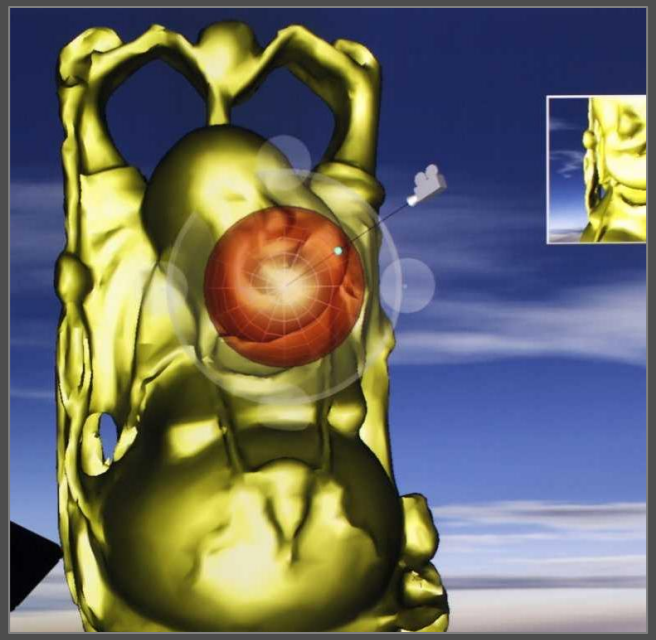

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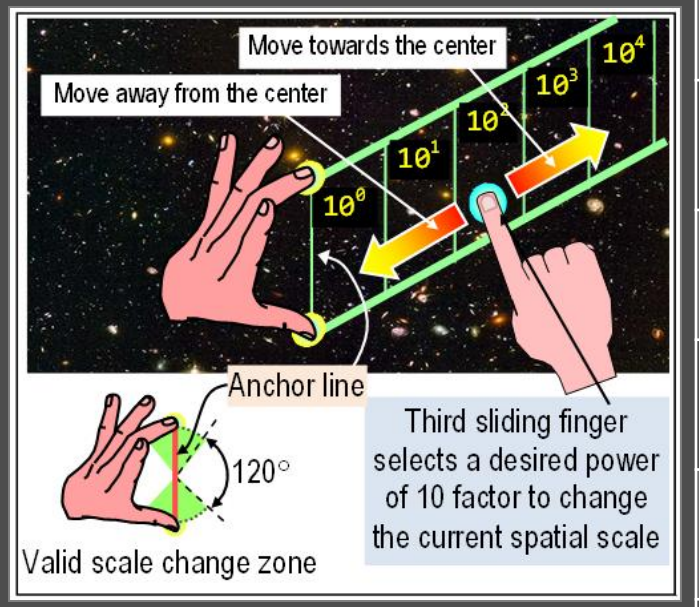
Scientific visualization examples



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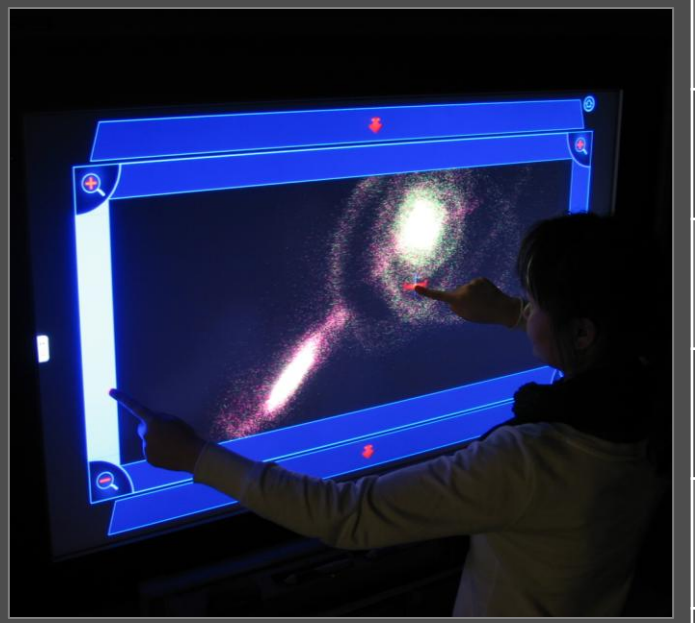

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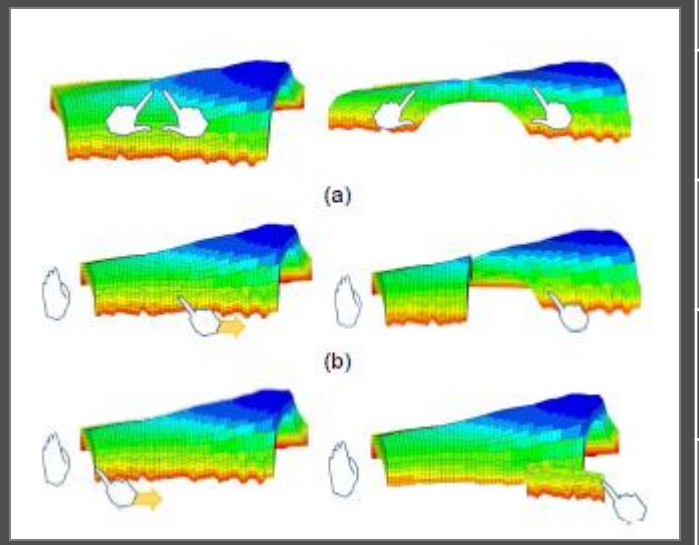

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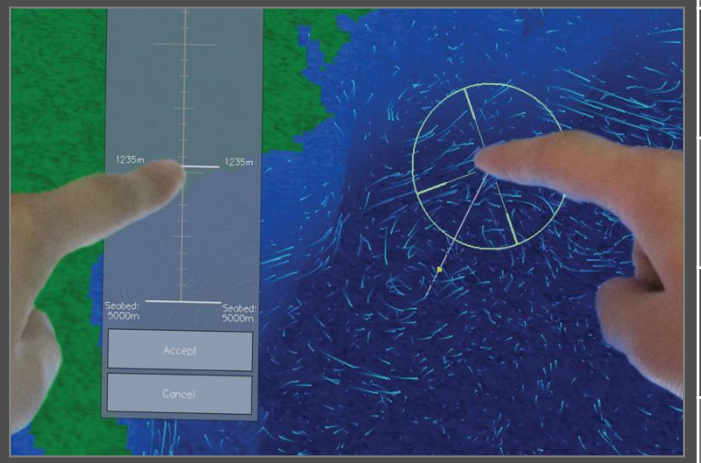

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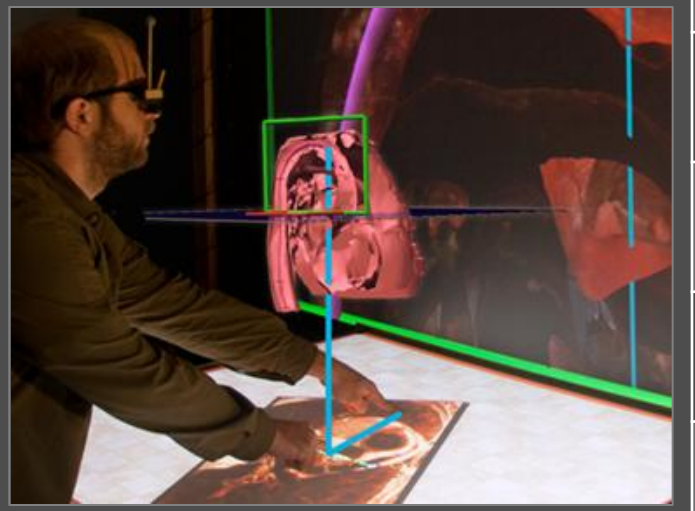

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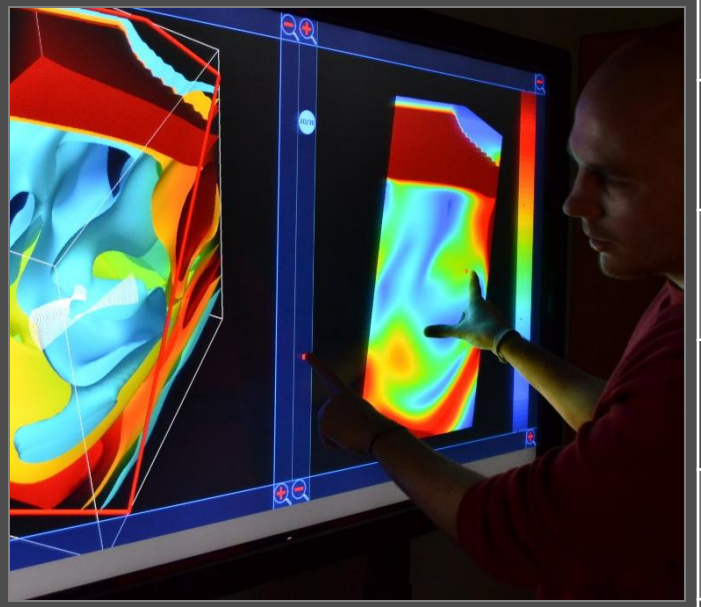

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Flow Vis (Klein et al., 2012)		✓	✓
* tapping *gesture*			

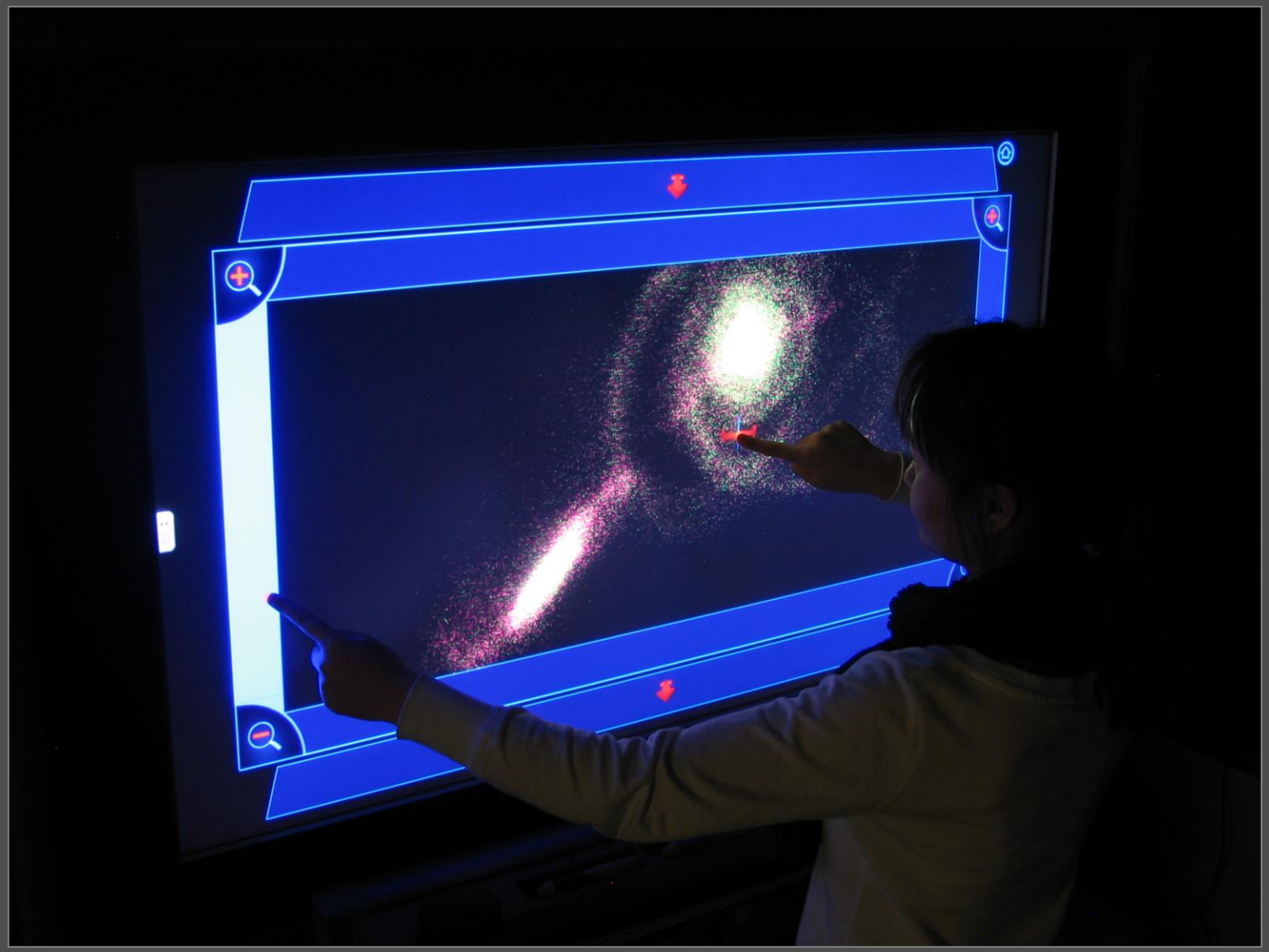
Why we think it is important to distinguish

- *gestures*: good for setting statuses (e.g., selections) or for initiating system-controlled modes

- (quasi-)postures: good for specifying user-controlled modes with a parameterization that follows, i.e., for ***directly-manipulative tasks***

- these directly-manipulative tasks are essential in scientific visualization and interactive exploration

Navigation in 3D Particle Datasets



TVCG / IEEE Visualization 2010, with L. Yu, P. Svetachov, P. Isenberg & M. H. Everts

Implications and challenges

- conflicts in the definition of postures
- but need for integration of interaction techniques
- need for precise interaction techniques

possible future directions:

- quasi-postures as potential vocabulary extension
- visual feedback/widget-based postures

question:

- tapping always a *gesture* ? (Eden vs., e.g., balloon)
- correct terminology? common use of 'gesture' …
- gesture research in communication sciences

Questions and discussion