Designing Interactive Kinetic Surface for Everyday Objects and Environments

TEI 2010 Graduate Student Consortium

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Contents

1 Background

Background

Contemporary Objects and Spaces

Cloaked in surfaces where the *physical* and *virtual*, the real and the imagined, collide (Lupton 2002).

Background

Ubiquitous computing (Weiser 1991)

Digital technology will eventually be woven into our environment *seamlessly*.

Organic Interaction Technologies: From Stone to Skin (Rekimoto 2008)

The surface of any object potentially provides *interactivity*.

Background

Interactive Kinetic Surface

Integrate the *physical* and the *virtual* world more closely so that digital information can be offered *naturally* to us when we interact with a physical object or an environment.

2 Aims

Aims

1. *Definition* & *Model* for I.K.S.
2. *Requirements* & *Guidelines* for applying I.K.S. to everyday objects & spaces
3. Design & Construct *Research Prototypes*
4. Explore Possible *Interactions* & *Application* Scenarios
5. *Evaluation*

3 Approach

Approach

Research through Design (Frayling, 1993)

Research Artifacts (Zimmerman et al. 2007)

- Artifacts that provide concrete *embodiments* of *theory* and *technical opportunities*
- Produce *knowledge* for the design & HCI research and practice communities
- For the understanding of *Interactive Kinetic Surface as new design medium* for enhancing interaction between human and the artifacts

4 Interactive Kinetic Surface

What is it?

Definition

Interactive Kinetic Surface

- A surface that embodies *kinetic interactions*
- Translates embedded information into
  1) *physical* or **Physical Kinetic Surface**
  2) *virtual* kinetic motion **Virtual Kinetic Surface**

  of the surface.

Model

Interactive Kinetic Surface

Physical Kinetic Surface

Virtual Kinetic Surface

Shade Pixel (Kim & Lee. 2008)

Digital Rubbing (Kim et al. 2008)

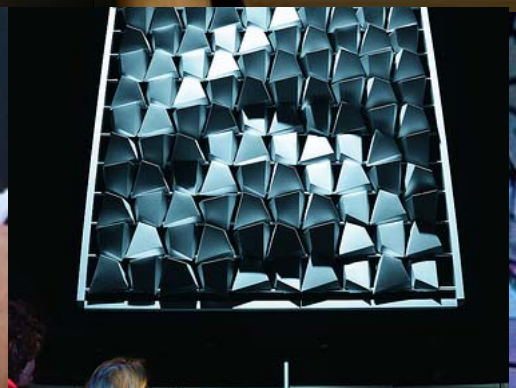
Examples Physical Kinetic Surface



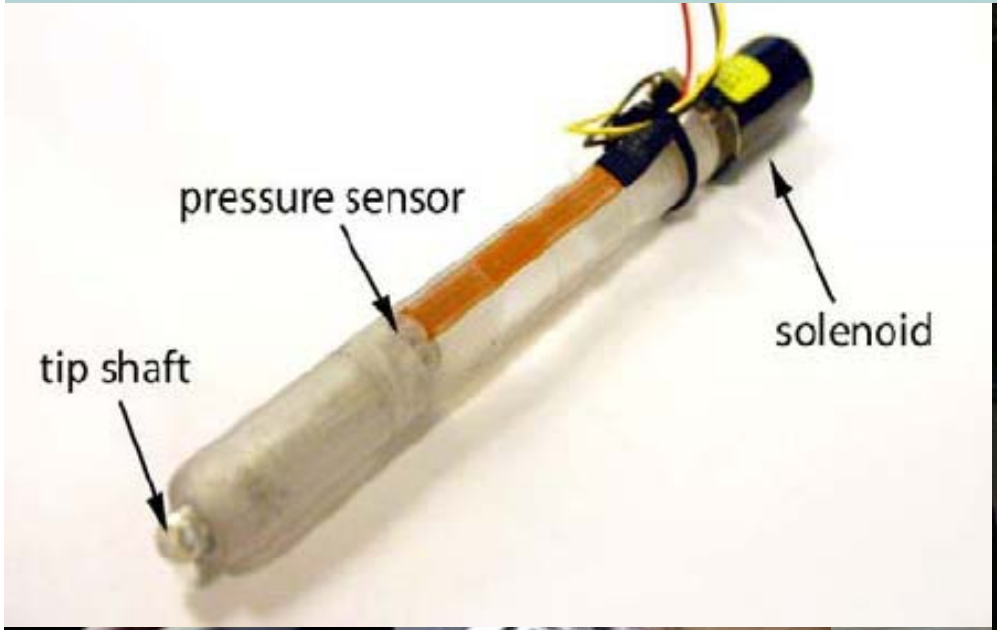


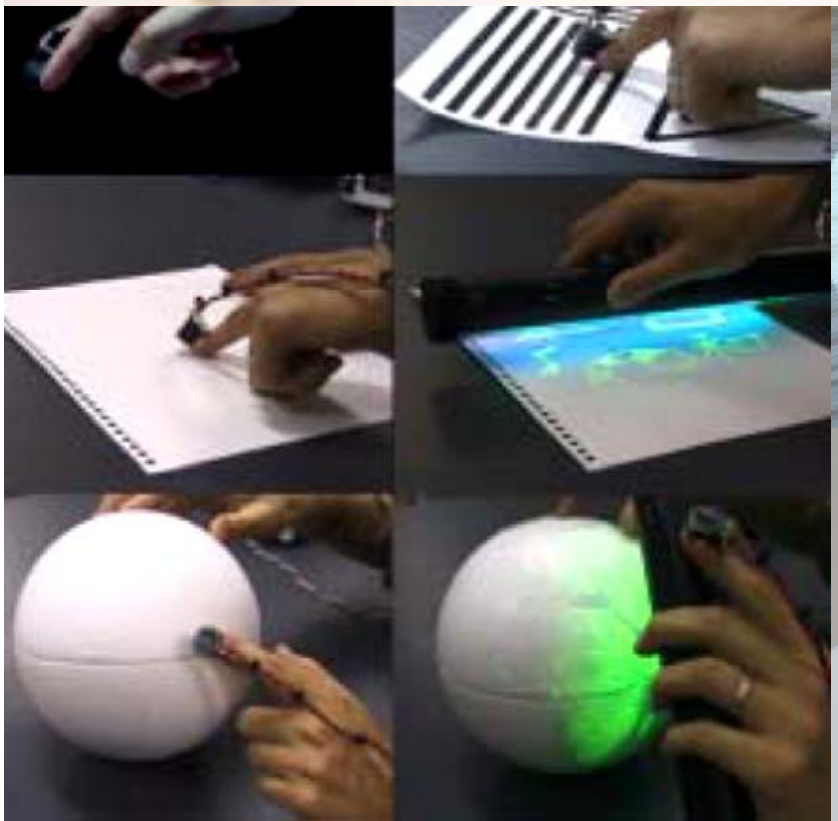





Examples Virtual Kinetic Surface





5 Interactive Kinetic Surface

Why do we need it?

Motivation

More *Interactivity* with Less *Complexity*

More Space for *Design Expression*

Natural Interaction

Multi-Modalities for Interaction

More *engaging relationship* between people and the objects

6 Interactive Kinetic Surface

How can we utilize it for everyday objects and spaces?

Case study

Interactive Kinetic Surface

Physical Kinetic Surface

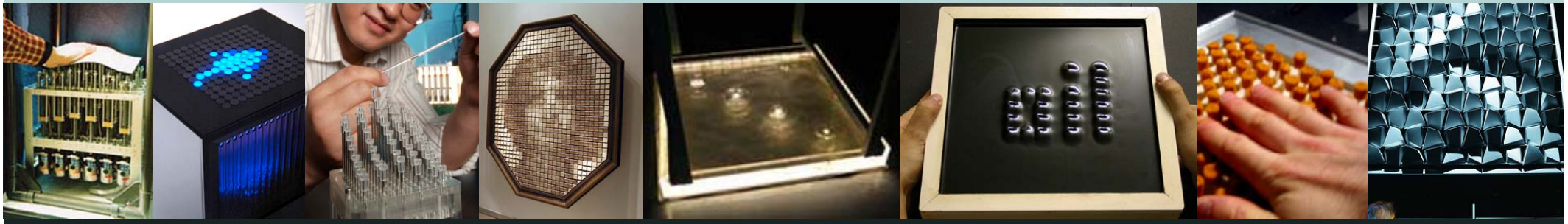
Kinetic Tiles

Virtual Kinetic Surface

Kinetic Blocks

- *Modular construction units* of Interactive Kinetic Surfaces
- *Research tools* to explore possible interactions and application scenarios of Interactive Kinetic Surface
- *Design materials* for everyday objects and environments

Case study Kinetic Tiles



- Complex and massive *structure*
- Requires considerable *energy*
- Use of expensive and experimental actuators or surface *material*

Simple & Flat
Form Factor

Energy Reducing
Mechanism

Cheap & Non-experimental
Material

Case study Kinetic Tiles

Simple & Flat Form Factor

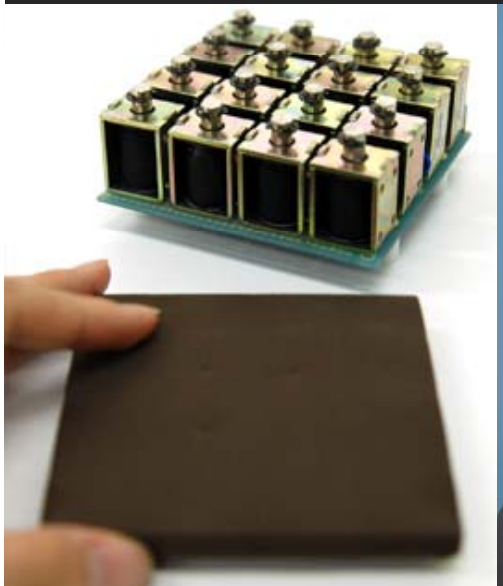
- Separating the surface material from the actuation part
- Actuators can be concealed behind the wall or other surface of objects

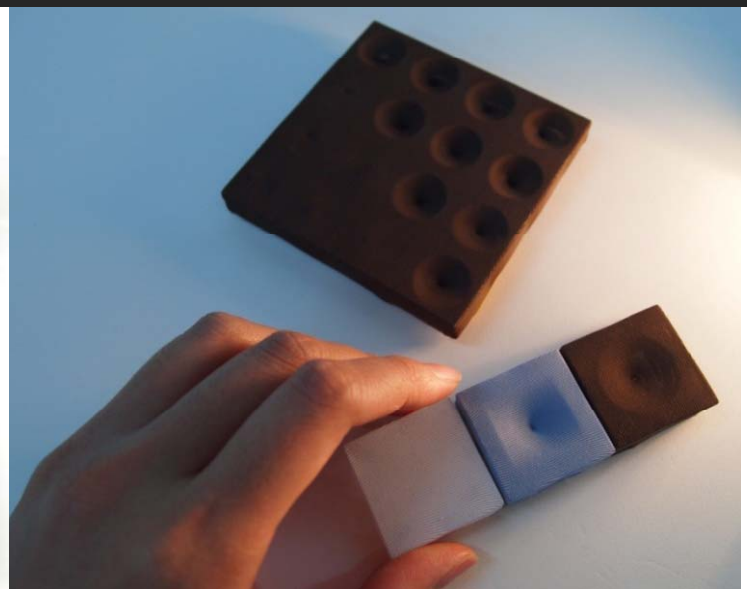
Energy Reducing Mechanism

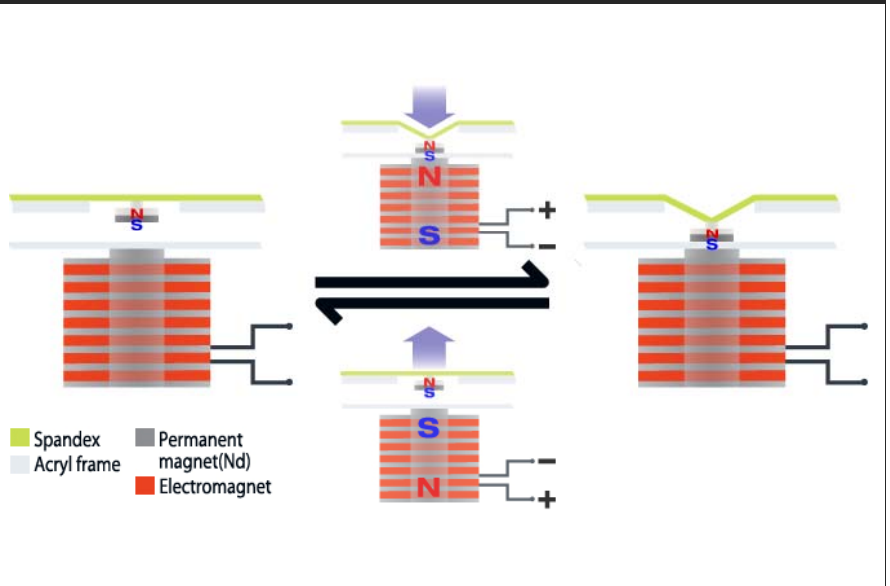
- Bi-stable mechanism: actuators maintain the position without electricity

Cheap & Non-experimental Material

- Spandex & electromagnets







Case study

Evaluation

How to evaluate *new* interactions and interfaces which are not necessarily related to efficiency but rather related to *emotional* qualities, to *experiential* qualities, and to *aesthetic* qualities

(Petersen, Hallnäs, & Jacob)

7 Appendix

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