# Interaction styles

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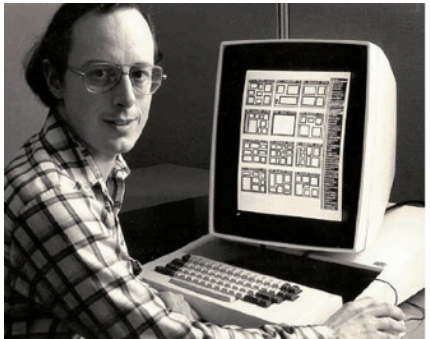
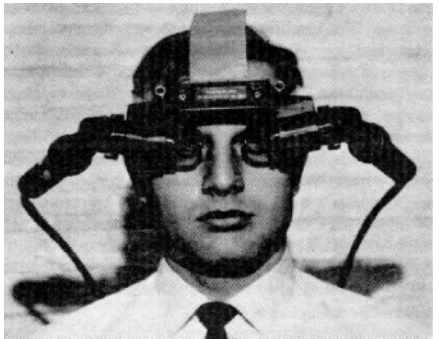
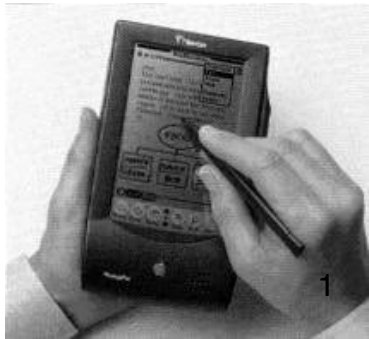




# Interaction styles

## Conversational

- Command language
- Dialog imposed by the system

```
% date
Fri February 11
%
```

## Menus, forms

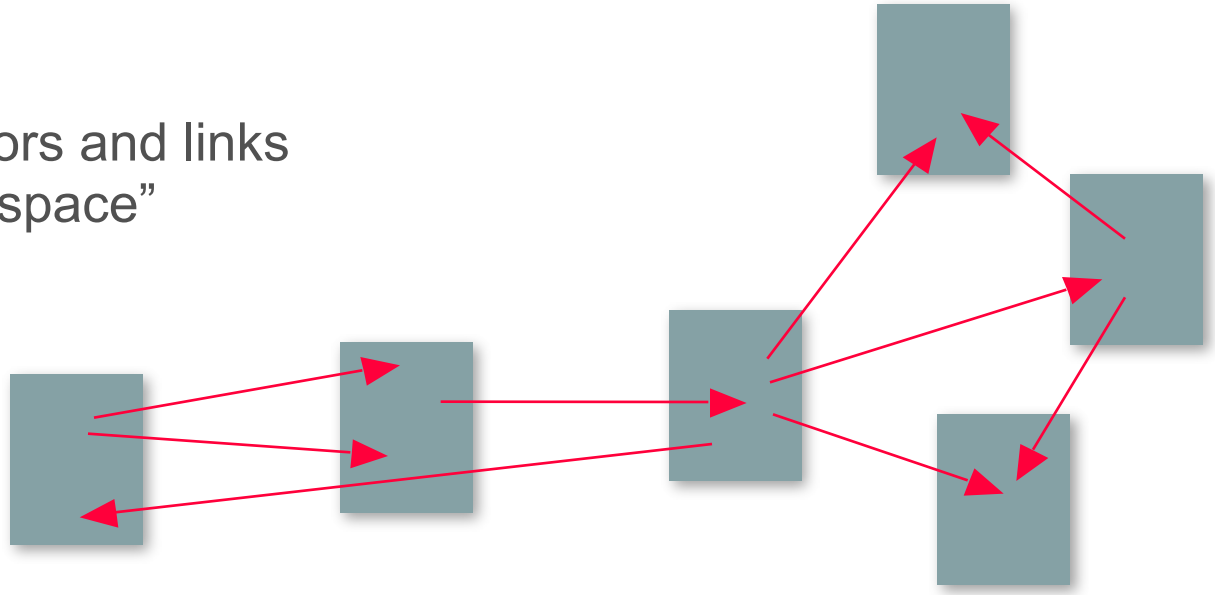
- The system guides the user
- Dialog controlled by the system

```
Name : ..............        1 - search
Surname : ...........        2 - create
CPR Number : ........        3 - delete
```

# Interaction styles

## Navigation

- Nodes, anchors and links
- “lost in hyperspace”



## Direct manipulation

- Physical, “direct” actions on (representations of) the objects
- Inspires all current “first person” interfaces

# Direct manipulation

Shneiderman (1983)

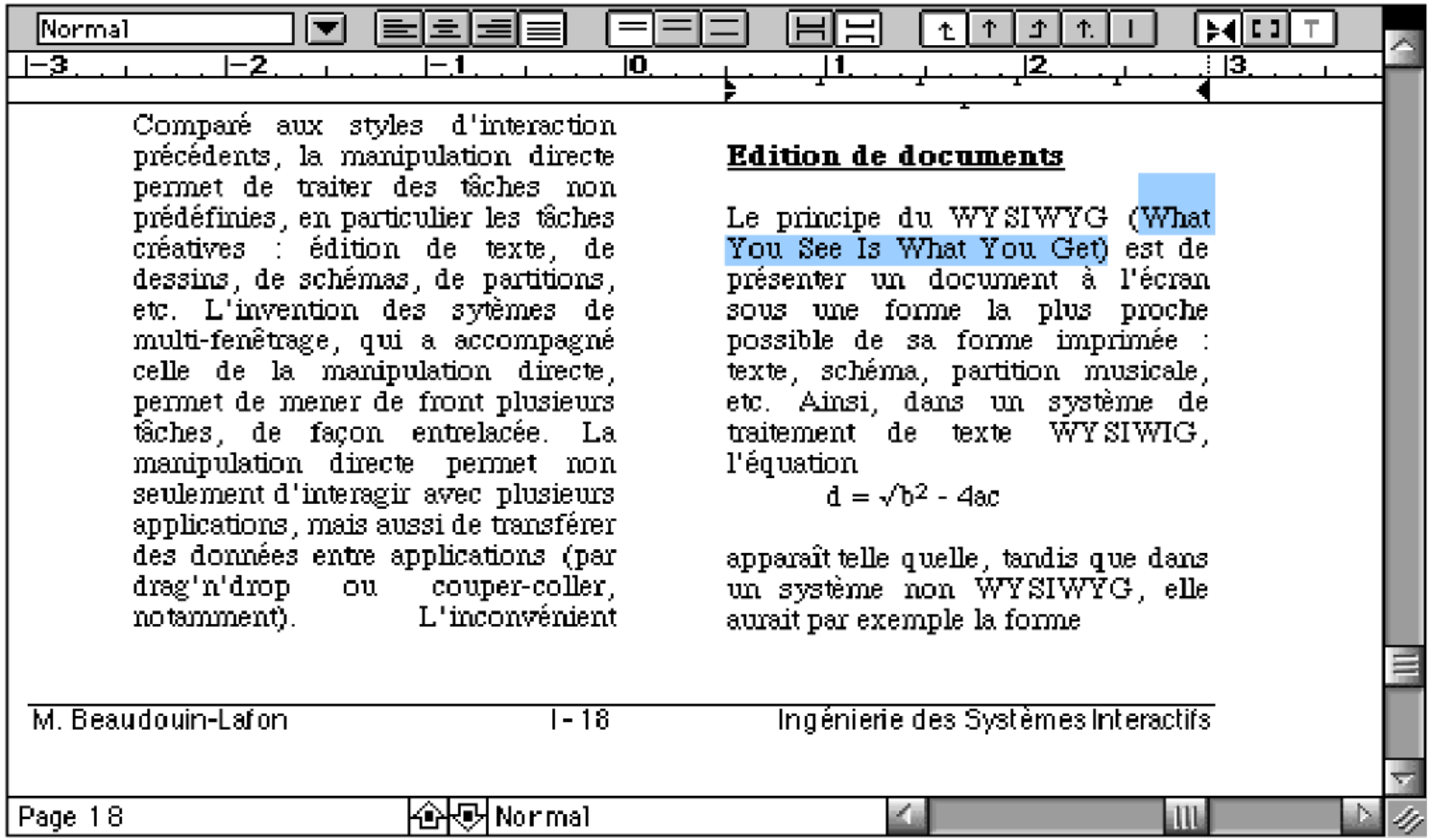
Four principles

1. Continuous representation of the objects of interest
2. Physical actions rather than complex syntax
3. Quick, incremental, reversible operations whose effect on the objects of interest is immediately visible
4. Layered approach to facilitate learning

# Direct manipulation

## Document editing

### Interaction controlled by the user




WYSIWYG

What
You
See
Is
What
You
Get

# Direct manipulation

## Iconic interaction

- Generic interface
- Metaphorical approach
- Drag-and-drop

# WIMP interfaces: the current standard

Presentation

- **W**indows
- **I**cons (and other graphical representations)

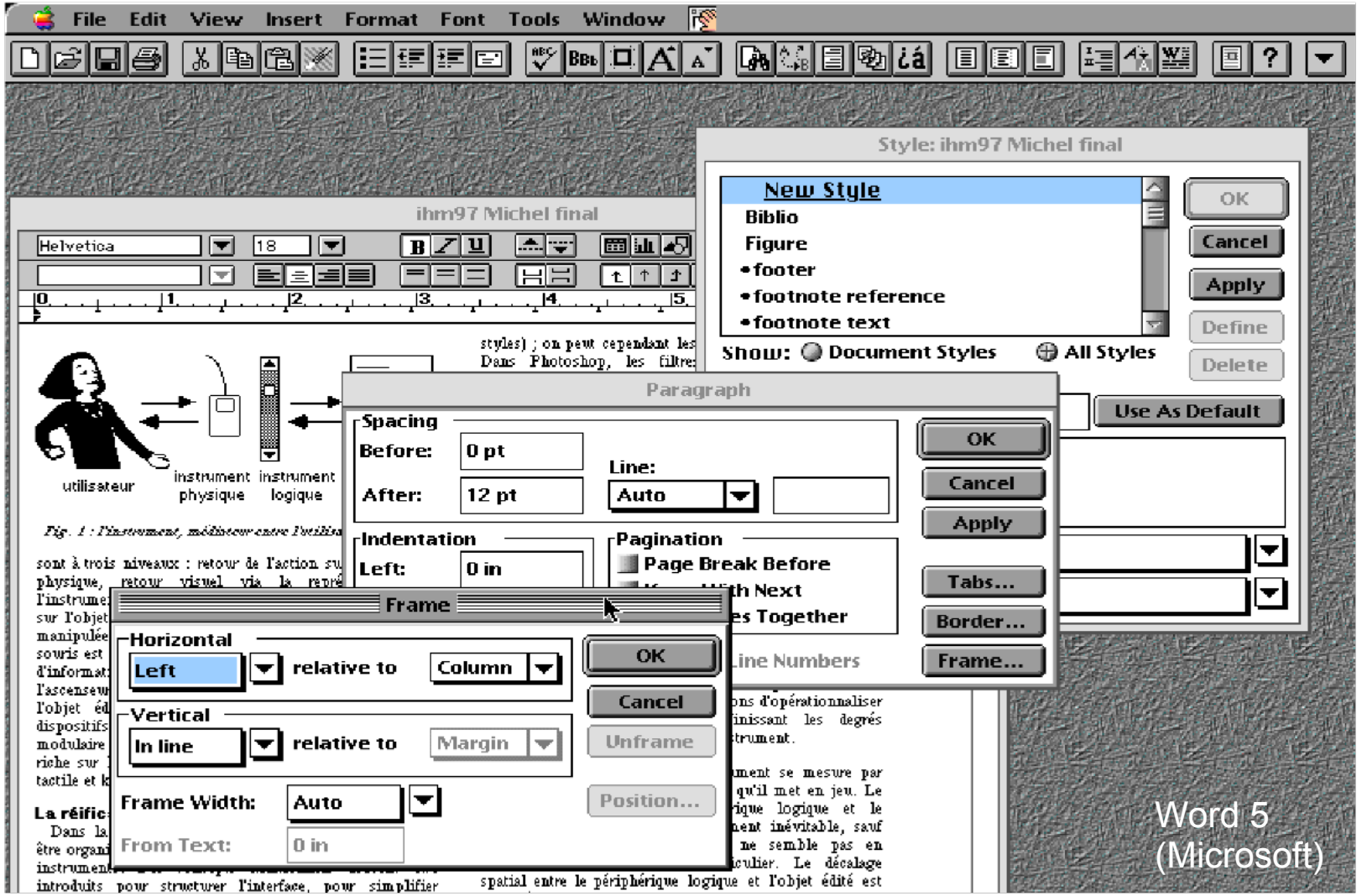
Interaction

- **M**enus,
  - Dialog boxes, Input fields, Scrollbars, etc.

Input

- **P**ointing, Selection, Gestures

# WIMP interfaces



# Interaction styles: gesture-based interaction

## Pen-based

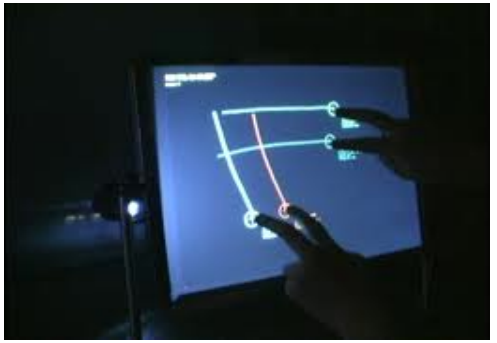
PDA (Palm Zire)

TabletPC (HP)

Whiteboard(Smart)

## Touch-based

PLATO (Buxton, 1972)

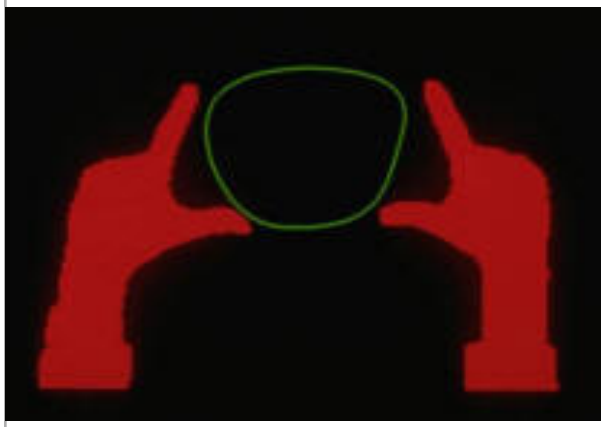


Multitouch (Jeff Han)

iPad (Apple)

# Interaction styles: gesture-based interaction

## 3D gestures



VideoPlace (Krueger, 1983)


Charade (Baudel, 1993)

Kinect (Microsoft)

# VideoPlace (Krueger, 1983)

# Recognition vs. Recall

Recognition-based interface:

- Provides information (feed-forward) about available commands, so the user can *recognize* them
- Example : menus, icons, toolbars, …

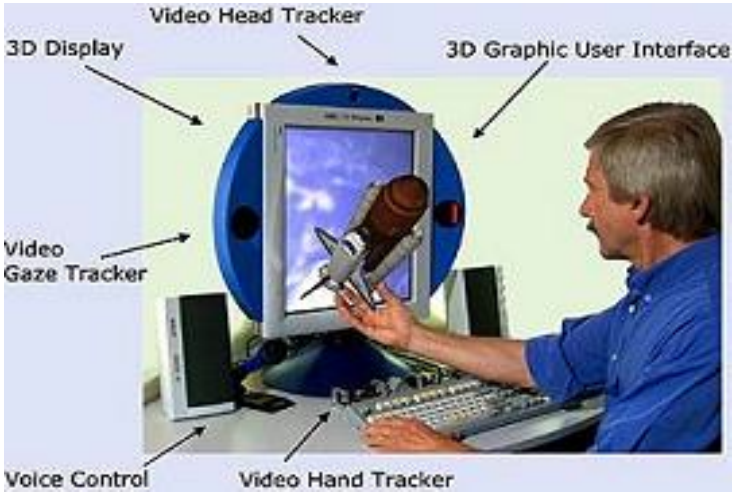
Recall-based interface:

- Relies on the user having *learned* and *memorized* the commands and/or how to input them
- Example : gesture-based interface, language-based interface (speech, natural language, command language)

# Interaction styles: multimodal interaction

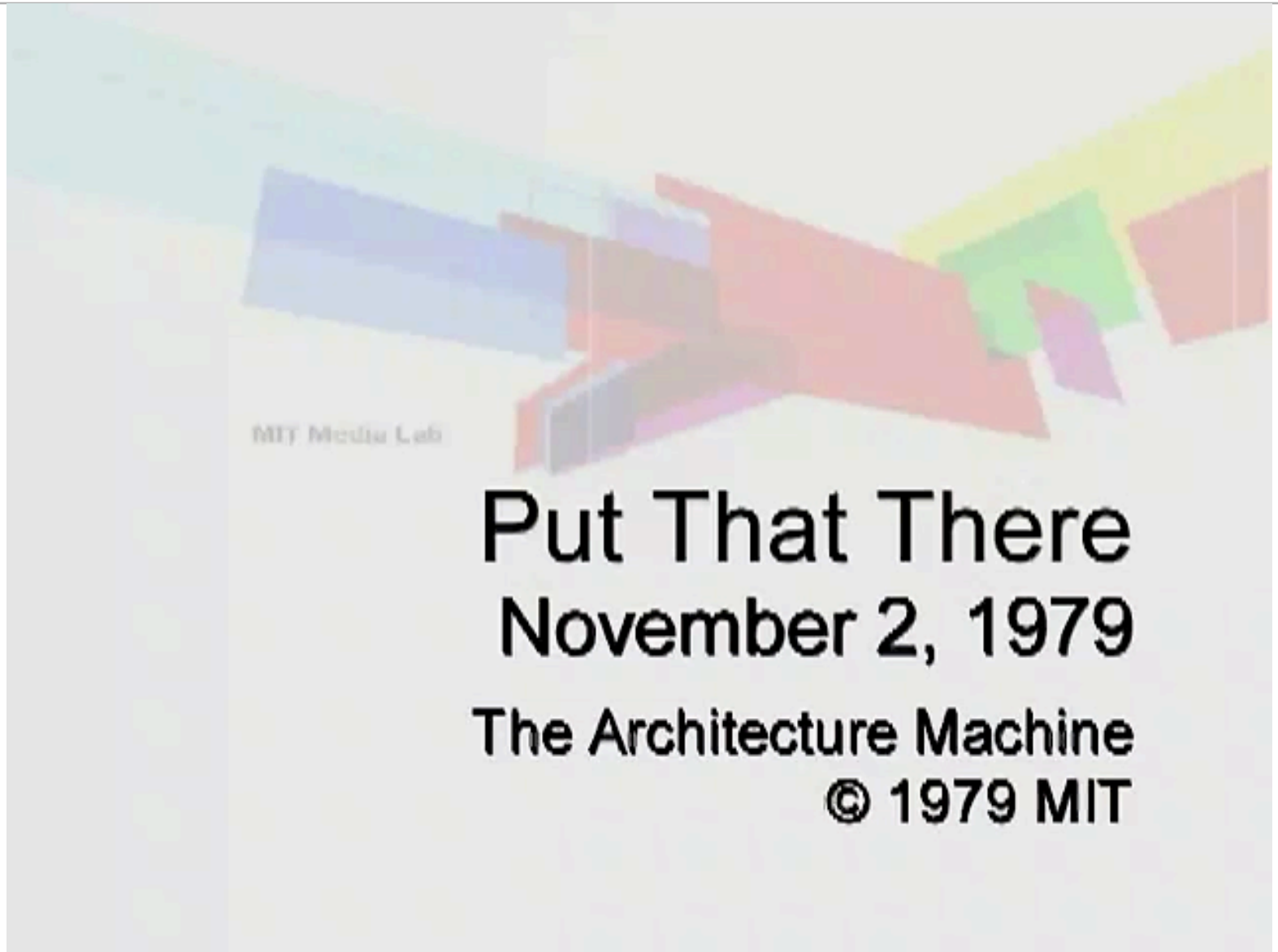
## Combine speech + gesture


Put-that-there (Bolt, 1980)



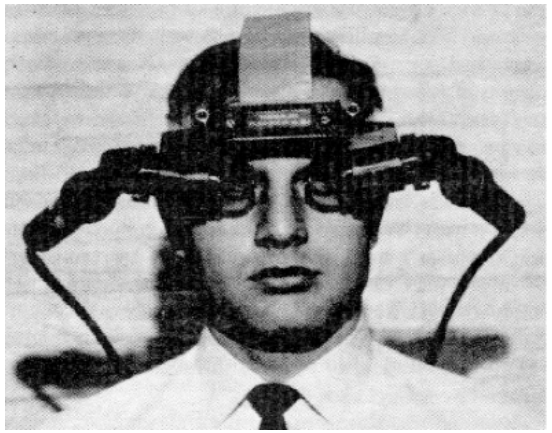

Minority Report (movie)

# Put-that-there (Bolt, 1980)

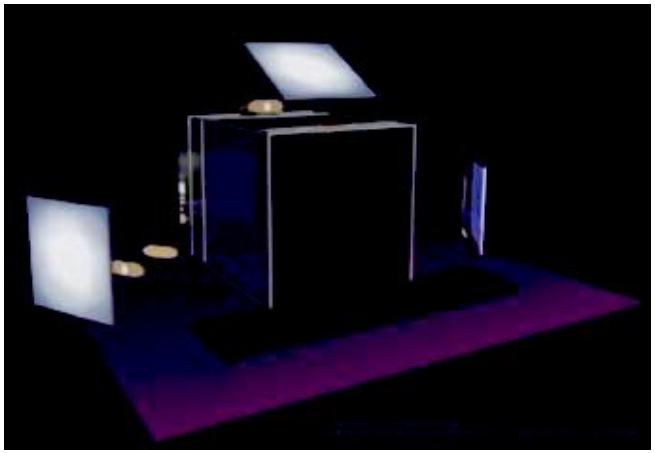


# Interaction styles: Virtual reality

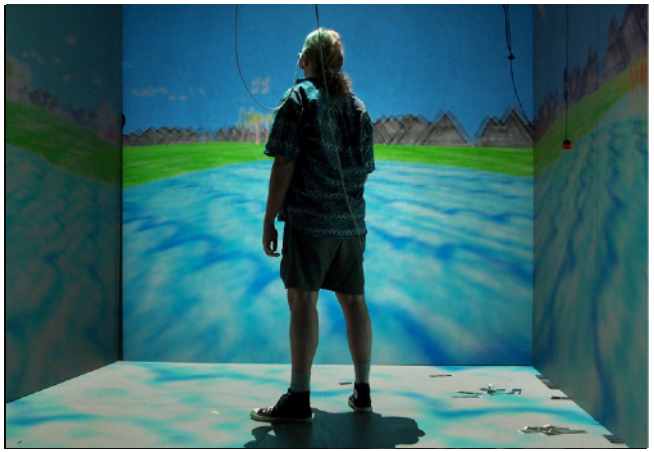
## Immersion of the user



Sutherland (1968)



HTC Vive



CAVE

# Interaction styles: mixed and augmented reality

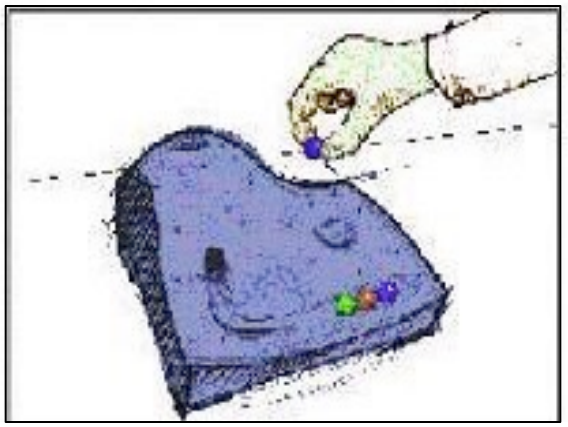
Augmented reality (later renamed Mixed reality):

Augment physical object with computational capabilities

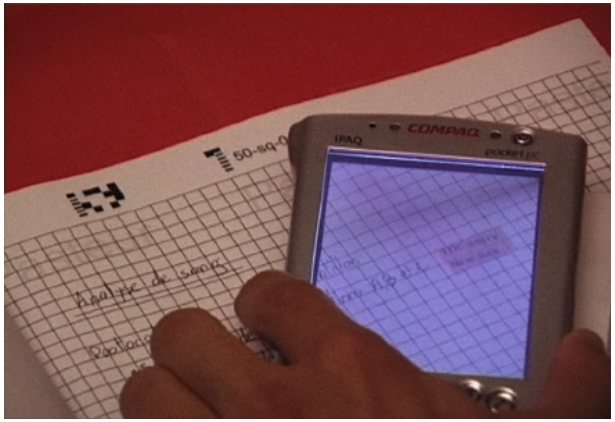
Tangible interaction:

Use physical objects for interaction


Digital Desk
Pierre Wellner

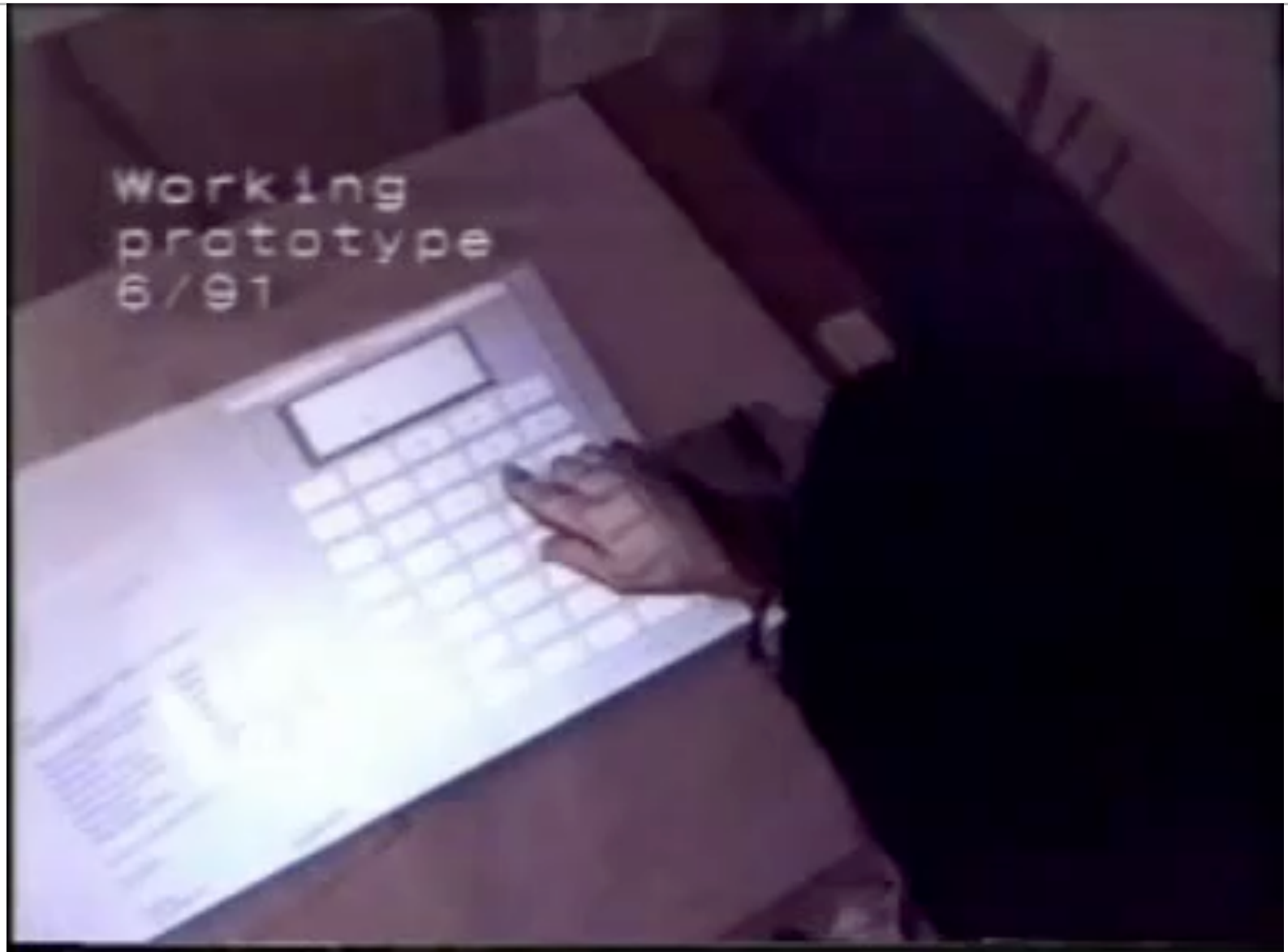


Marble answering machine
Durrell Bishop



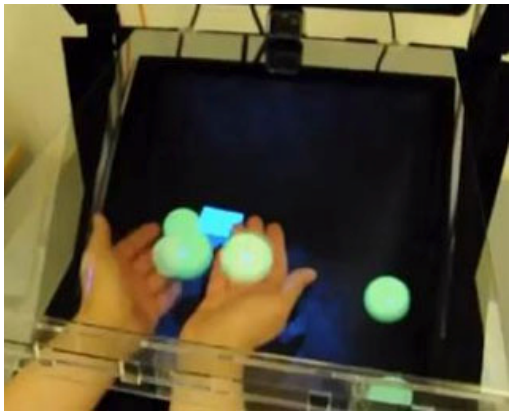

A-book
Wendy Mackay

# DigitalDesk (Wellner, 1993)



# Augmented Reality

Wearable group / Thad Starner (1995, MIT)



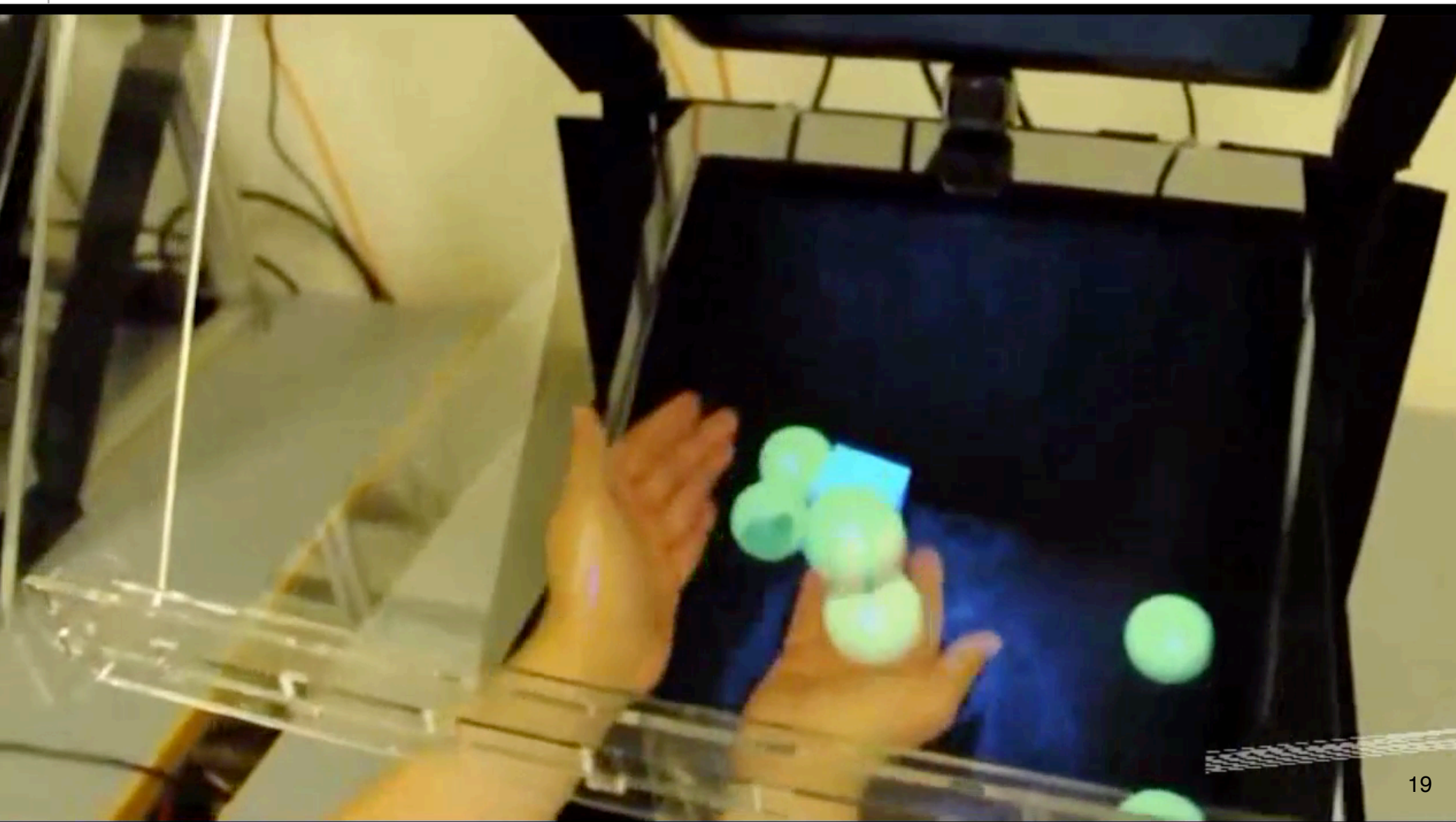
Holodesk (2012, Microsoft)

ARKit (2017, Apple)

Google Glass (2010)

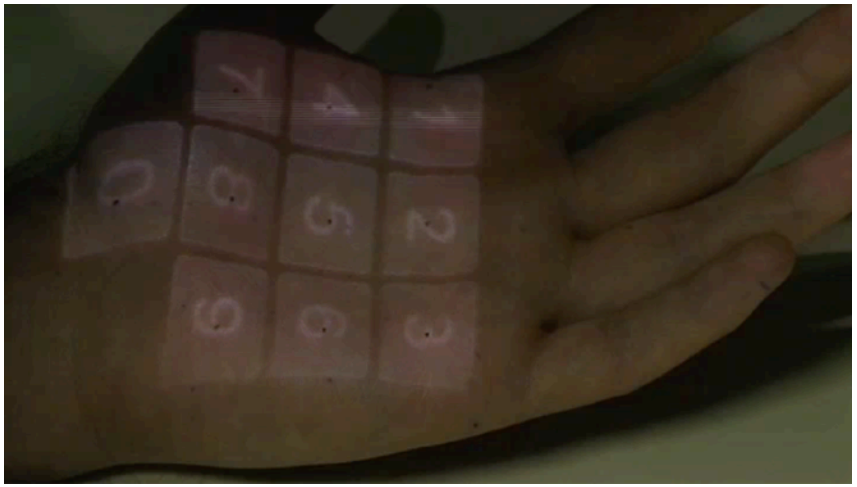
Hololens (2015, Microsoft)

# Holodesk (Microsoft, 2012)

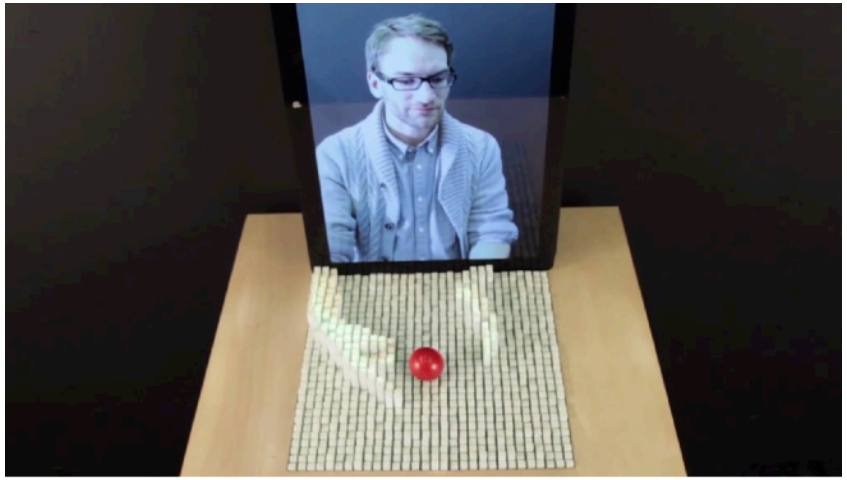


# Embodied and Physical interaction

RomAlive (2014, Microsoft)



Skinput (2016, CMU)

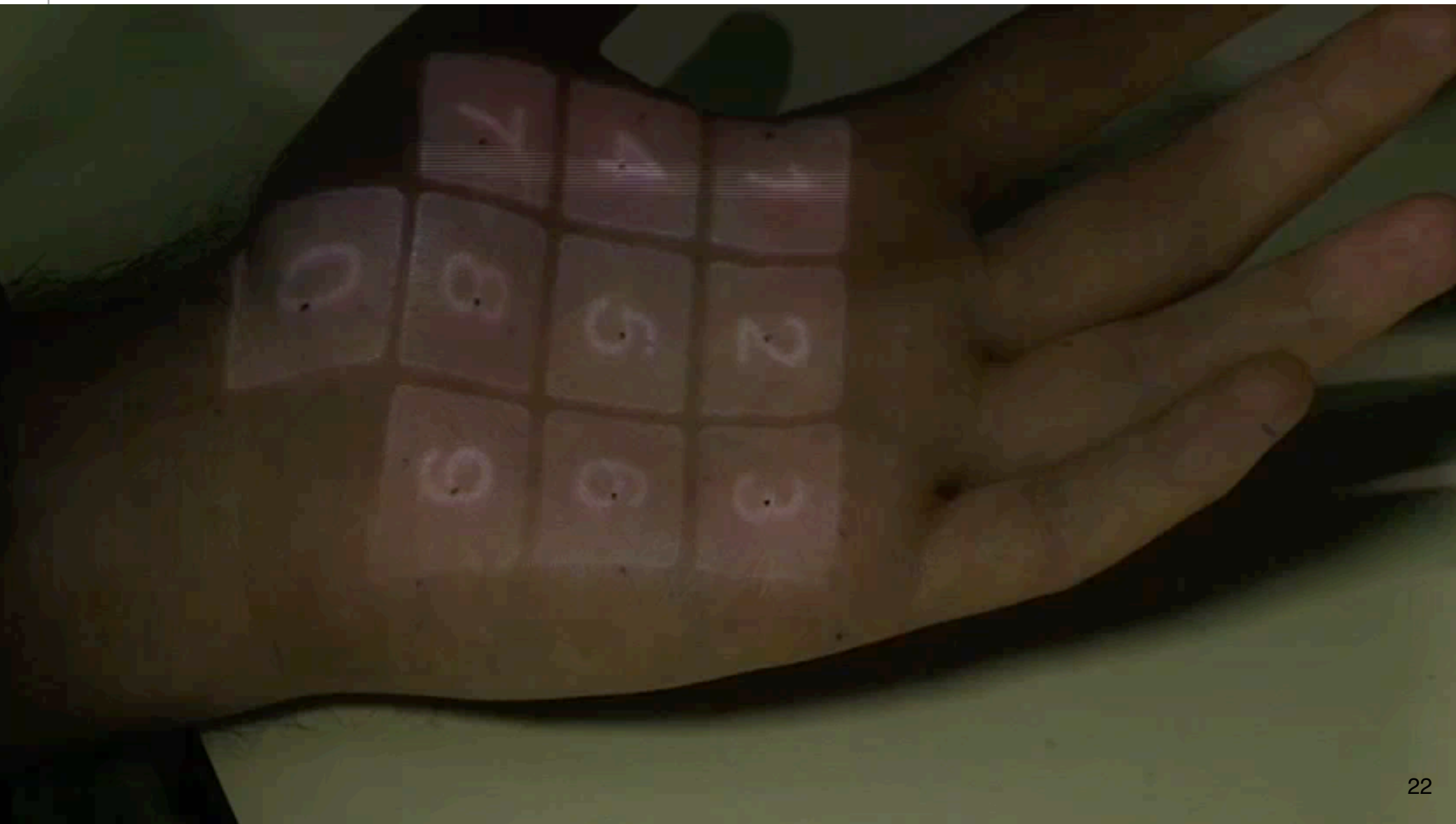


InForm (2013, MIT)

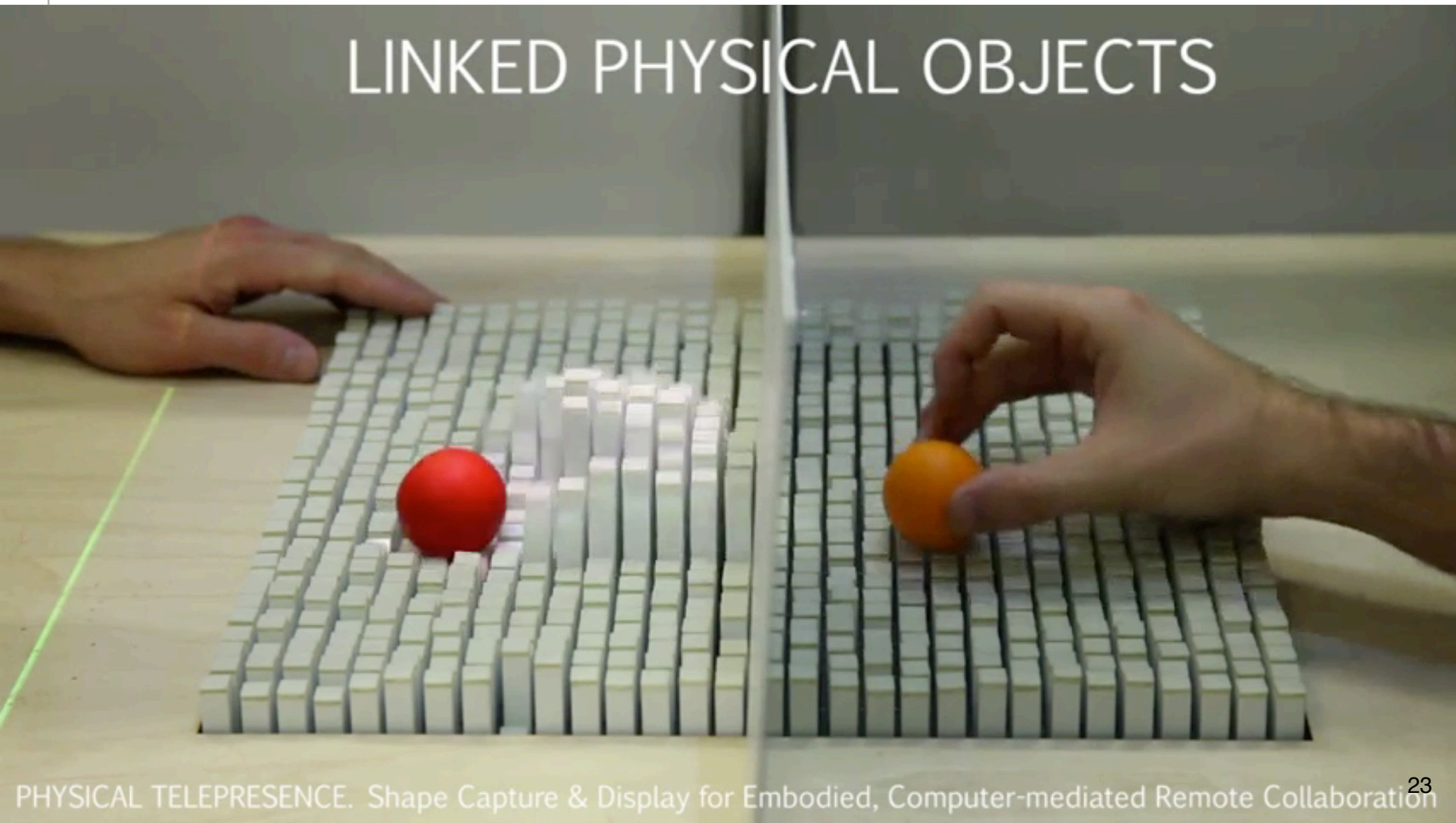
Zooids (2017, Inria)

# RoomAlive (Microsoft, 2014)

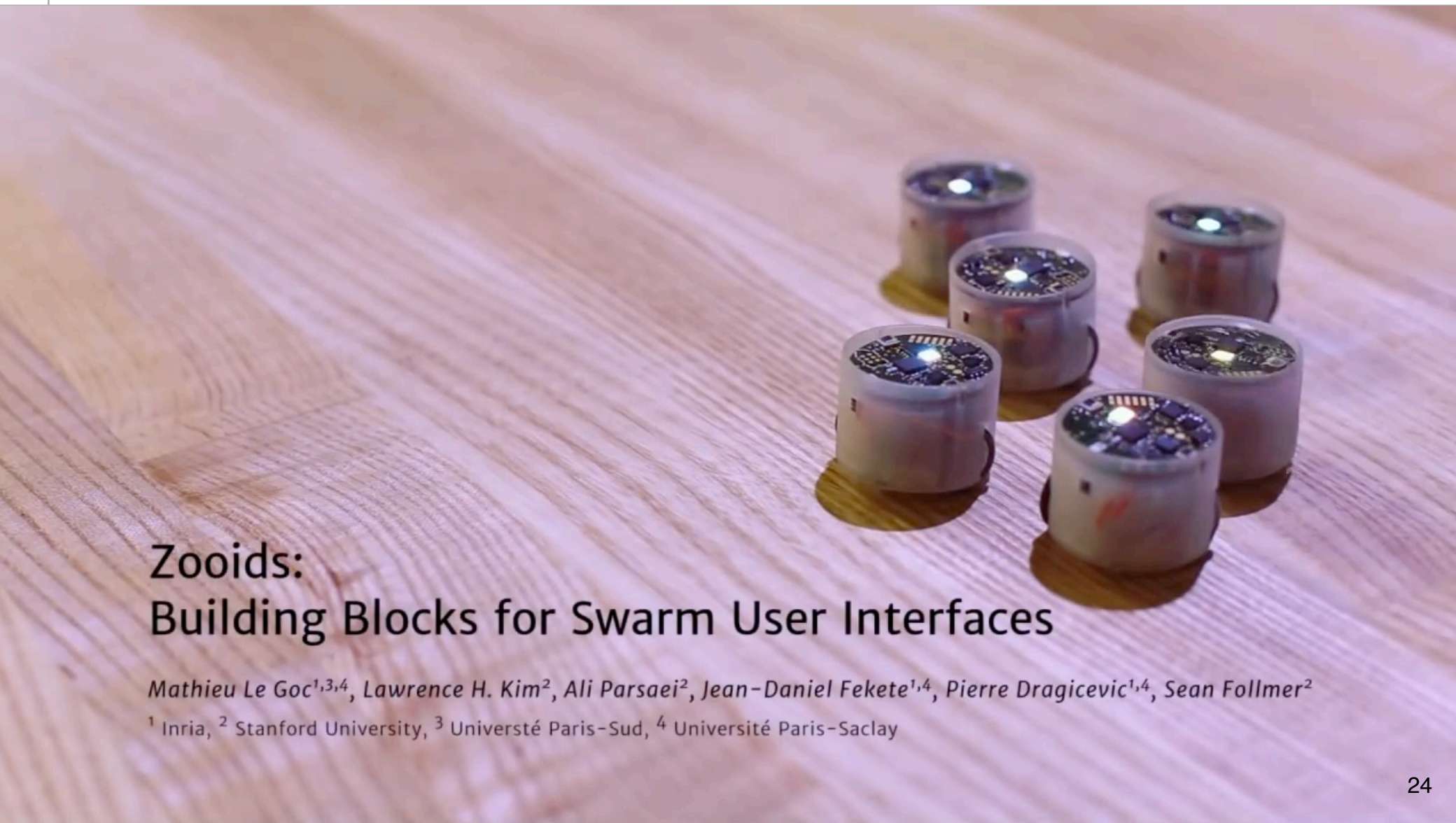
# Skinput (CMU, 2016)



# InForm (MIT, 2013)



# Zooids (Inria, 2017)



# What next?

Brain-computer interfaces?

Emotional agents


Robots


Your idea?

# What future do you want?

# What future do you want?