# Tutorial Day at MobileHCI 2008, Amsterdam

**Text input for mobile devices by Scott MacKenzie**

Scott will give an overview of different input means (e.g. key-based, stylus, predictive, virtual keyboard), parameters relevant for designing and assessing mobile text input (e.g., writing speed, cognitive load) and issues related to the context of use (e.g., walking/standing).

**Mobile GUIs and Mobile Visualization by Patrick Baudisch**

Patrick will introduce different approaches for creating mobile graphical user interfaces. He will talk about the design process, prototyping and assessment of user interfaces, trade-offs related to the design of mobile GUIs and different possible interaction styles. As one specific topic in mobile GUIs he will address concept for mobile interactive visualization (e.g. maps).

**Understanding Mobile User Experience by Mirjana Spasojevic**

Mirjana will discuss different means for studying mobile user needs and evaluating the user experience. This includes explorative studies and formal evaluations (in the lab vs. in the field), including longitudinal pilot deployments. The lecture will discuss traditional HCI methods of user research and how they need to be adapted for different mobile contexts and products.

**Context-Aware Communication and Interaction by Albrecht Schmidt**

Albrecht will give an overview of work in context-awareness and activity recognition that is related to mobile HCI. He will discuss how sharing of context in communication applications can improve the user experience. The lecture will explain how perception and sensing can be used to acquire context and activity information and show examples how such information can be exploited.

**Haptics, audio output and sensor input in mobile HCI by Stephen Brewster**

Stephen will discuss the design space for haptics, audio output as well as sensor and gesture input in mobile HCI. Furthermore he will assess resulting interaction methods and implications for the interactive experience.

**Camera-based interaction and interaction with public displays by Michael Rohs**

Michael will introduce you camera based interaction with mobile devices; this includes a assessment of optical markers, 2D-barcodes and optical flow as well as techniques related to augmented reality. In this context he will address interaction with public displays, too.



Spetember 2nd 2008

designing for

# small screens

patrick
baudisch

microsoft research
adaptive systems—interaction focus

# what changes?

battery life


processing power

screen space

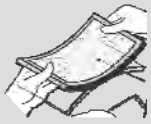

portability

# mantra

always use the **most available** device

only when that **fails, escalate** to a larger, more powerful device

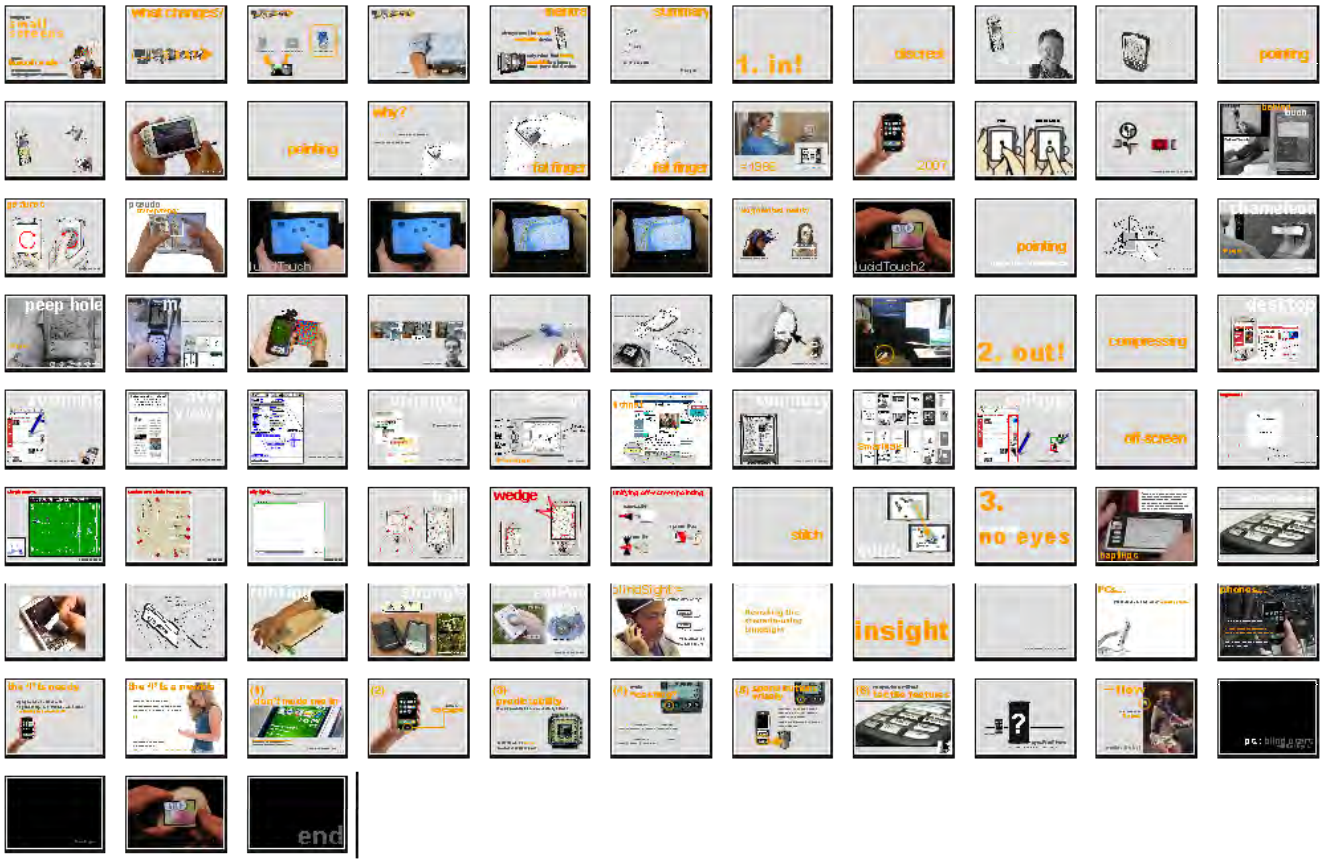
# summary



in (discreet, touch, backside, device)

out (compress, off-screen, extend, audio, tactile)

**so what should I use?**


small screens
what changes?
Summary
1. in!
discrete
pointing
why?
fat finger
fat finger
=1985
2007
pointing
peep hole
pointing
2. out!
compressing
desktop
off-screen
wedge
stitch
3.
no eyes
insight
end

# 1. in!

# in!

# 1. discreet

keypad

d-pad/
joystick

thumb wheel

# →Scott


for **discreet** tasks use **discreet** controls
(such as buttons for typing or launching app)

and for **pointing** tasks?

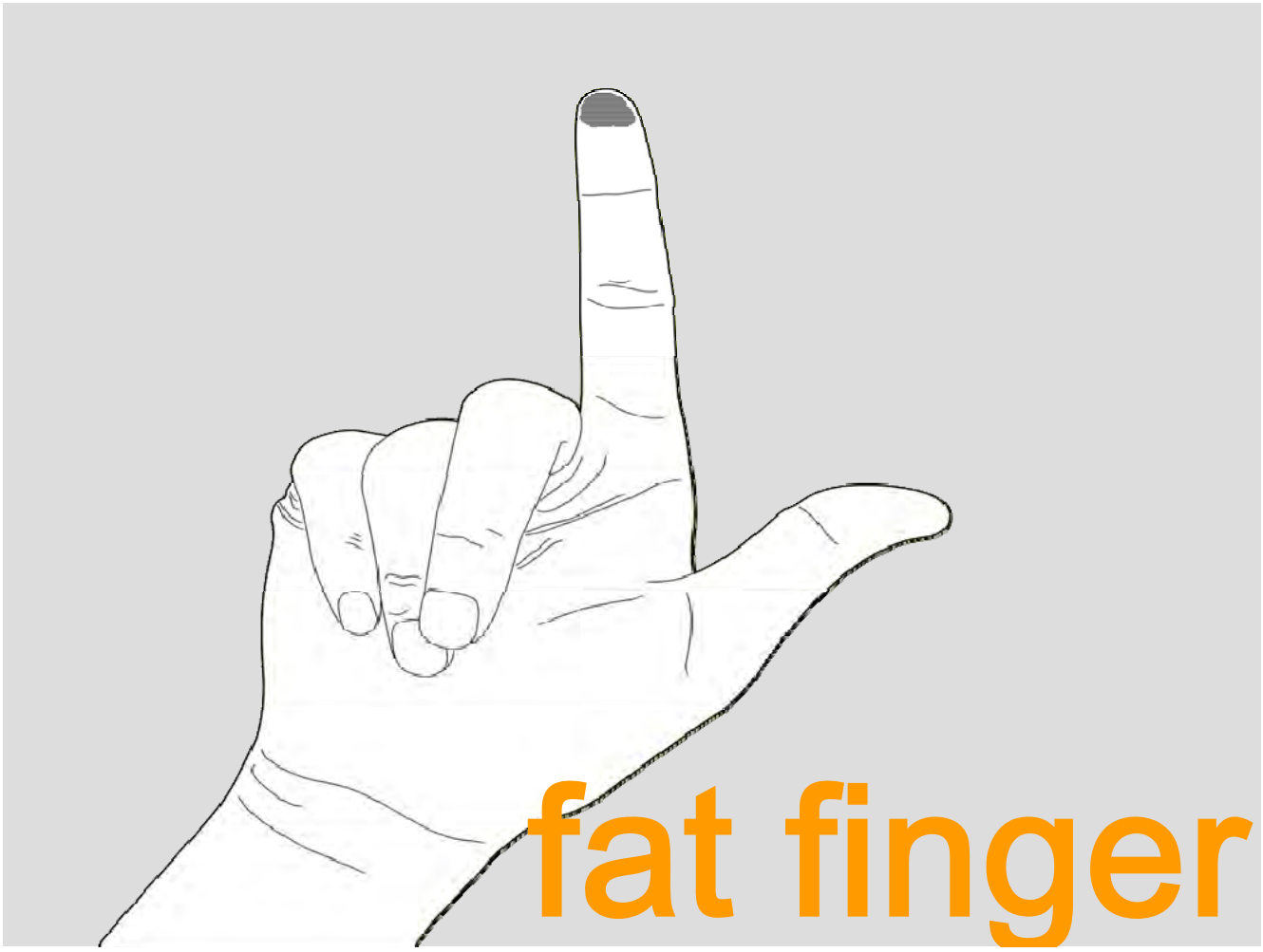
**in!**

# 2. pointing/touch

**1. quite ergonomic** compared to desktop

2. discreet controls
and rate-control
**very limited**

# fat finger


fat finger

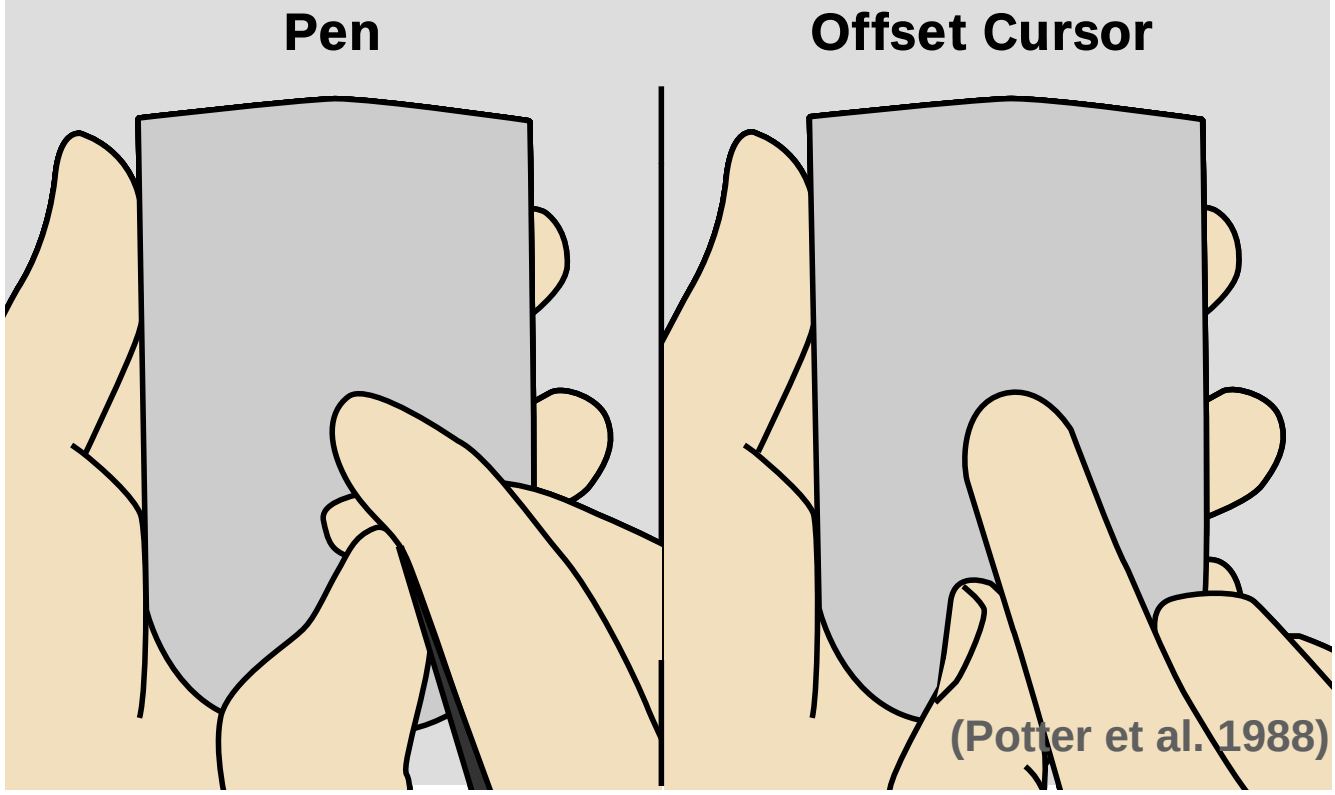

NILES
102.7 FM
Band
K-Rock
Lite Jazz
The Wave
Classical
Talk Radio
98.5
94.9
FM 9
103.5
FM 10
Prev
Next
Tuner
DVD
CD
DSS
OFF
DOWN
UP
VOL
VOL
MUTE

# <1988

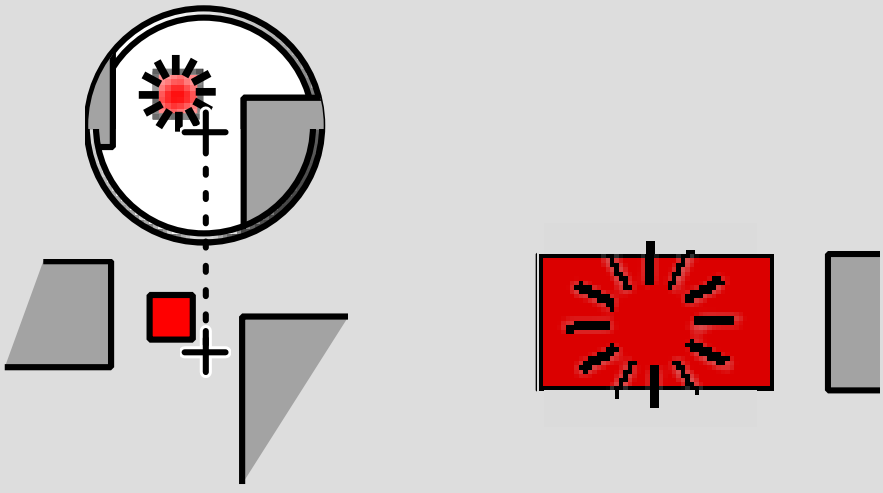
(→2007)

precision?

# offset cursor

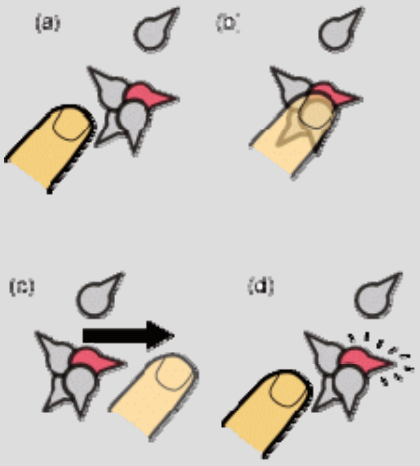



# shift



[vogel & baudisch, CHI 2007]

# escape



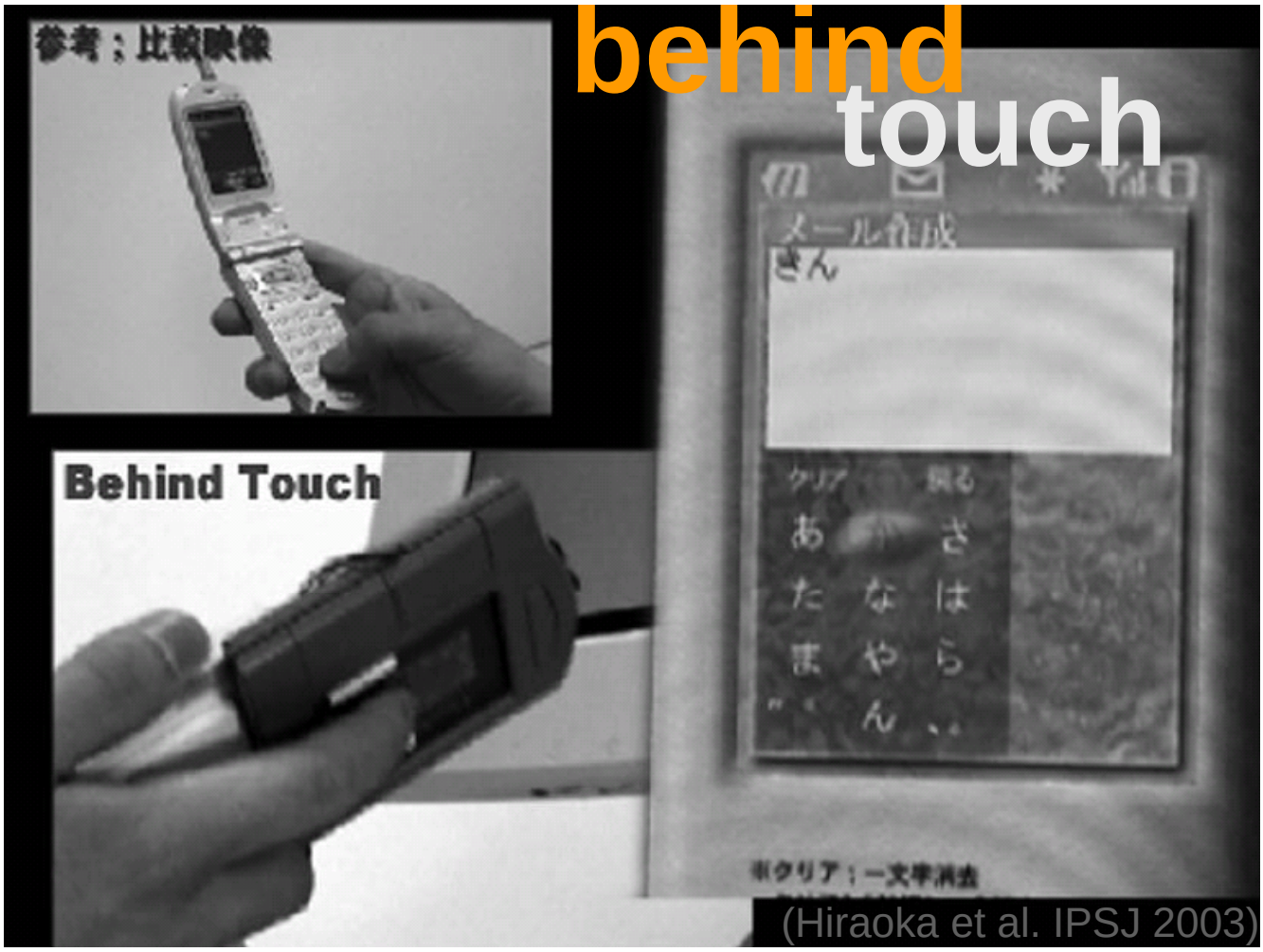


[yatani et al, CHI 2008]

**in!**

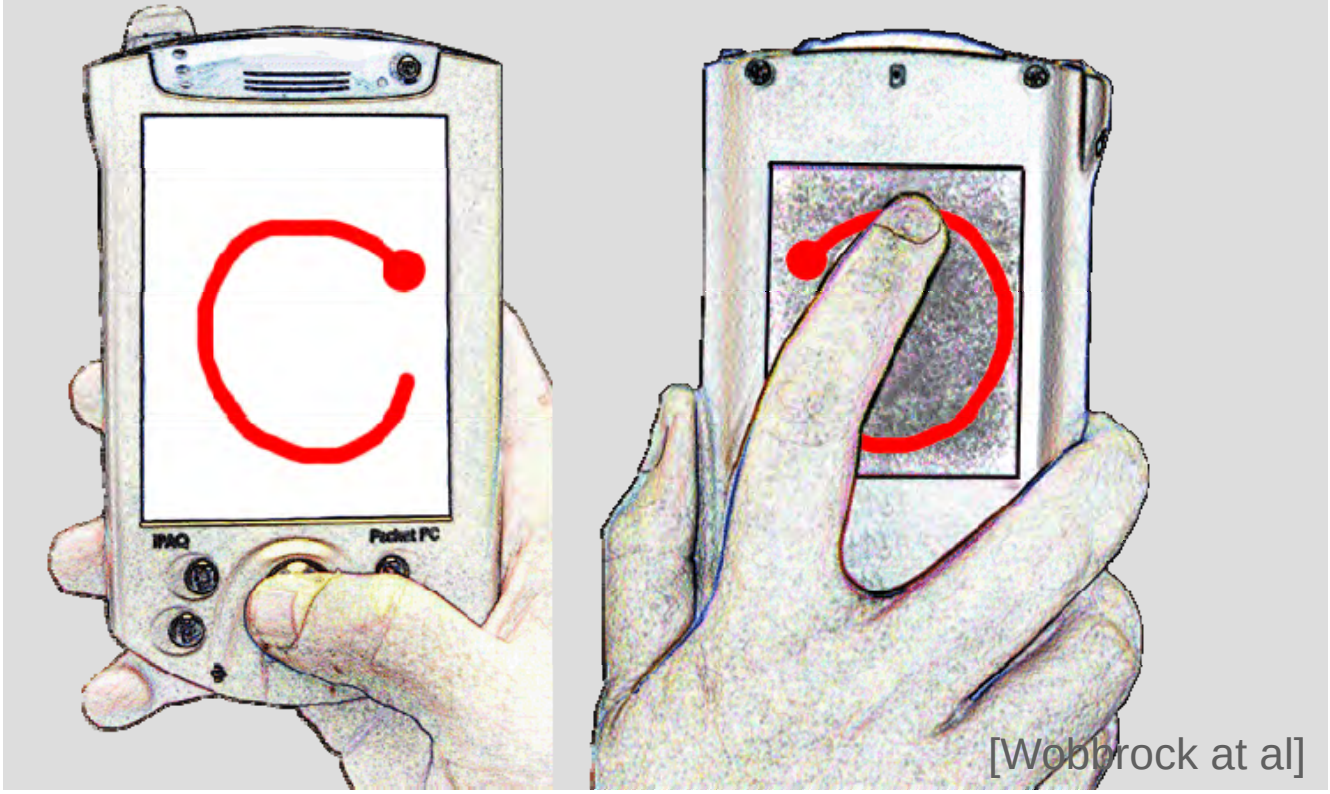
# 3. backside

# behind touch



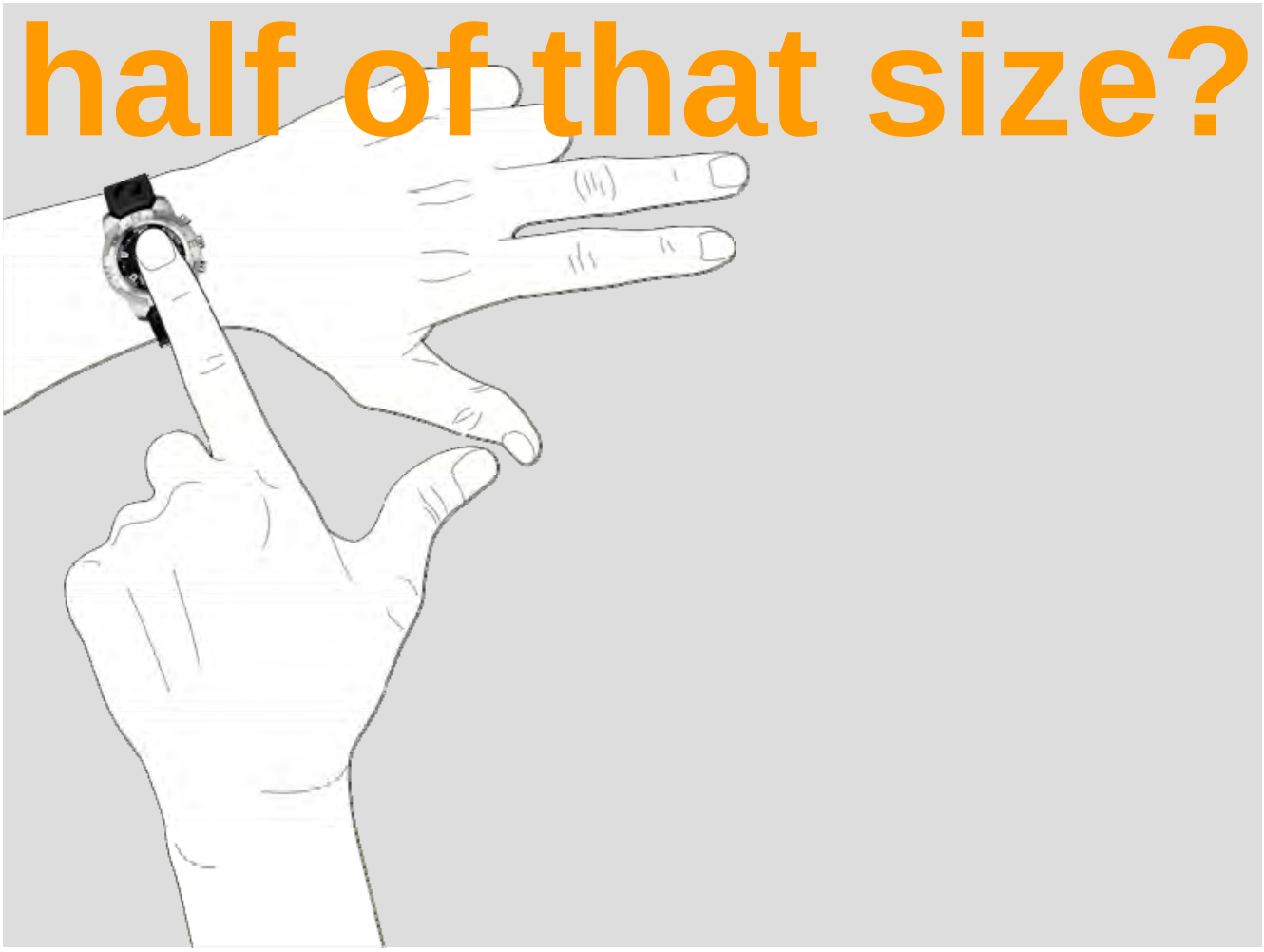

(Hiraoka et al. IPSJ 2003)

# gestures

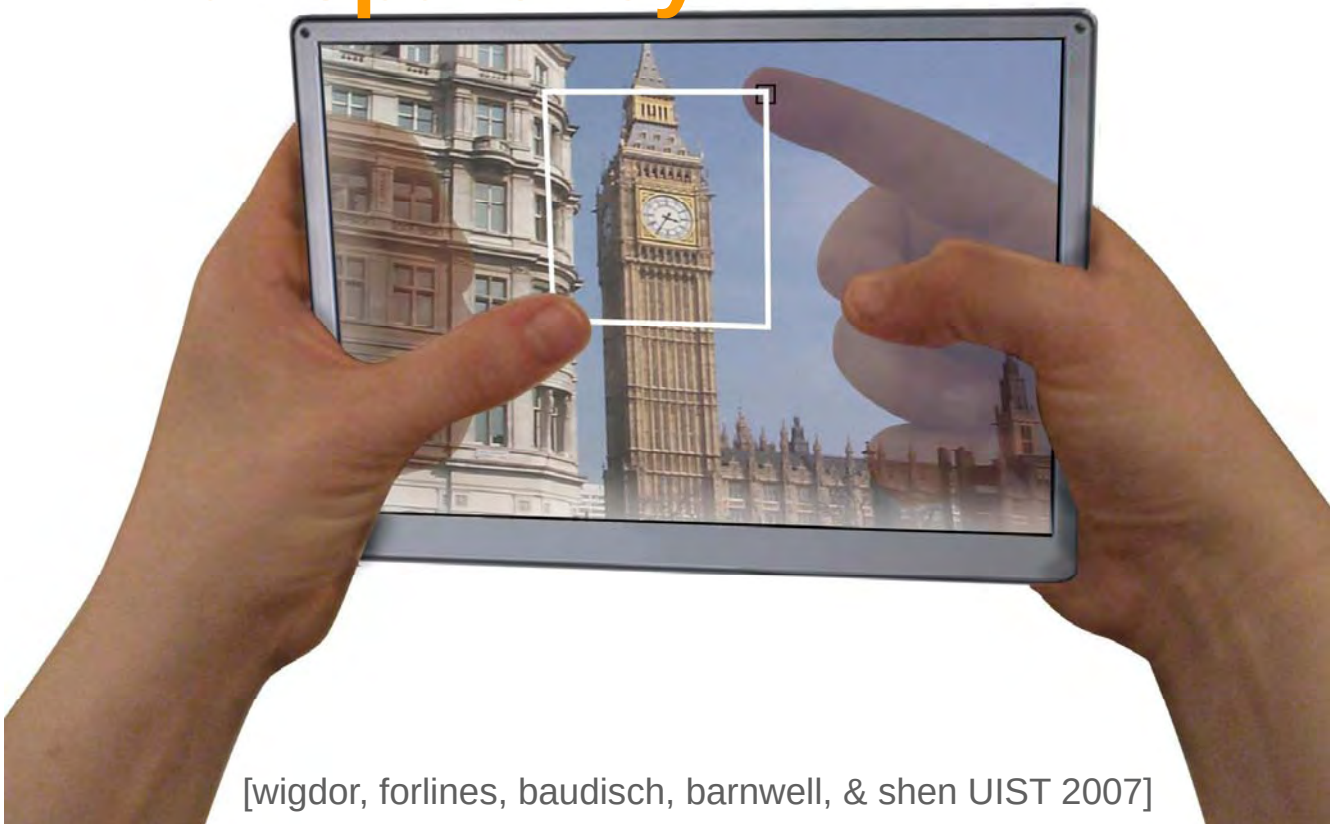



[Wobbrock at al]

# half of that size?



# pseudo transparency

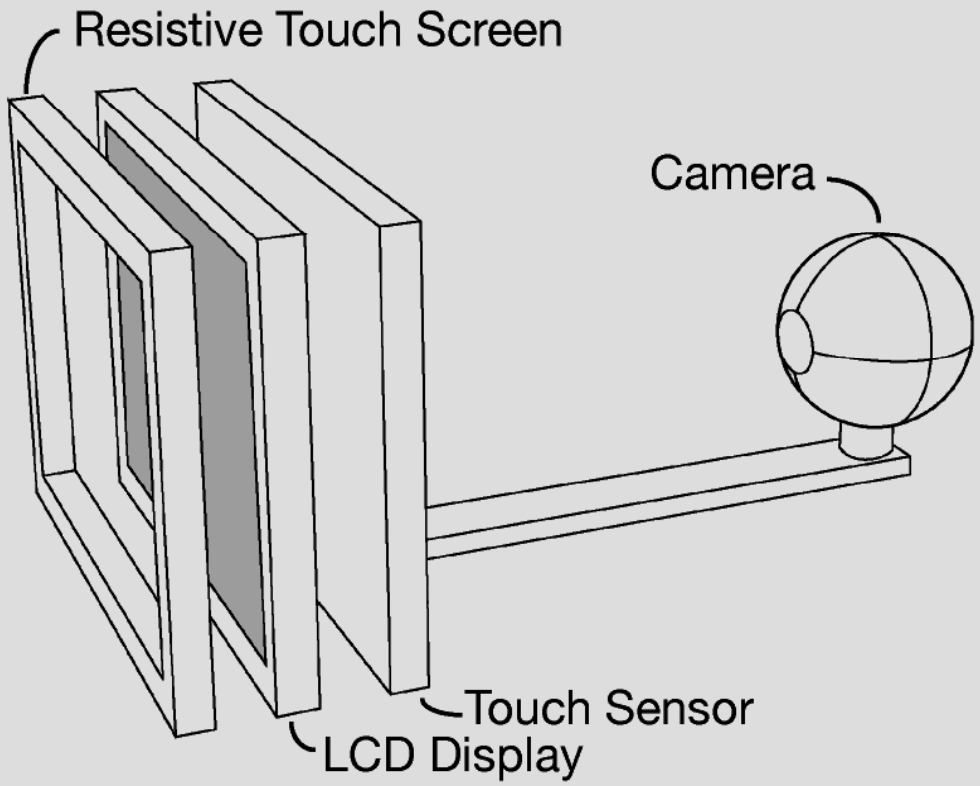


[wigdor, forlines, baudisch, barnwell, & shen UIST 2007]


lucidTouch

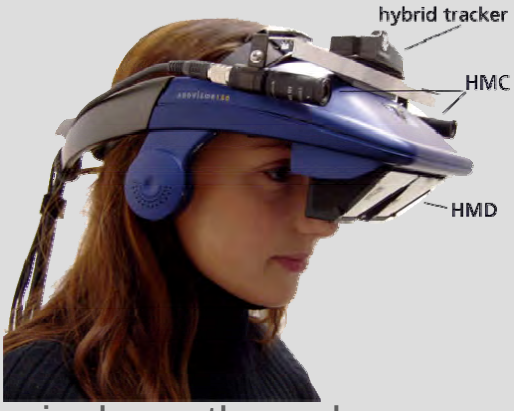

XENARC


XENARC



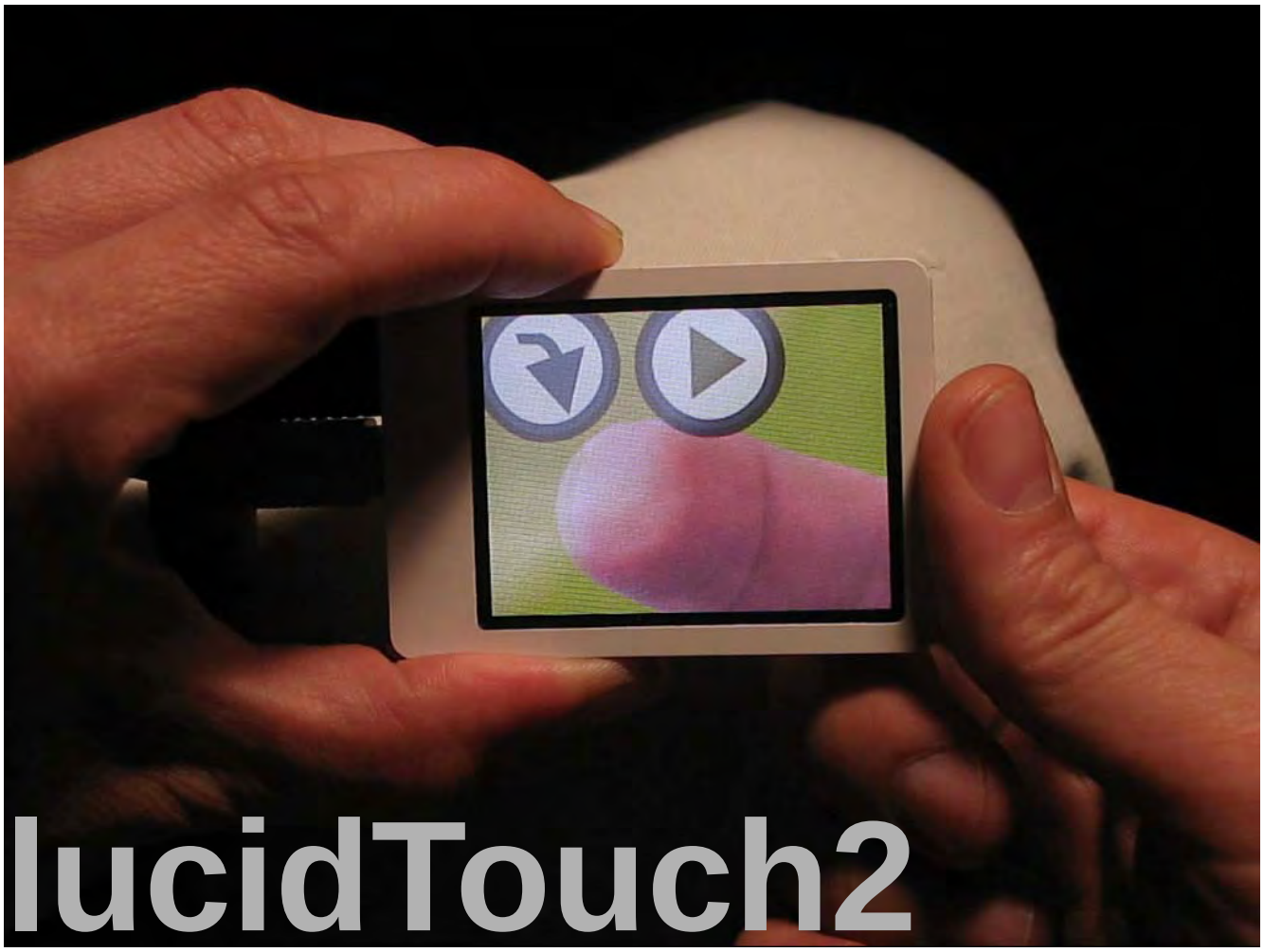

borrowed from

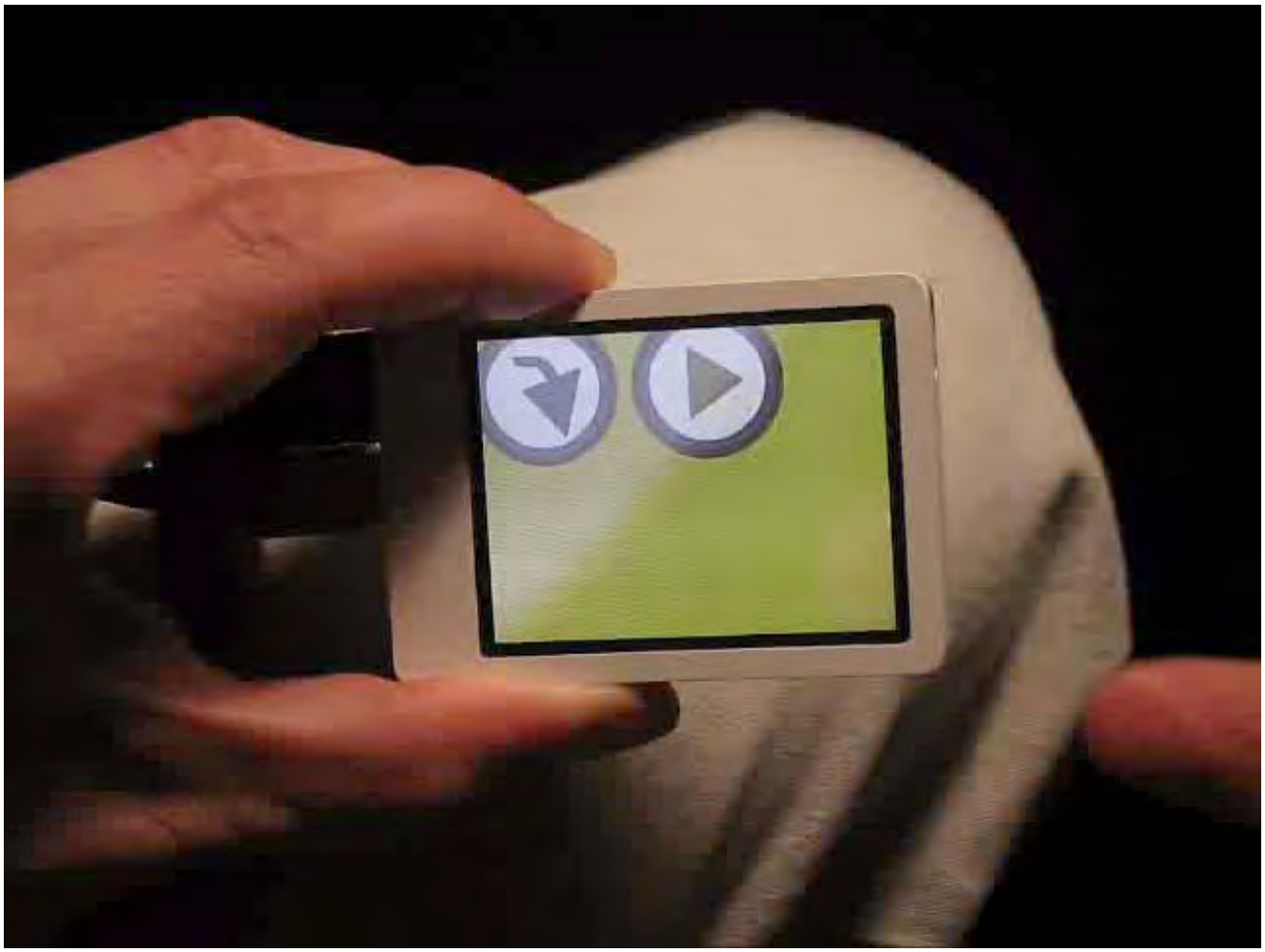
# augmented reality




physical see-through

camera see-through

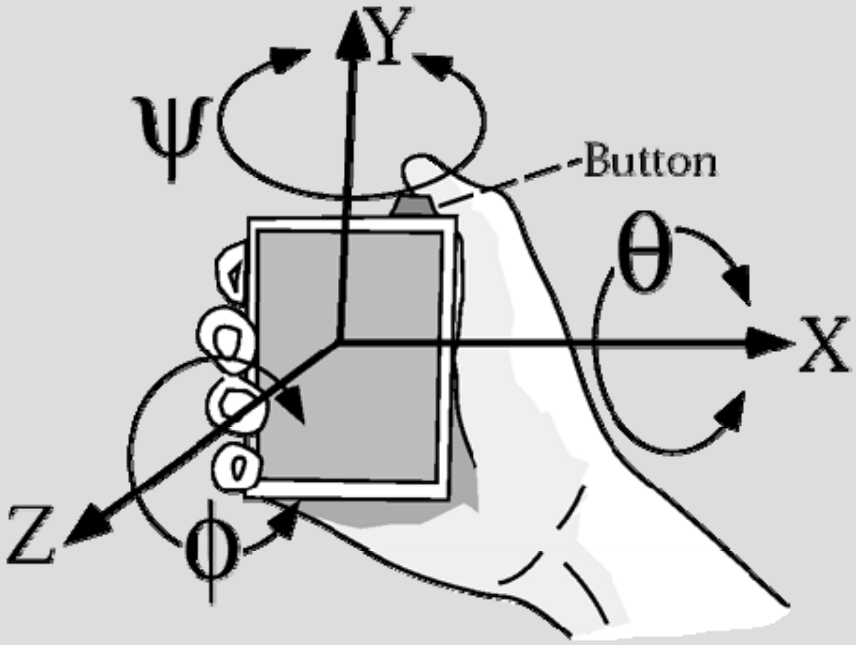

lucidTouch2



# in!

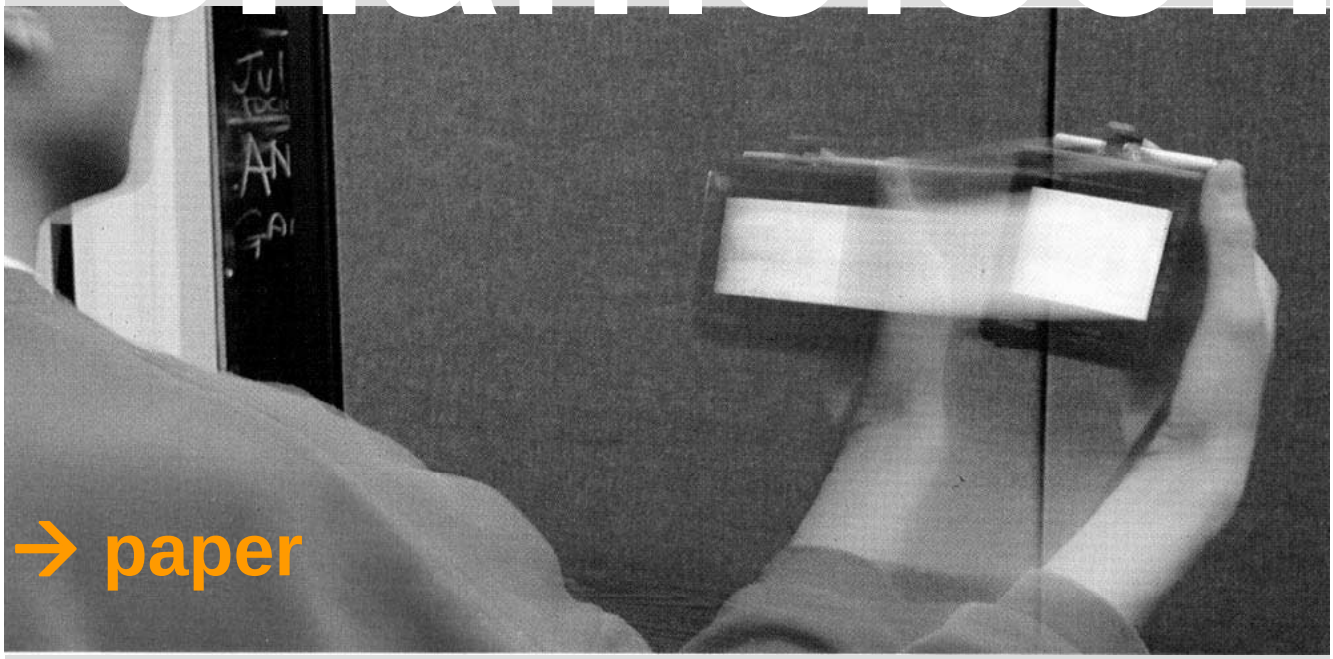
# 4. move device

tilting




[rekimoto uist 96]

# chameleon



→ paper

[Fitzmaurice ‘93]

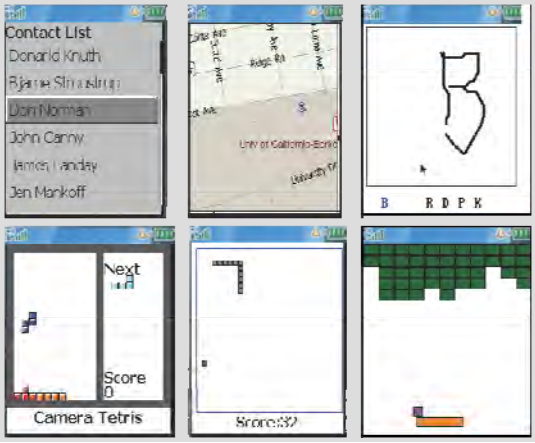
# peep hole


→ paper

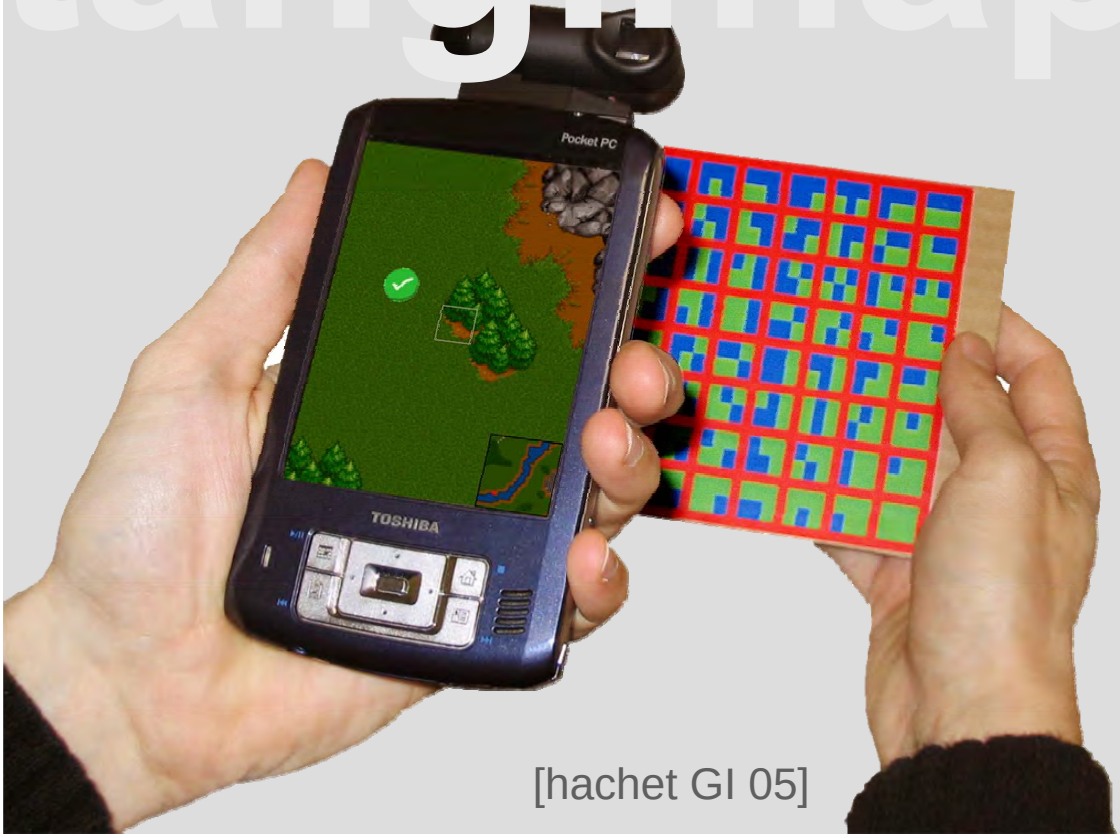
Ka-Ping Yee [CHI’03]

# motion


[Wang, Zhai, Canny UIST 06]



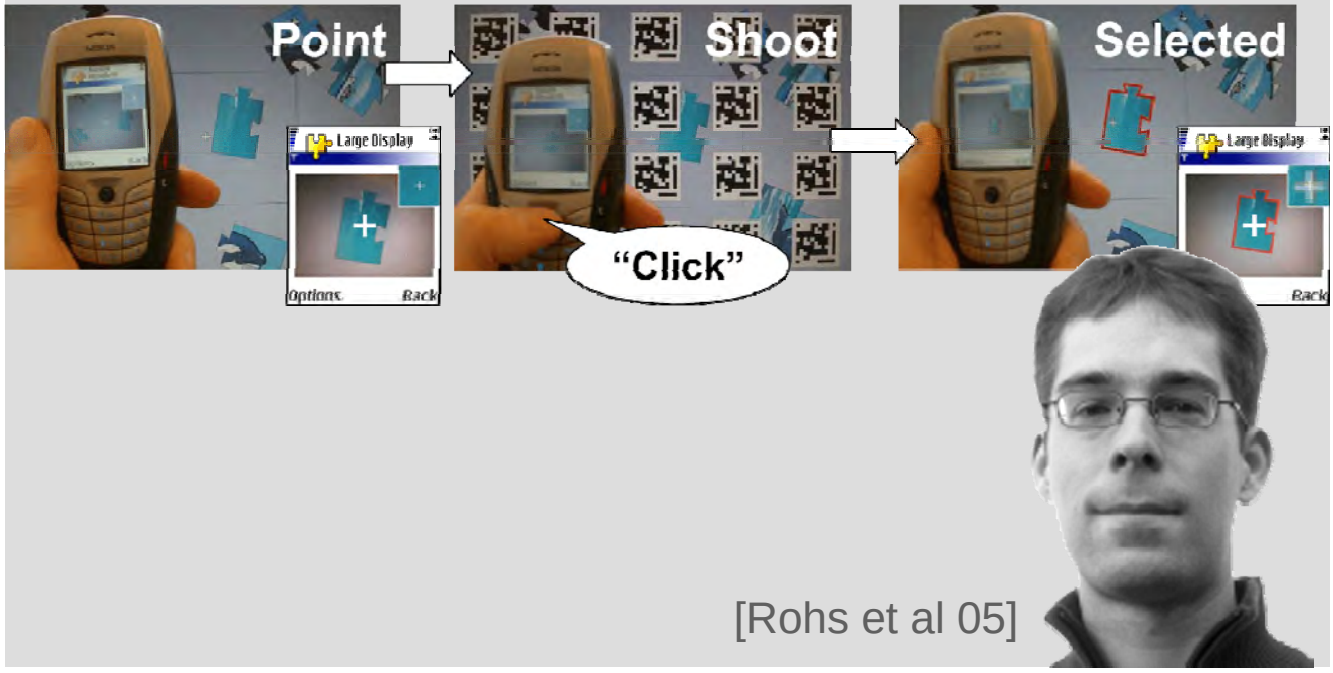

# tangimap




[hachet GI 05]

# sweep

point & shoot



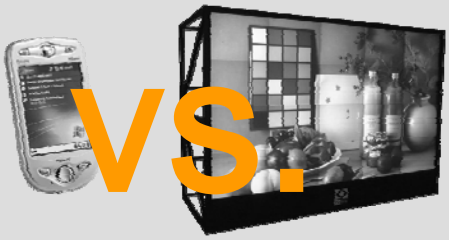

[Rohs et al 05]

# related

gyro mouse

xwand
[wilson 03]

wii
[nintendo 06]




limited screen size

user's perceptually limited

lack of keyboard & pointing device

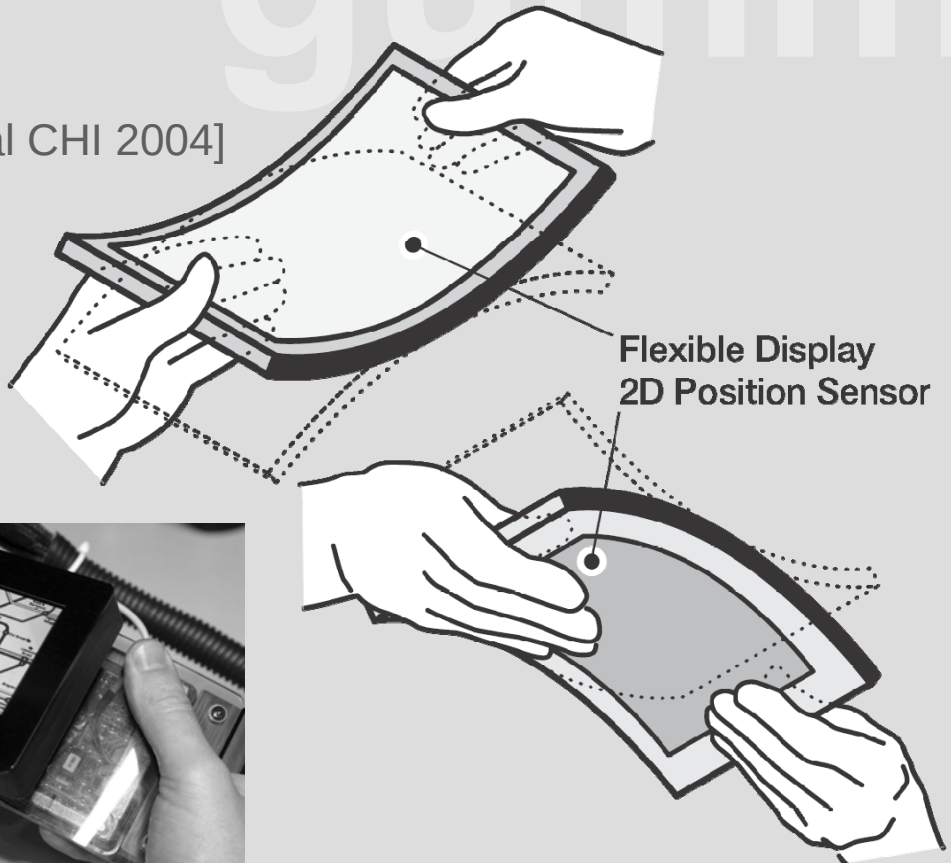
no space to set down keyboard and mouse

large display users **are** mobile users

…

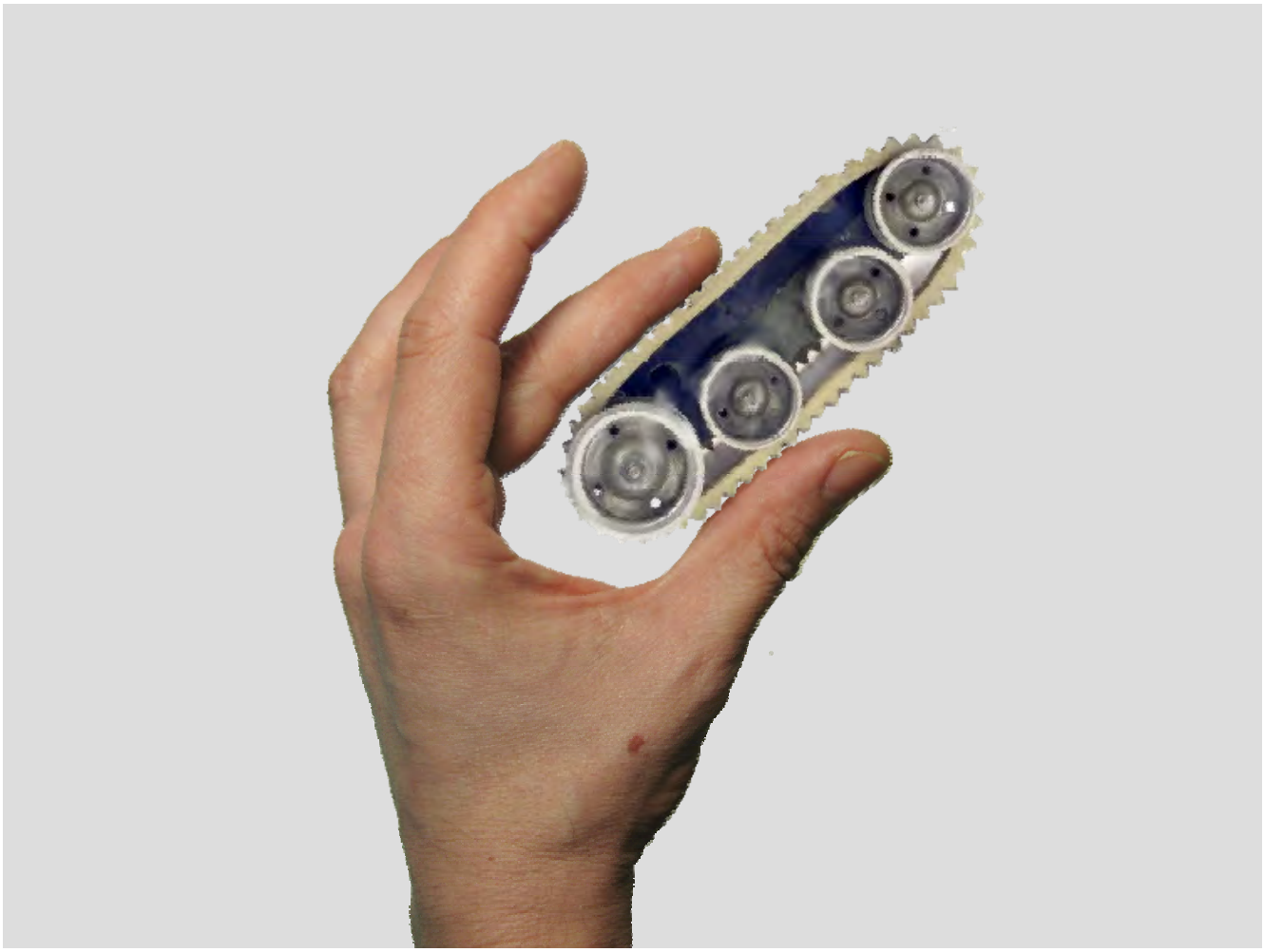


[schwesig et al CHI 2004]

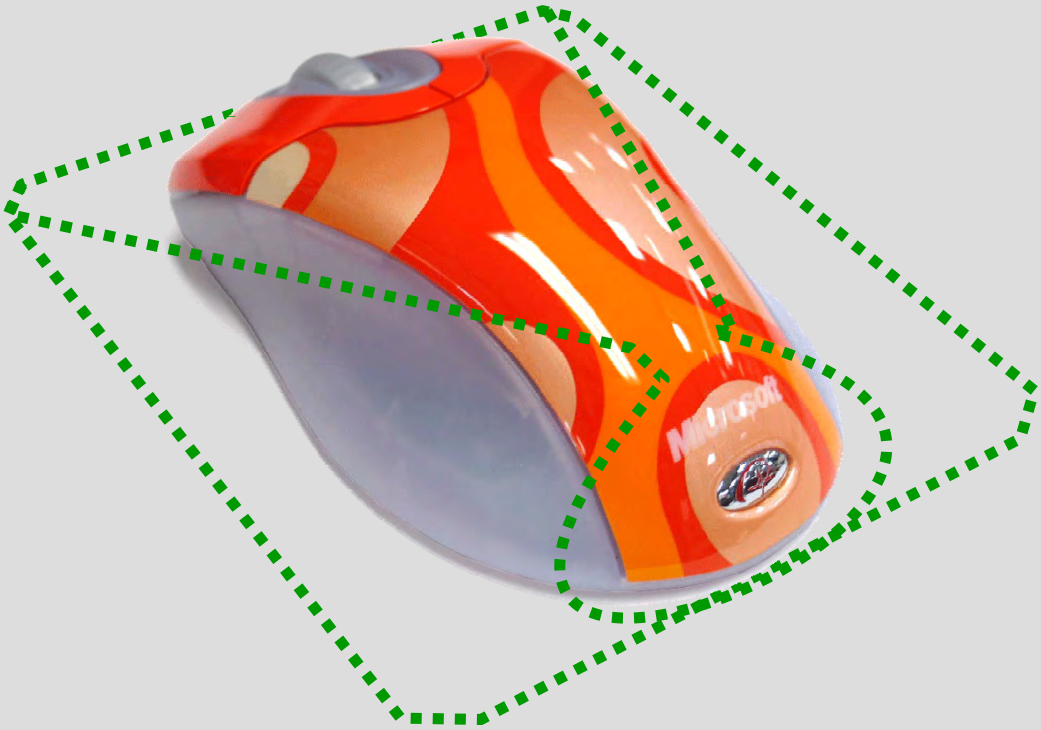


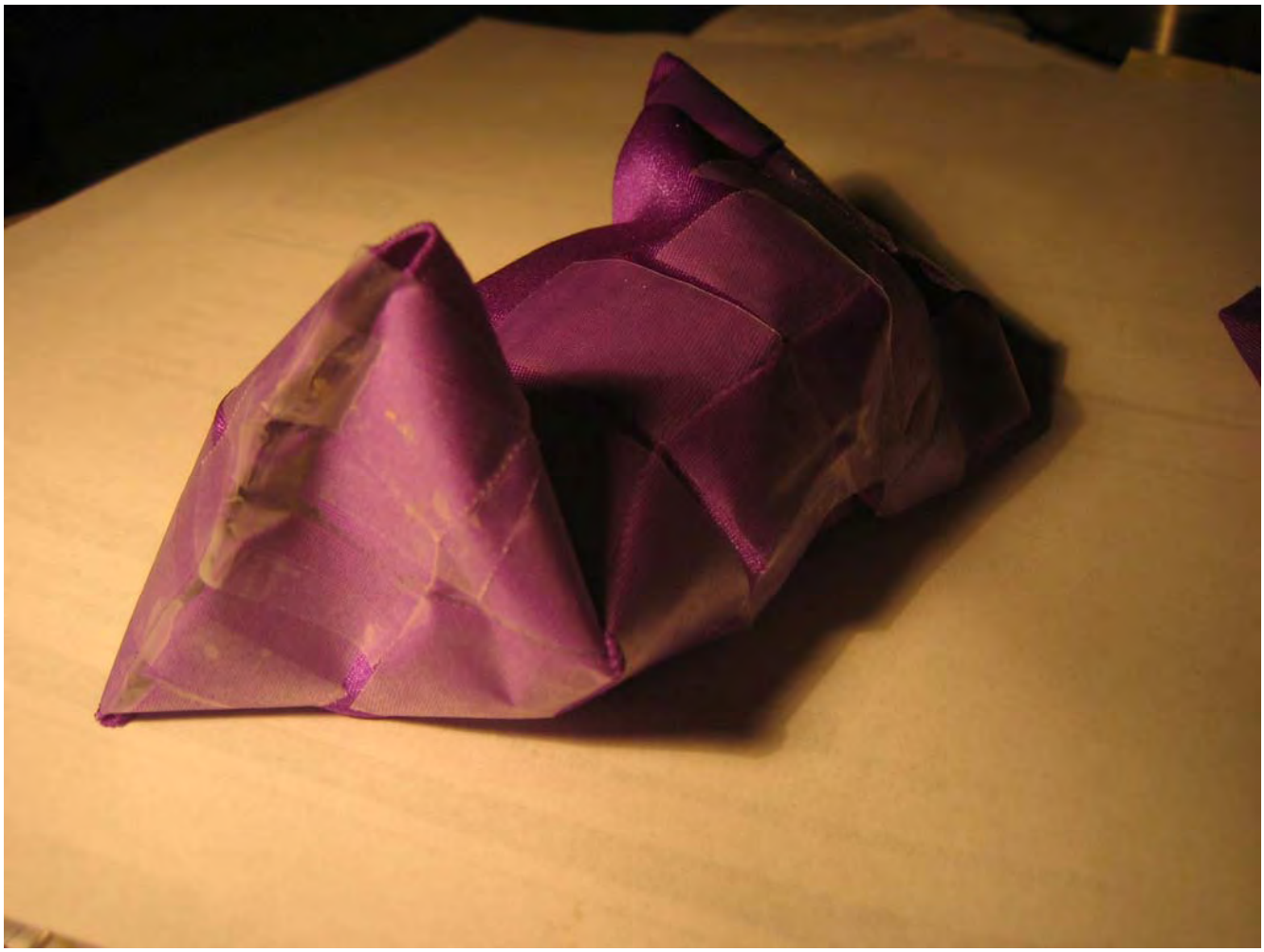


soap
hull
optical
sensor
core
[baudisch et al, UIST 2006]

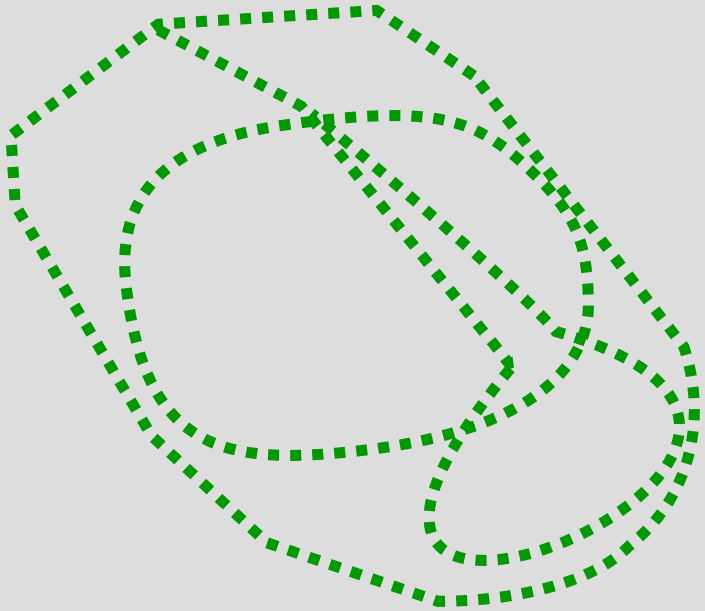


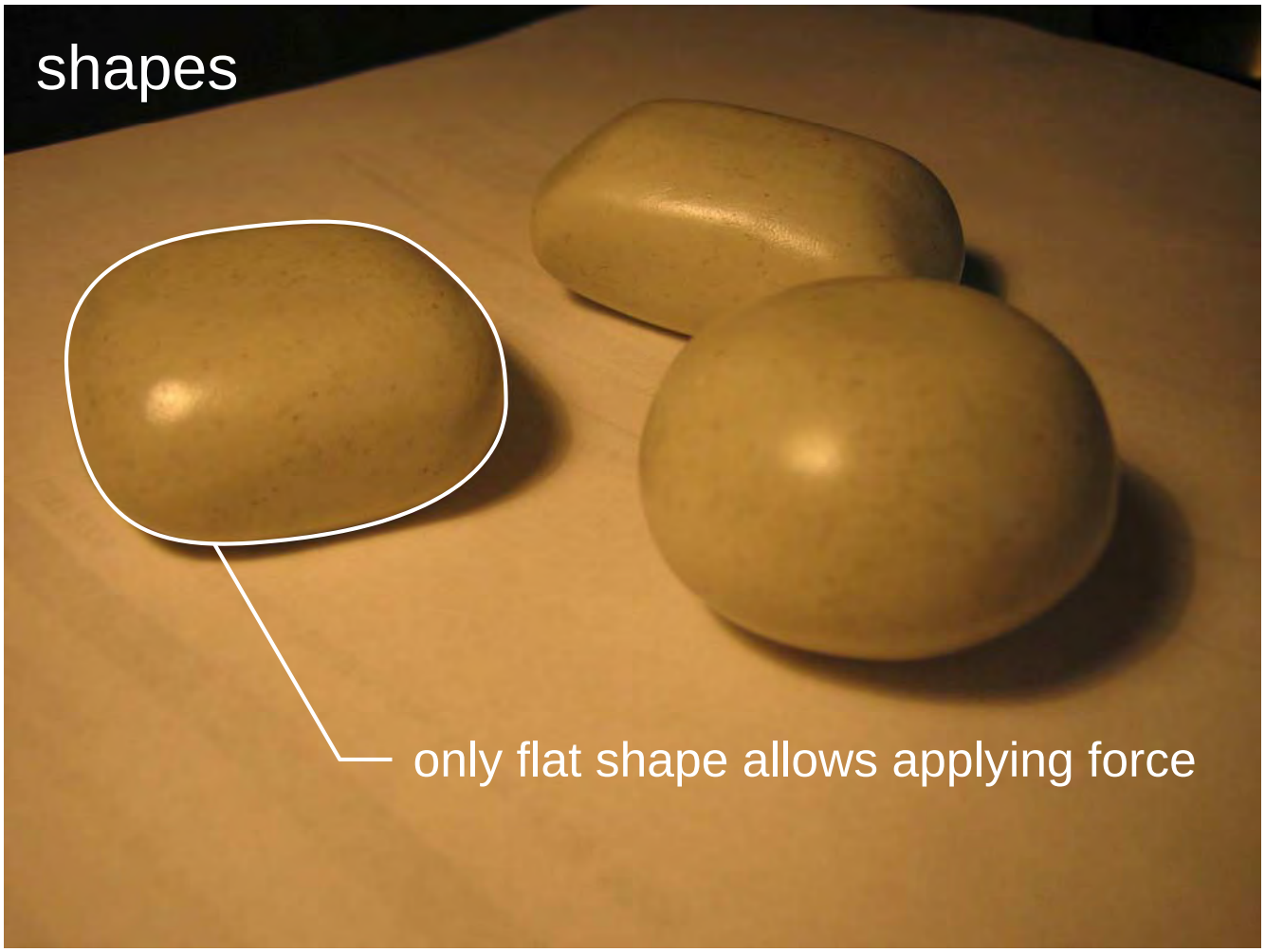
step 1

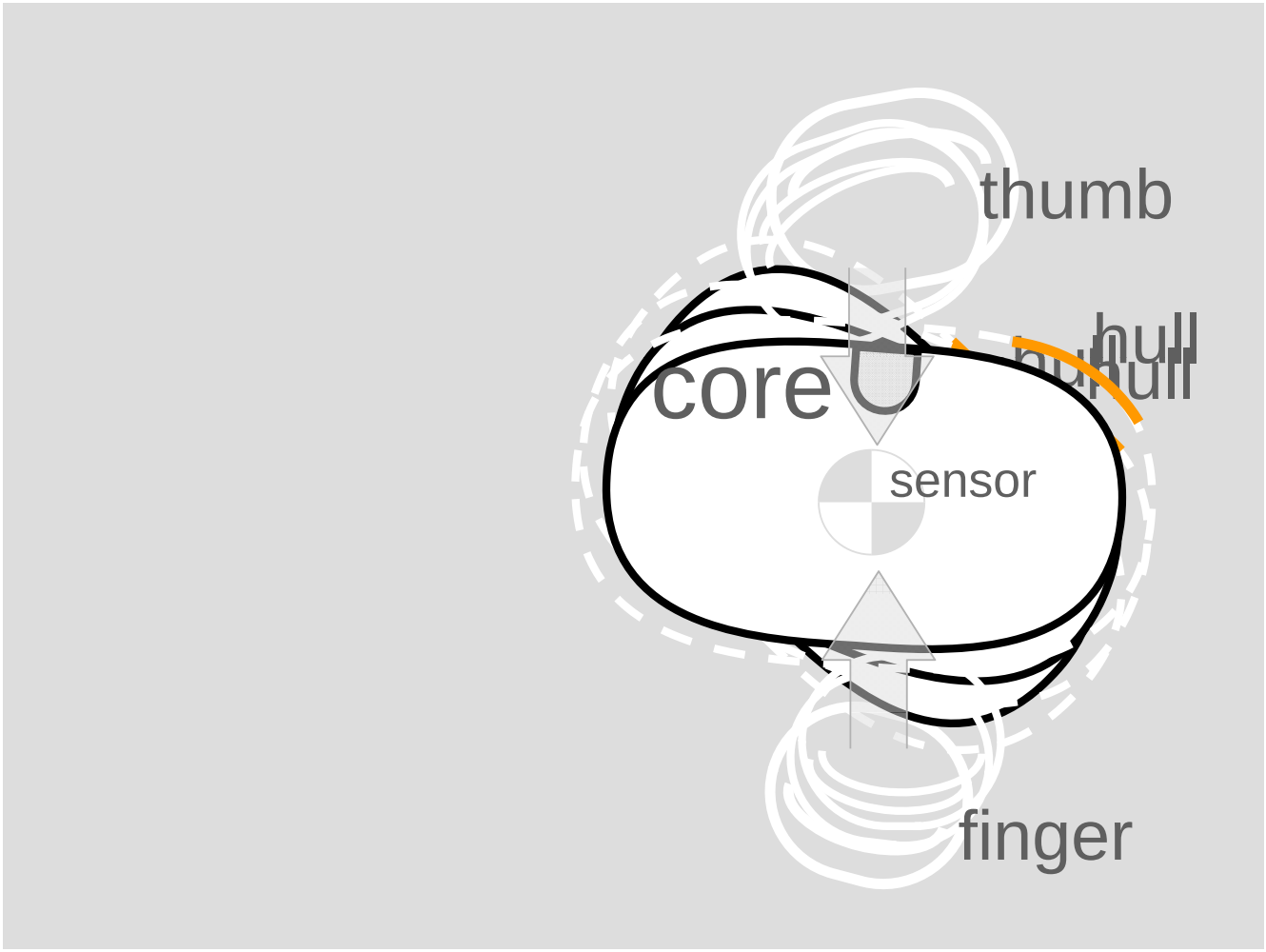




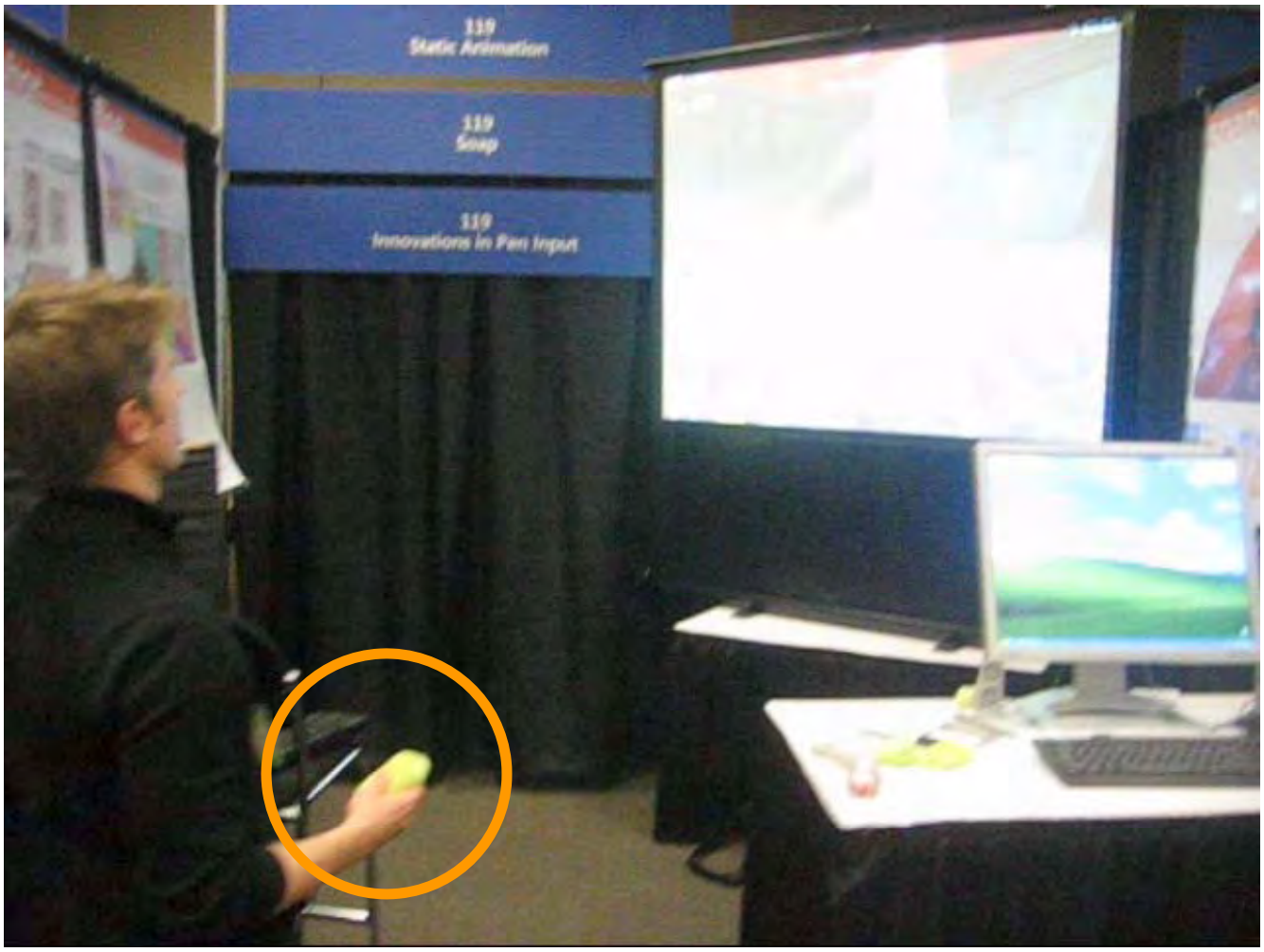
step 2






thumb
hull
core
sensor
finger


“joystick”
“belt”
“soap”
video


119
Static Animation
119
Soap
119
Innovations in Pen Input


119
Static Animation
119
Soap
119
Innovations in Pen Input

# 2. out!

# desktop contents

# out!

# 1. compressing

# zooming


[Xie etc. al, www'04]

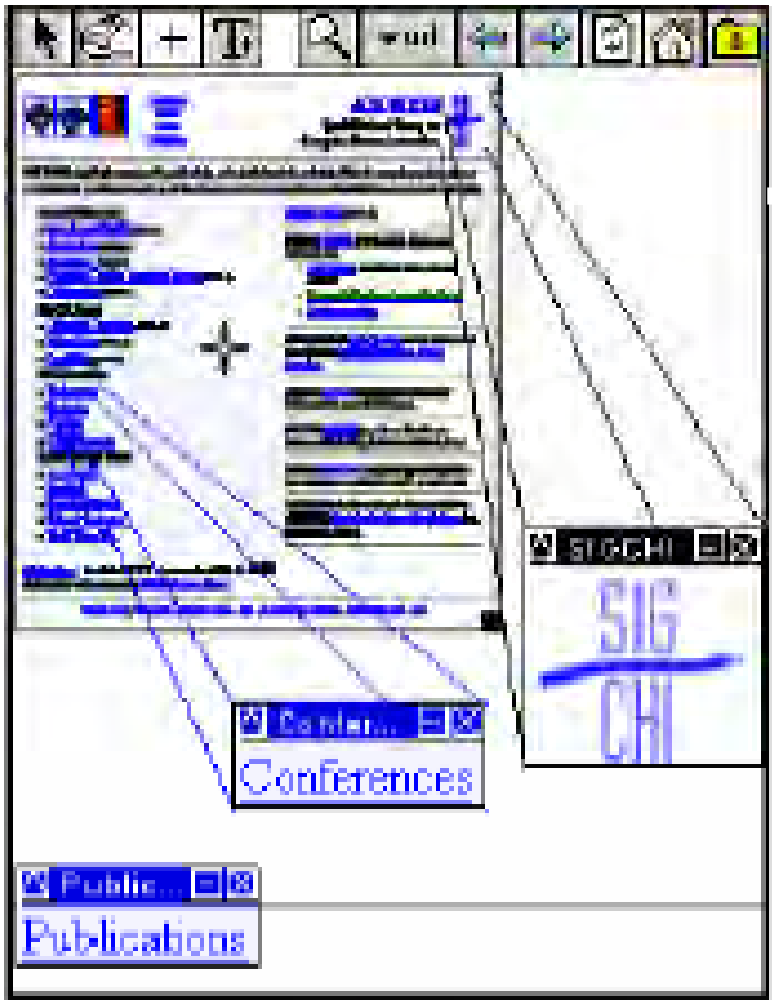
# over views


But Kirkpatrick's efforts to understand the life history of an elusive monkey with bright red lips and a snub nose have taken him further afield than most.

CHINA'S MOUNTAIN MONKEYS

[O'Hara et. at CHI 99]

# web thumb



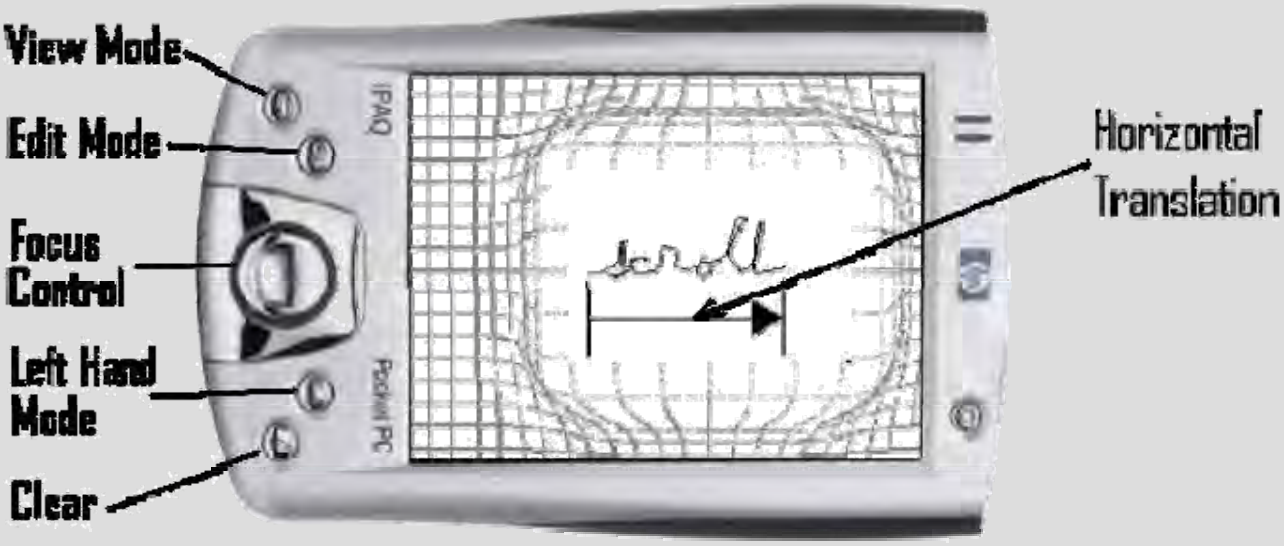

[Wobbrock et. al UIST'02]

# enhanced thumbnails


→ semantic zooming

[suh, et al., chi'02]

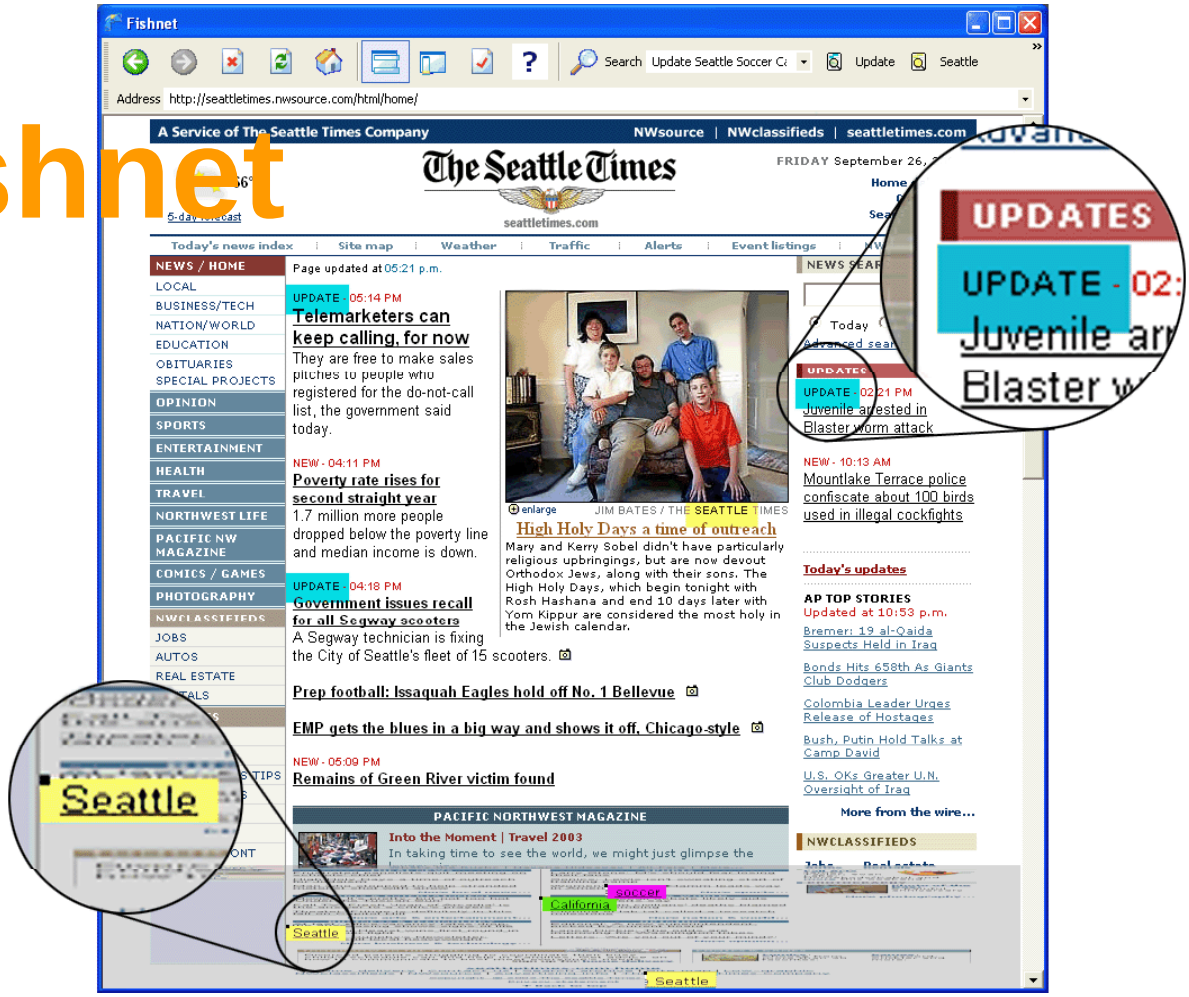
# fisheye




→ furnas paper

[lank, chi'04]

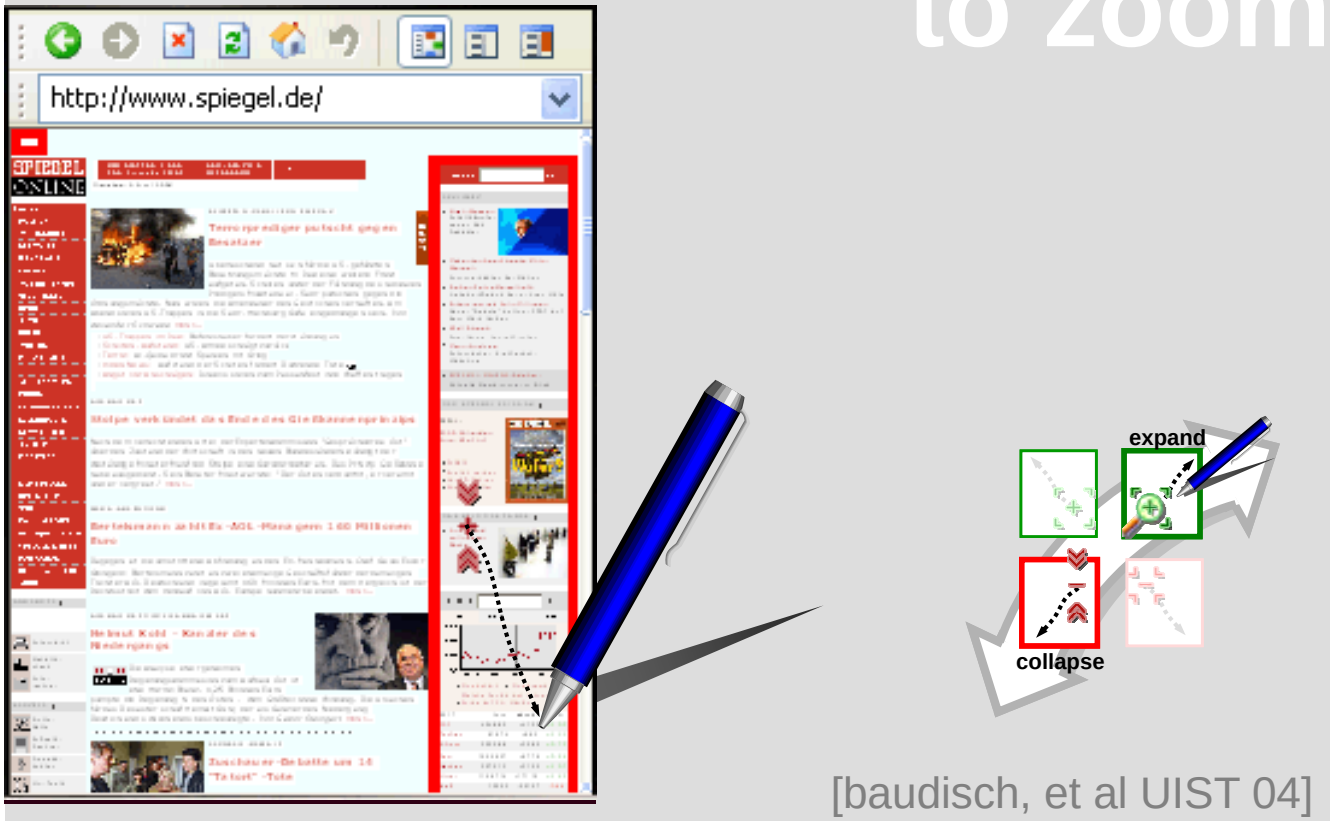
# fishnet




# summary thumbnails


[lam & baudisch, CHI 05]

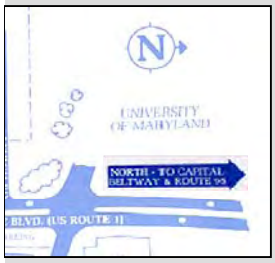

collapse to zoom



**out!**

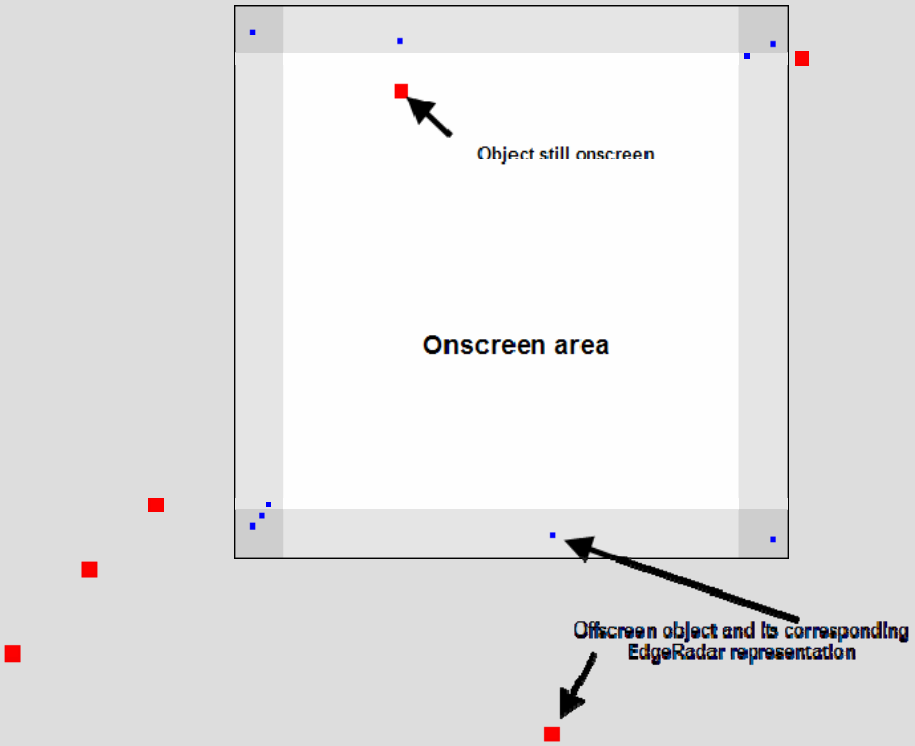
2. off-screen

simple arrows

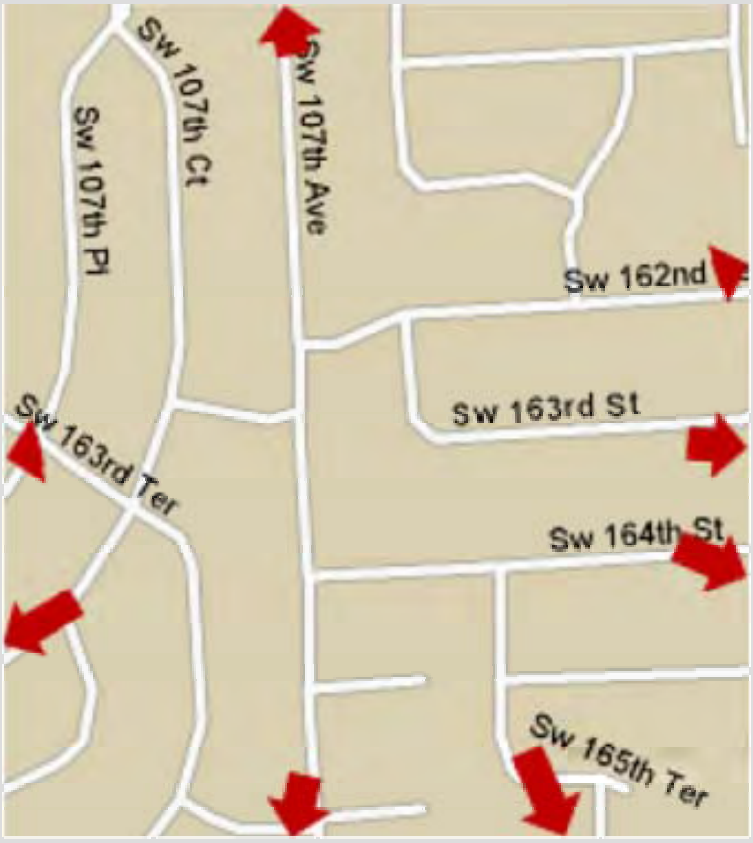

[Tecmo Bowl 87]

# edge radar




[Gustafson 07]

# scaled&stretched arrows



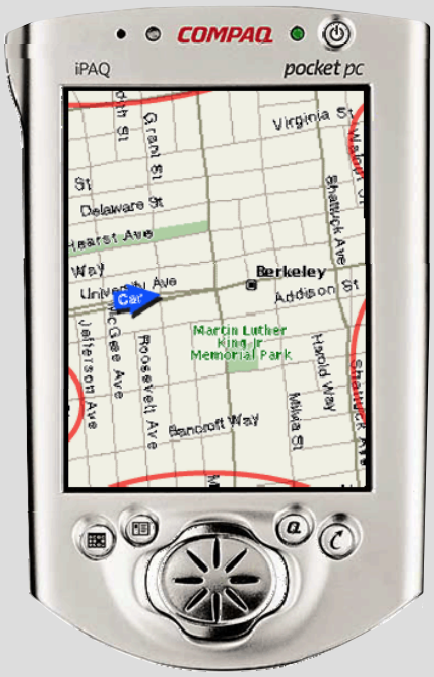

[Burigat 06]

# city lights

"space-efficient fisheye technique"


[Mackinlay 03]

# halo




[baudisch & rosenholtz, CHI 03]

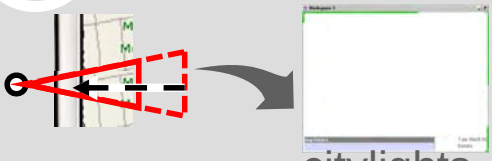
# wedge


halo: clutter problem


wedge: avoids overlap

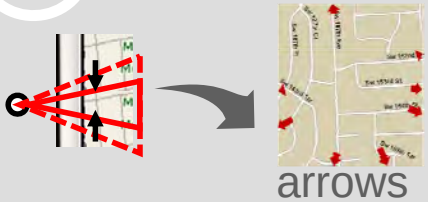
# unifying off-screen pointing

1 intrusion → 0



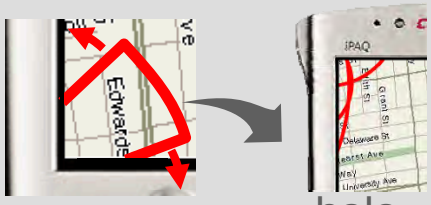
citylights

2 aperture → 0



arrows

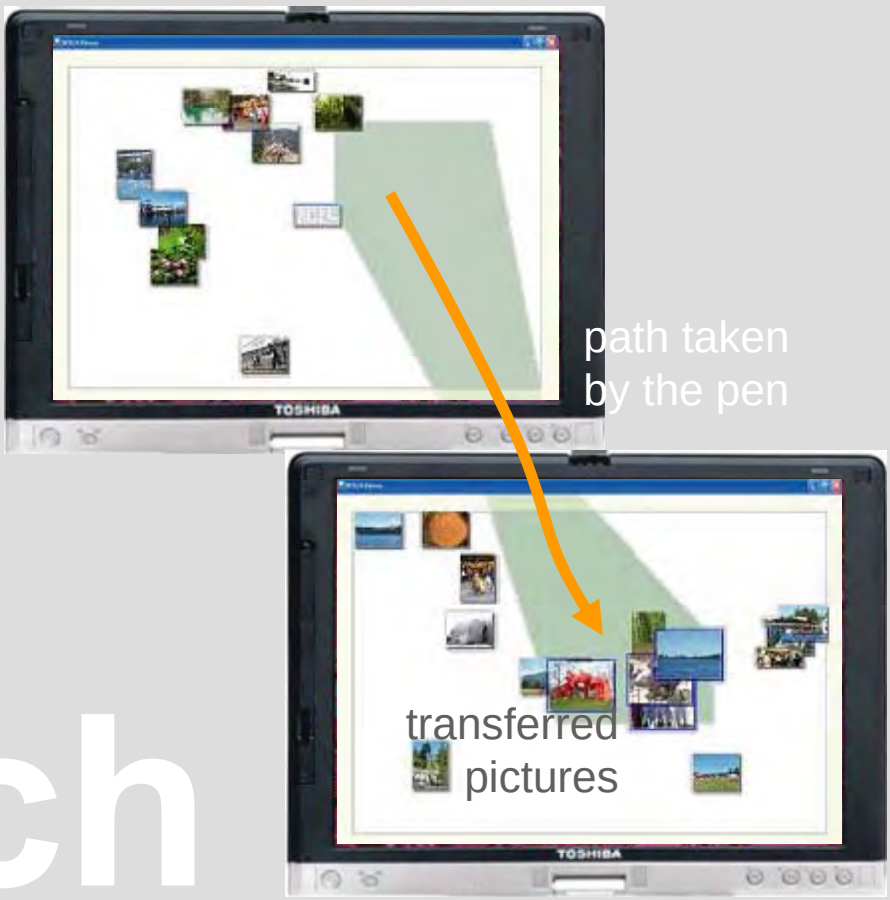
3 aperture → 360




halo

**out!**

3. extend




**stitch**

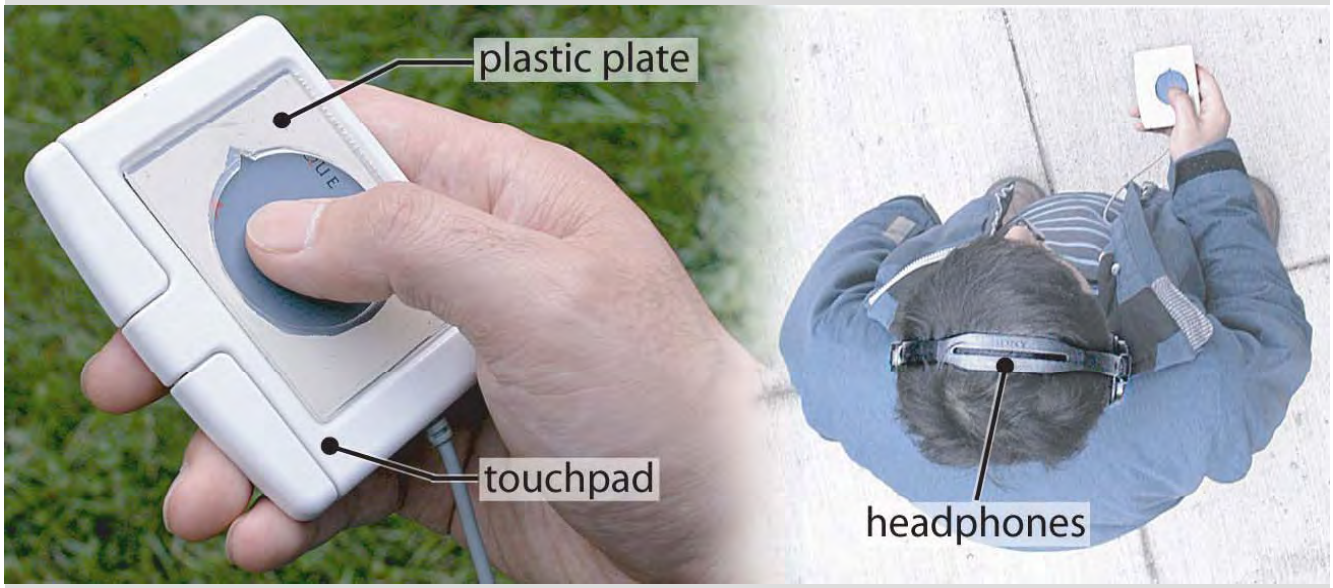
[hinckley et al 2004]


# near-eye

# out!

## 4. eyes-free/audio

# earPod




[zhao et al, CHI 2007]


experienced


expert

# blindSight:=

*“How about Monday morning?”*

calendar

*“Monday 9am”*

preview

*“tic, tic, sssssh”*

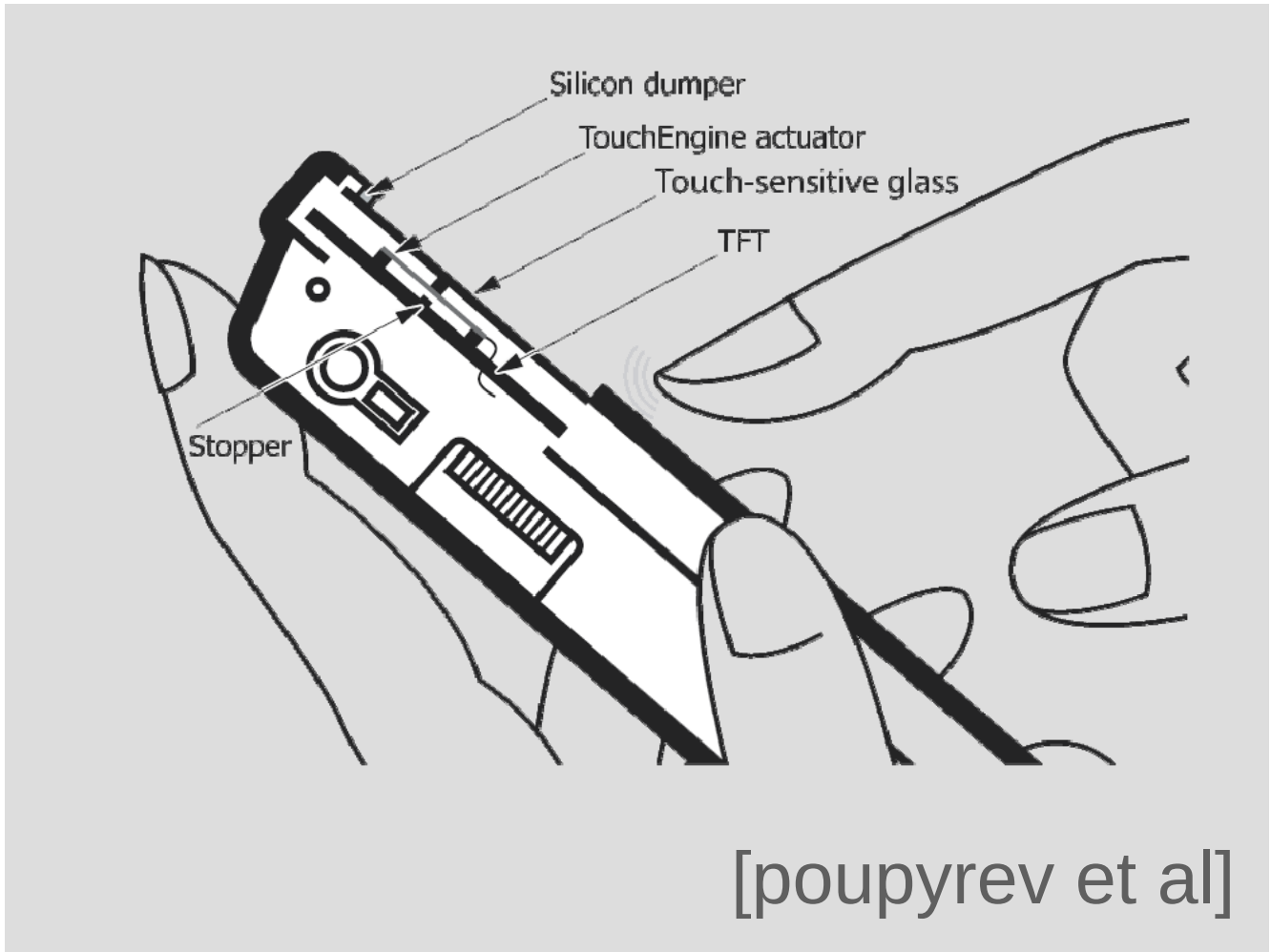
“Yeah, looks like I’m free after 10”

# Revisiting the scenario-using blindSight

**out!**

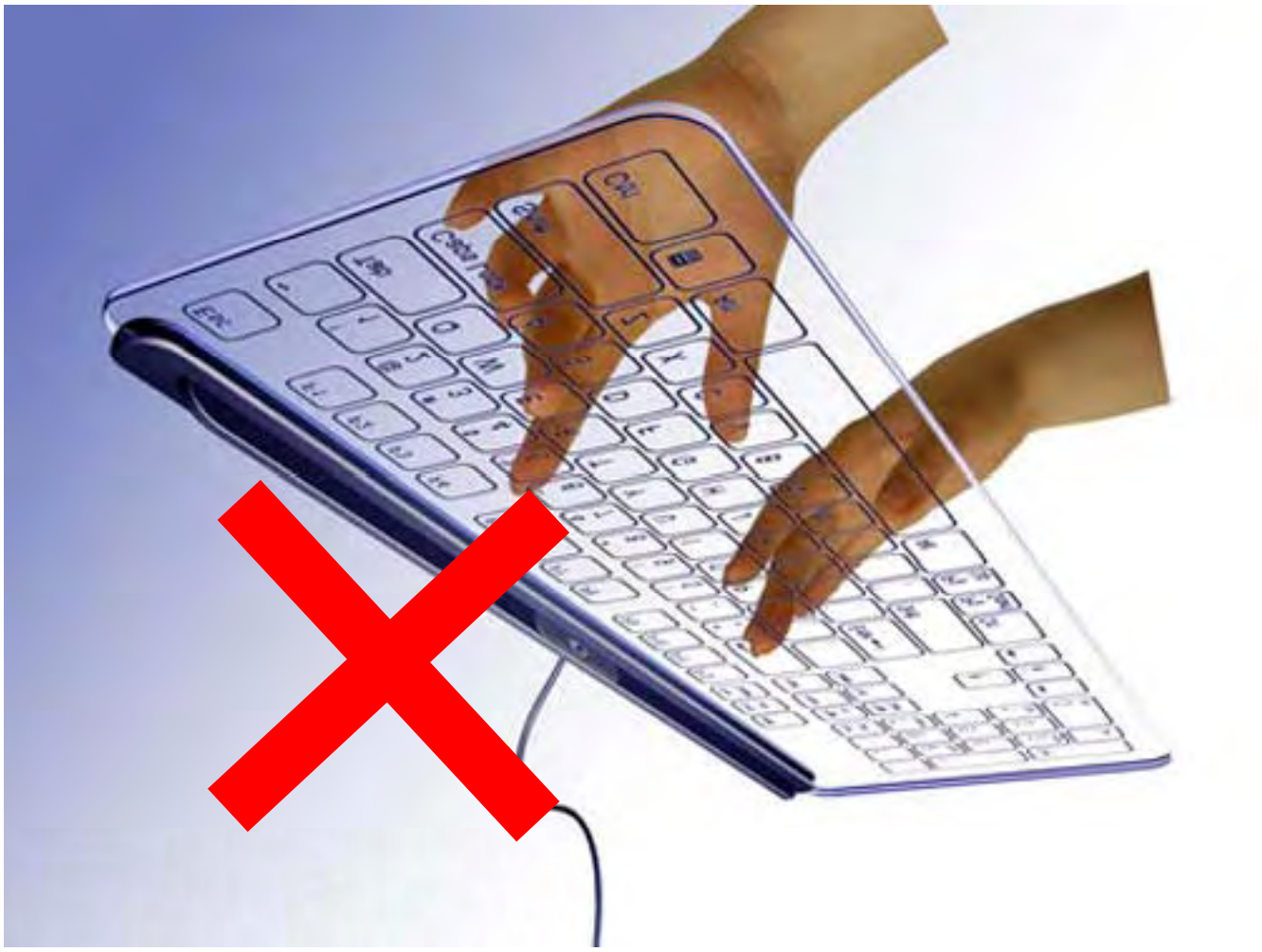
5. eyes-free/tactile


SONY
[poupyrev et al]


Silicon dumper
TouchEngine actuator
Touch-sensitive glass
TFT
Stopper
[poupyrev et al]

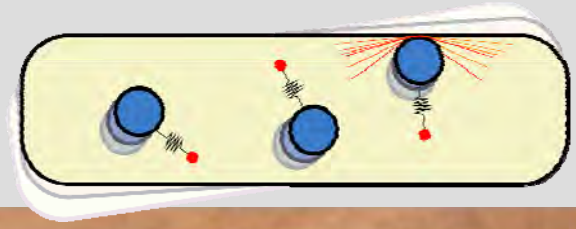

“Each press of a key returned a **clunky click and tactile snap** on the touch screen, which made typing feel incredibly responsive and very usable on the smooth screen surface.”

# haptikos



# tactile features

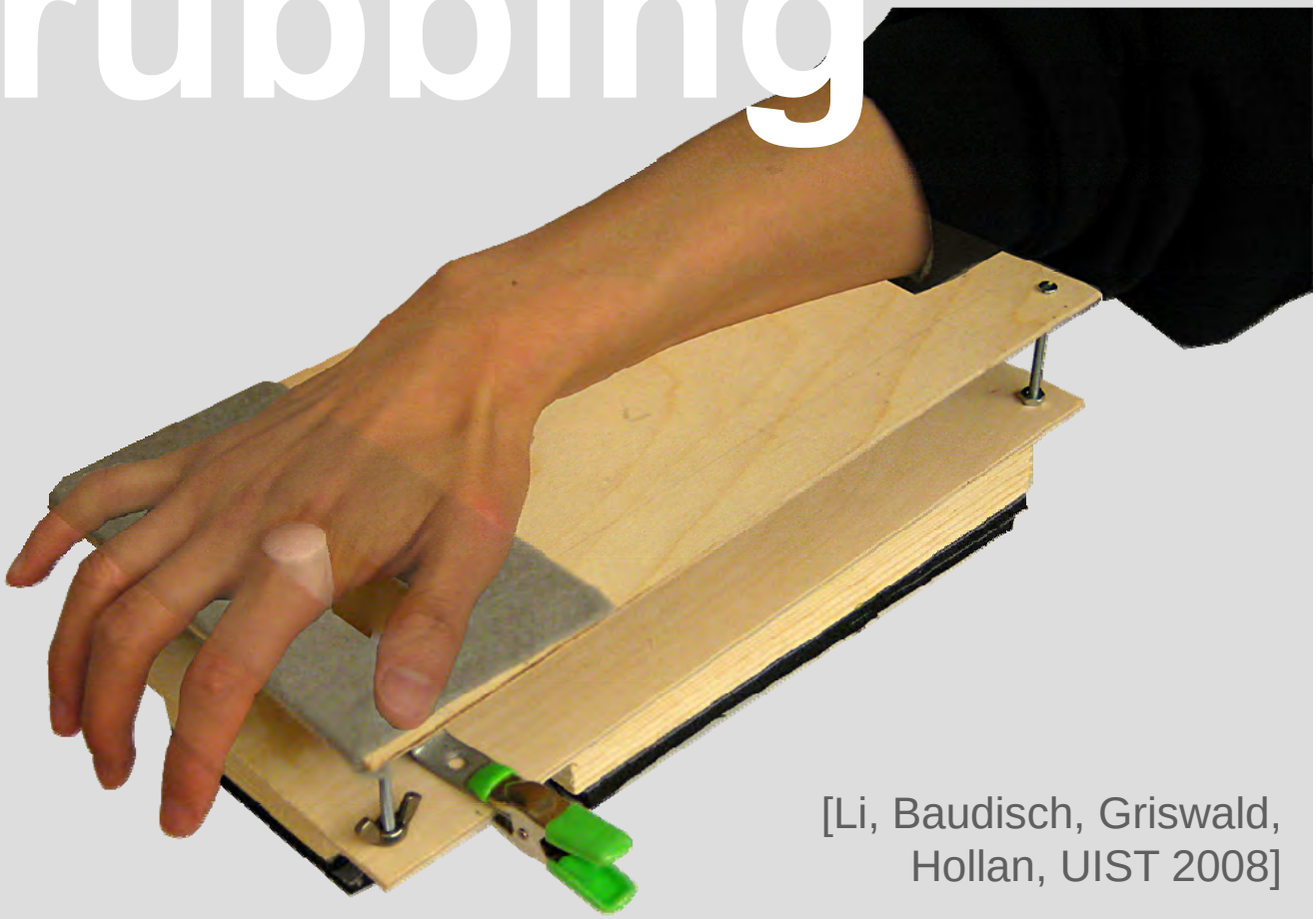
# shoogle





[williamson, CHI '07]

# rubbing



[Li, Baudisch, Griswald, Hollan, UIST 2008]

# summary

in (discreet, touch, backside, device)

out (compress, off-screen, extend, audio, tactile)

## so what should I use?

my 2t…

# PCs...

PC screens have the users' undivided attention

# phones...

…are in in a mobile situation

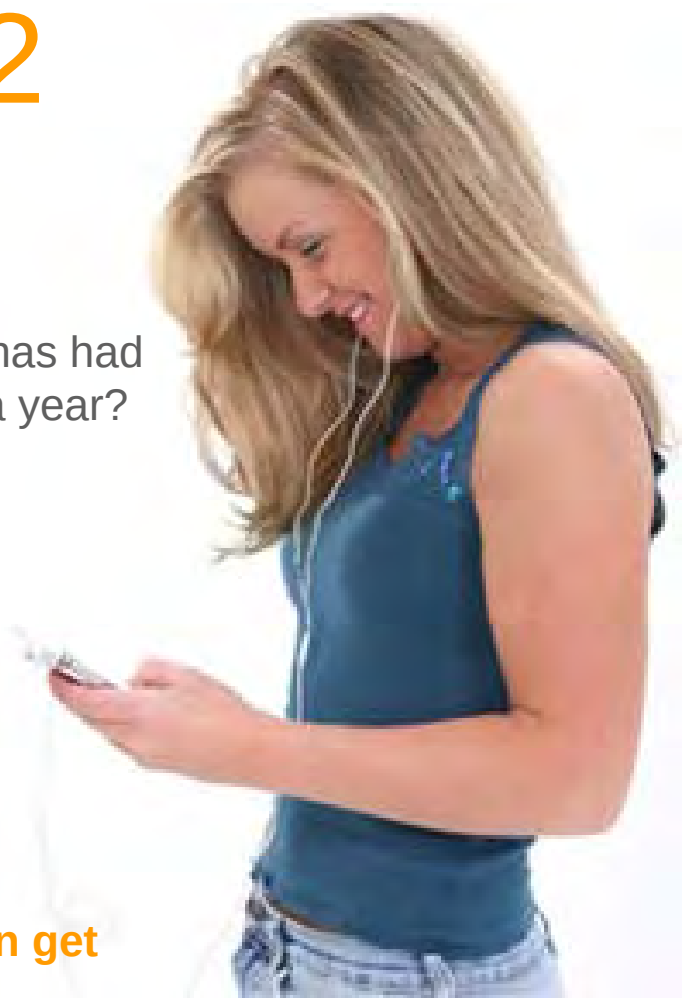
If they requires visual attention,
users will fail at their current activity

interference with social activities
drive off the road…

relying on the visual channel
- is good design on a PC (max bandwidth)
- but limiting on a mobile device

# reason #1

# reason #2



watch an iPod/iPhone user

can you tell whether he/she has had the device for a week or for a year?

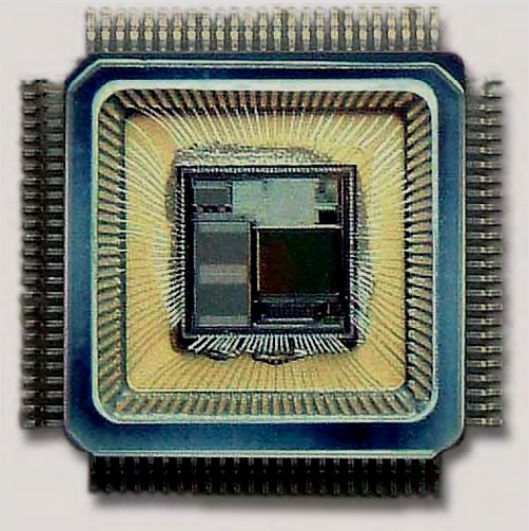
**no**

this might indicate that
(1) easy to learn
**(2) use of visual channel limits how skilled users can get**

## so how to design for eyes-free use?

# (1) predictability

is more important than number of key strokes

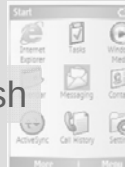


"I use multi tap
because it always works"

(Fitts' law is the **least**
important of all UI laws)

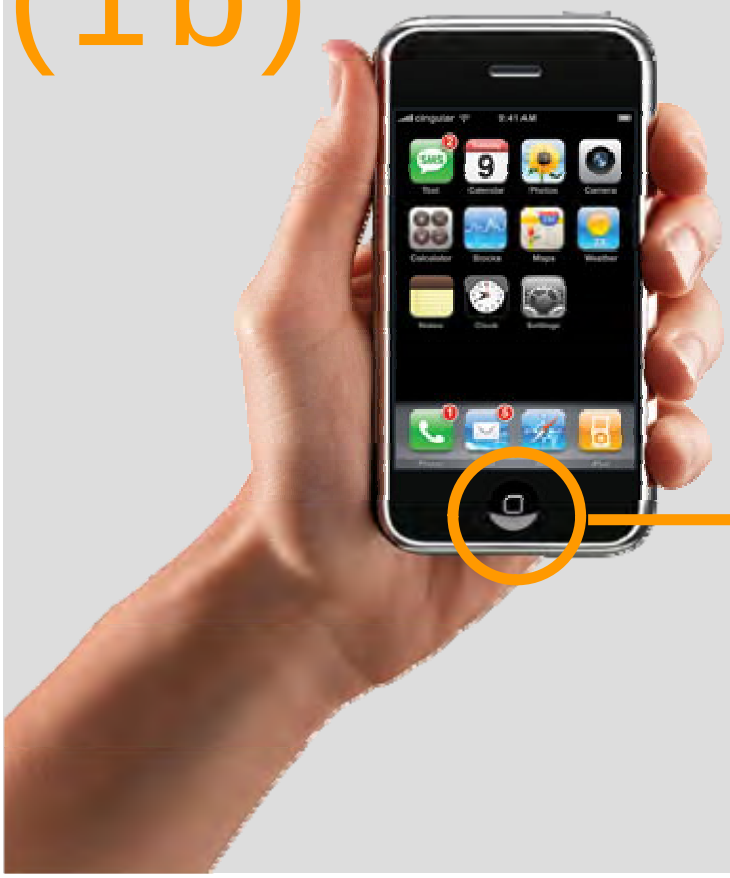
# (1a) don't mode me in


most-recently used list are 99% evil
they make new users 5% faster
but make experienced users 10x slower



also after install or flash

# (1b)



offer an
escape

# (2) avoid “casting”


for **discreet** tasks use **discreet** controls
(such as buttons for typing or launching app)

**pointing** controls for **pointing** tasks
(such as touch for panning)

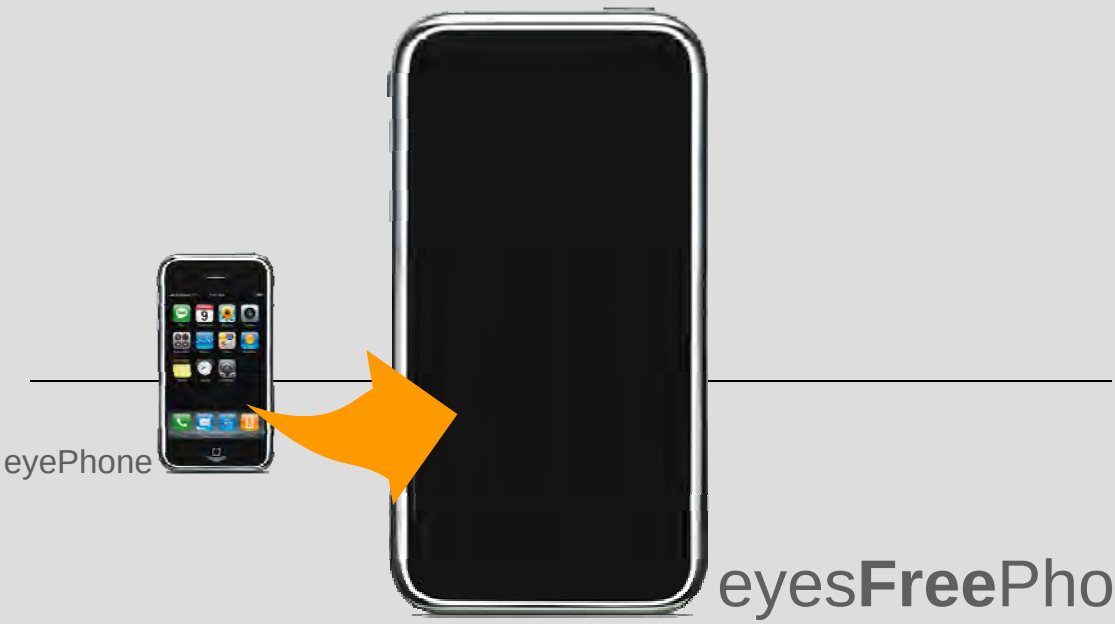
# (3) no eyes-free without tactile features


# (3a) spend buttons wisely



does entering phone numbers deserve 80% or our buttons in home screen mode?

should each button in app start smart search?




eyes**Free**Phone

require as little visual attention as possible

# ps.: blind users will thank you

thank you!


end