

Understanding Challenges in Designing Interactions for the Age of Ambient Media

Radu-Daniel Vatavu
University „Stefan cel Mare” of Suceava



UNIUNEA EUROPEANĂ



GUVERNUL ROMÂNIEI
MINISTERUL MUNCII, FAMILIEI ȘI
PROTECȚIEI SOCIALE
AMPOSDRU



Fondul Social European
POS DRU
2007-2013



Instrumente Structurale
2007-2013



MINISTERUL
EDUCAȚIEI
CERCETĂRII
TINERETULUI
ȘI SPORTULUI

OIPOSDRU

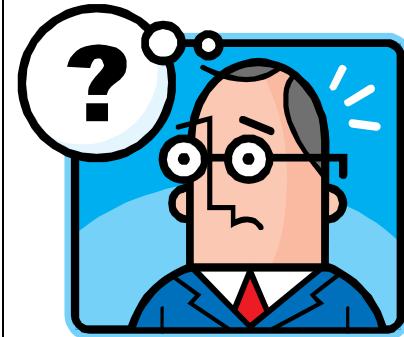


UNIVERSITATEA
„ȘTEFAN CEL MARE”
SUCEAVA

Motivation:

There are important issues to address for ambient media such as:

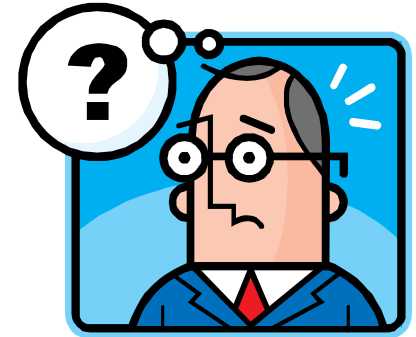
- ❖ **content creation**
what is the message?
who creates it?
- ❖ **content presentation**
how does the message gets through?
what are the technologies?
- ❖ **addressability**
to whom is the message addressed?
in what context?



Motivation:

But, equally important, how does one **interact** with ambient media content?

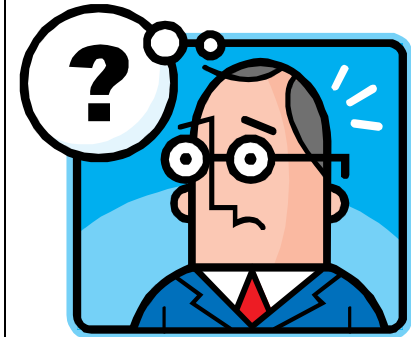
- ❖ *what are the technologies?*
- ❖ *what are the most suited interaction techniques?*
- ❖ *what type of interaction? (passive/implicit vs. active/explicit)*



Motivation:

There are important issues to address for ambient media such as:

- ❖ **content creation**
what is the message?
who creates it?
interactivity: how to create content?
- ❖ **content presentation**
how does the message gets through?
what are the technologies?
interactivity: how to use ambient content?
- ❖ **addressability**
to whom is the message addressed?
in what context?
interactivity: how to create interactions?





The aim of this position paper is to trigger discussion on **how should we interact with ambient content** so that the interaction would be effective, efficient, fluent, and natural.

Focus on public ambient displays for which two types of interfaces have been proposed so far:

- ❖ using mobile „smart” phones
- ❖ point and gesture

Focus on public ambient displays for which two types of interfaces have been proposed so far:

❖ using mobile „smart” phones:



- ❖ sending SMS to the ambient display;
- ❖ control the display via some software installed on the mobile device;
- ❖ use the device as a controller via motion sensing;

Rapid growth and high penetration of mobile phones: 5,000,000,000 mobile phones for a population of 6,877,706,288; 67.6% owns a mobile phone (Romania 108%, Spain 111%, Hong Kong 150%) [BBC Measuring the Information Society 2010]

❖ point and gesture

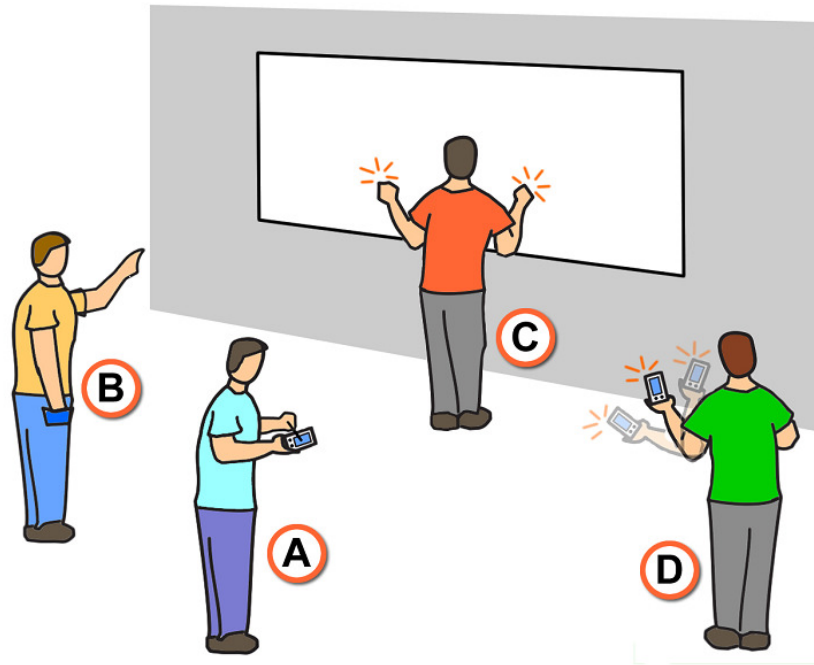
Focus on public ambient displays for which two types of interfaces have been proposed:

- ❖ using mobile „smart” phones

- ❖ **point and gesture:**

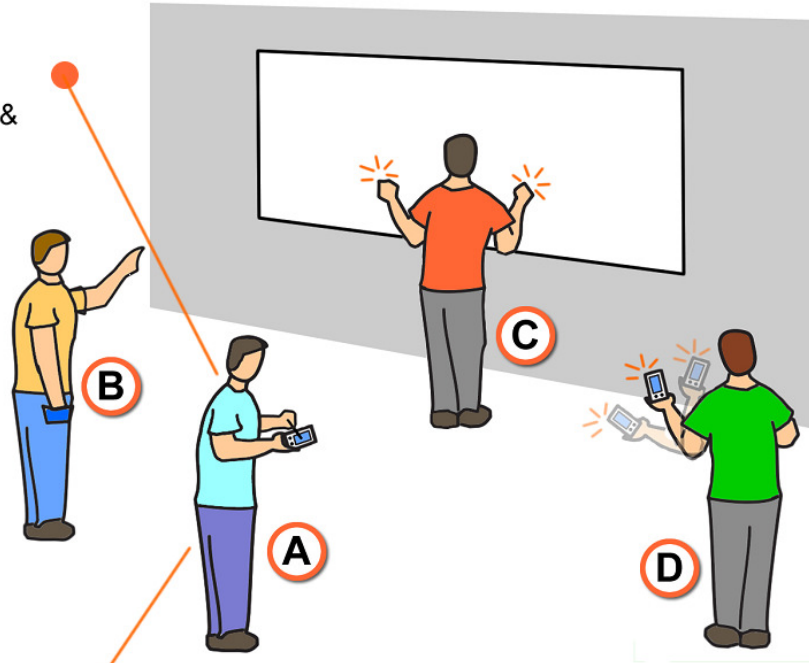


- ❖ technology is present within the environment (video cameras): users are monitored and their actions detected and recognized;
- ❖ users carry sensing technology (wearable computing - cameras, accelerometer devices, Wii);
- ❖ pointing is natural;
- ❖ ... as are also some gestures such as pinch, grasp, but gestures in general are not self-revealing.





Throw and tilt
interaction, Dachsel &
Buchholz, CHI 2009



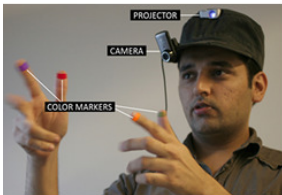
Vatavu, Presence
Bubbles, SAME,
2009



Throw and tilt interaction, Dachsel & Buchholz, CHI 2009



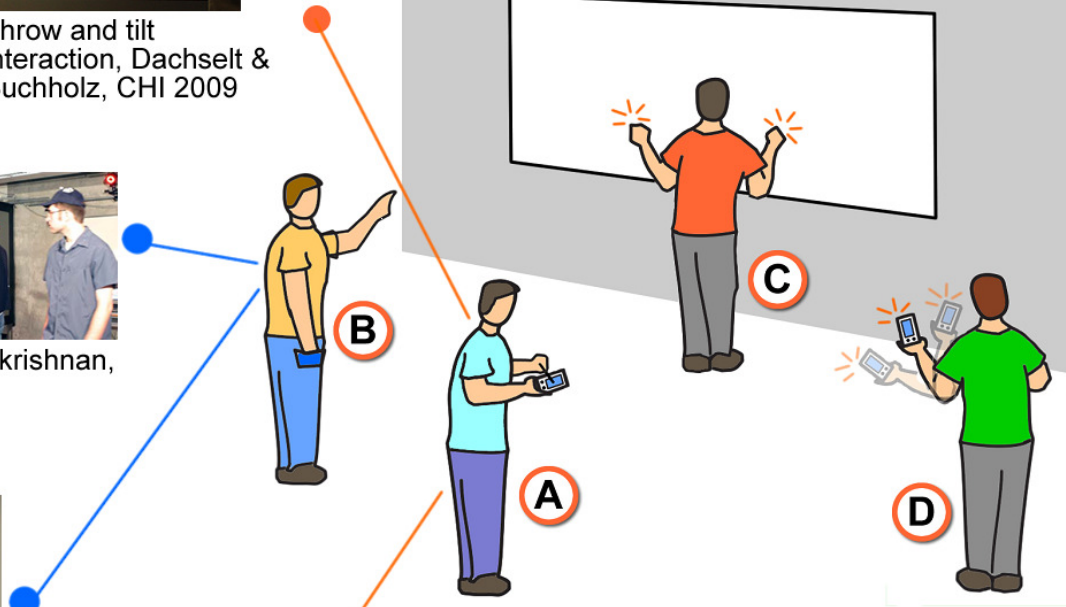
Vogel & Balakrishnan, UIST, 2004



6th Sense, Pranav Mistry, 2009



Vatavu, Presence Bubbles, SAME, 2009

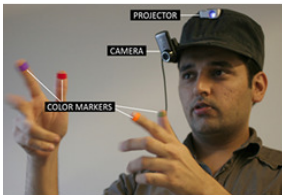




Throw and tilt interaction, Dachsel & Buchholz, CHI 2009



Vogel & Balakrishnan, UIST, 2004



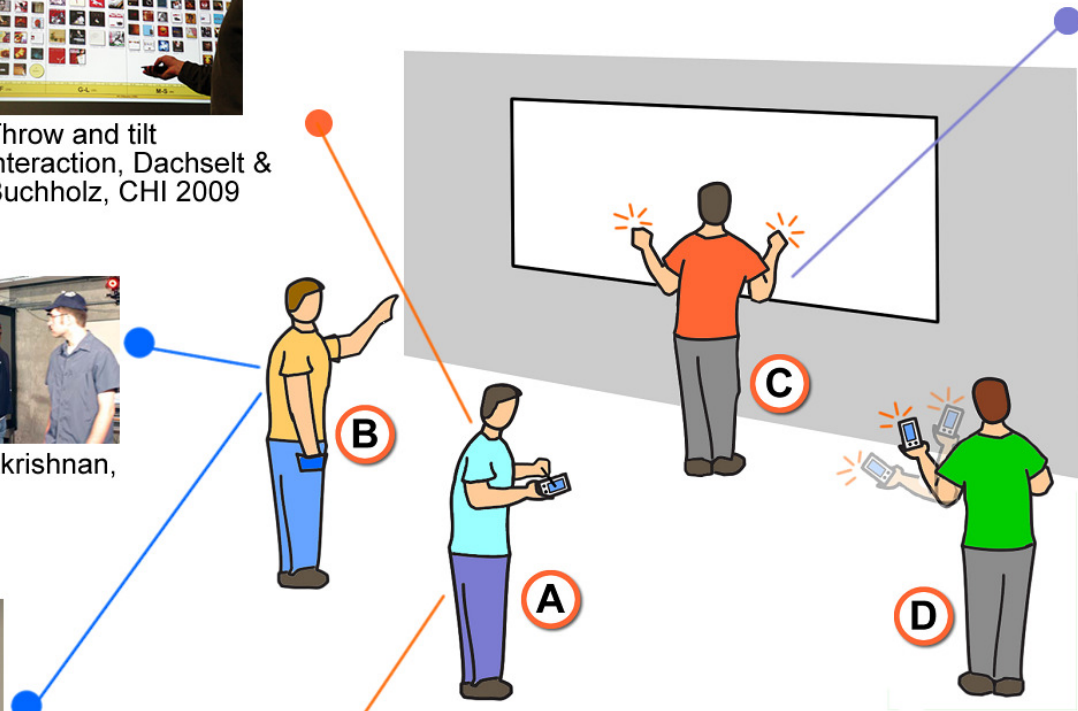
6th Sense, Pranav Mistry, 2009



Vatavu, Presence Bubbles, SAME, 2009



www.naturalinteraction.org





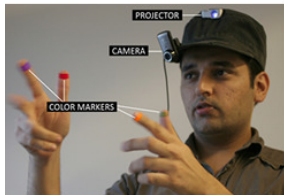
Throw and tilt interaction, Dachsel & Buchholz, CHI 2009



www.naturalinteraction.org



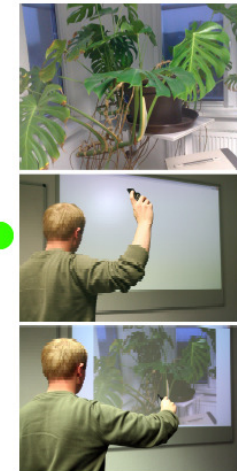
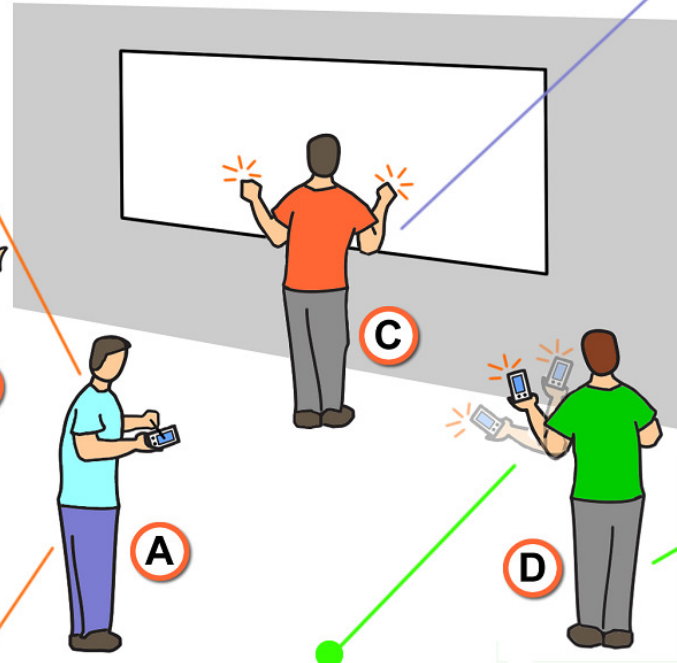
Vogel & Balakrishnan, UIST, 2004



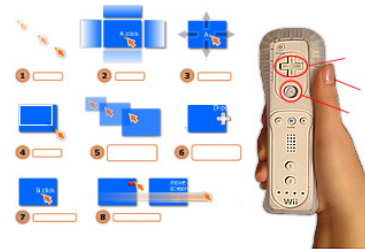
6th Sense, Pranav Mistry, 2009



Vatavu, Presence Bubbles, SAME, 2009



Throw and tilt interaction, Dachsel & Buchholz, CHI 2009



Vatavu, work in progress, 2010

Technology is there so... how to use it?

Phone or gesture?



- ❖ requires establishing a connection: wireless LAN, Bluetooth, IR, etc.
→ affects the **fluidity** of the interaction

- ❖ requires reliable tracking technology for detecting users actions
→ affects the **fluidity** of the interaction



Technology is there so... how to use it?

Phone or gesture?



- ❖ requires establishing a connection: wireless LAN, Bluetooth, IR, etc.
→ affects **fluidity** of the interaction
- ❖ needs downloading and installing software
→ how to **use** it?

- ❖ requires reliable tracking technology for detecting users actions
→ affects **fluidity** of the interaction
- ❖ do you know what gestures are available?
→ how to **use** it?



Technology is there so... how to use it?

Phone or gesture?



- ❖ requires establishing a connection: wireless LAN, Bluetooth, IR, etc.
→ affects **fluidity** of the interaction
- ❖ needs downloading and installing software
→ how to **use** it?
- ❖ **privacy** concerns (phone data/person location)

- ❖ requires reliable tracking technology for detecting users actions
→ affects **fluidity** of the interaction
- ❖ do you know what gestures are available?
→ how to **use** it?
- ❖ **privacy** concerns (face/actions are being captured)



Technology is there so... how to use it?

Phone or gesture?



- ❖ requires establishing a connection: wireless LAN, Bluetooth, IR, etc.
→ affects **fluidity** of the interaction
 - ❖ needs downloading and installing software
→ how to **use** it?
 - ❖ **privacy** concerns (phone data/person location)
 - ❖ would you spend **time** to connect to the display?
- ❖ requires reliable tracking technology for detecting users actions
→ affects **fluidity** of the interaction
 - ❖ do you know what gestures are available?
→ how to **use** it?
 - ❖ **privacy** concerns (face/actions may be captured)
 - ❖ would you **perform gesture** commands in midair in public spaces?



A1st UI problem:

**How do you know what kind of interface
[phone/gesture/other] does the ambient display
expose?**

→ self-revealing interfaces

A1st UI problem:

How do you know what kind of interface [phone/gesture/other] does the ambient display expose?

→ self-revealing interfaces

Why is this a problem?

- ❖ more and more public displays being installed;
- ❖ some of them are far away...;
- ❖ some of them are very close... and ... can be touched;
- ❖ some are interactive, some are not;
- ❖ **which one is interactive? how can you tell?**

A1st UI problem:

How do you know what kind of interface [phone/gesture/other] does the ambient display expose?

→ self-revealing interfaces

Why is this a problem?

❖ which one is interactive? how can you tell?

Public signaling - does it work so far?



A1st UI problem:

How do you know what kind of interface [phone/gesture/other] does the ambient display expose?

→ self-revealing interfaces

Why is this a problem?

❖ which one is interactive? how can you tell?

Public signaling - will it work?



The 2nd UI problem:

Suppose you knew the type of the interface, **how do you know what interaction techniques does the ambient display allow?**

→ **self-revealing interfaces**

The 2nd UI problem:

Suppose you knew the type of the interface, **how do you know what interaction techniques does the ambient display allow?**

→ **self-revealing interfaces**

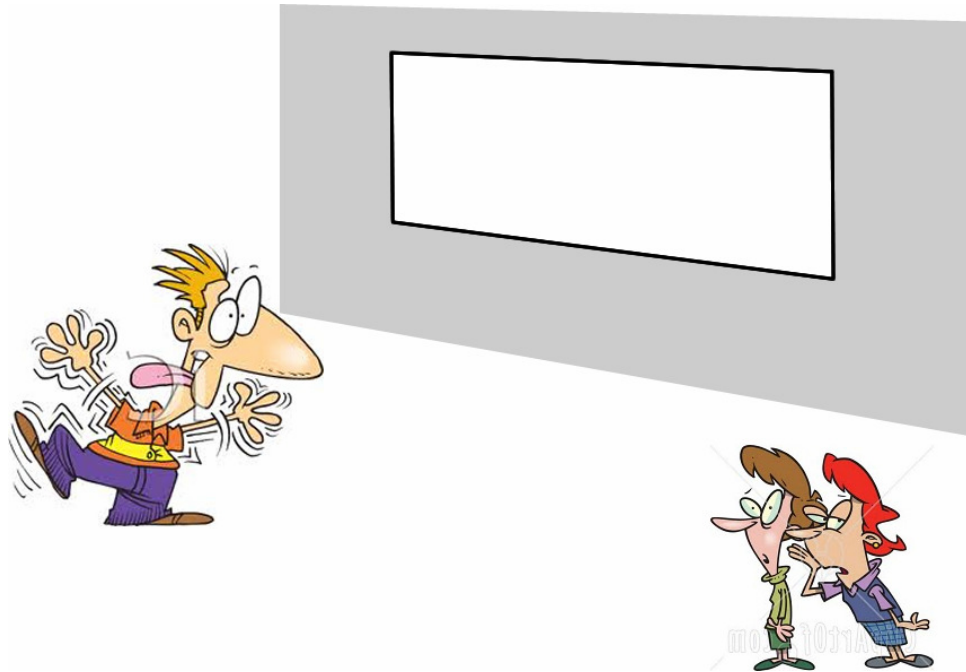
Why is this a problem?

- ❖ how do you know what are the functions and tasks?
- ❖ what are the commands?
- ❖ if gesture-based, what are the gestures?
- ❖ **would you give it a few tries to find out? 😊**



The 3rd UI problem:

There are already concerns for talking on the phone in public or phones are expressly banned in some contexts. On top of all this, **would you perform motion gestures in public?**



Rico & Brewster, CHI 2010, *Usable gestures for mobile interfaces: evaluating social acceptability*

found that **users' willingness to perform gestures in public depends on location and audience.**



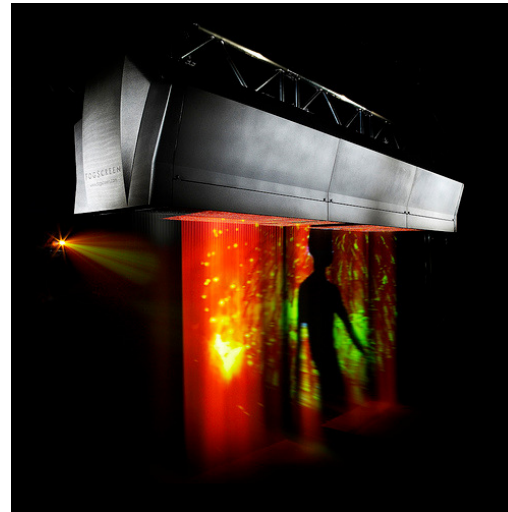
An initial survey on few people
[a larger survey is in course]
indicates that people don't know
how to interact with a large
display!

They can't even tell if the display
is interactive or not!

Self-revealing interfaces + intuitive + fluent interactions
= no frustrations
... should also apply for public ambient displays.



Problems are just at the beginning as other types of public ambient displays become available: floor, ceiling, fog, ...



see www.naturalinteraction.org

In the end, how should ambient media interactions look like?



Arguing for **friendly vs. rude** (non self-revealing) displays.

A position paper meant to provoke discussions!

Thank you!

The small survey on phone and gesture-based interaction has been exemplified using the following references:

- Dachsel, R., Buchholz, R.: *Natural Throw and Tilt Interaction between Mobile Phones and Distant Displays*, CHI '09 Extended Abstracts on Human Factors in Computing Systems (Boston, MA, USA, April 04-09, 2009), CHI '09, ACM, New York, NY
- Radu-Daniel Vatavu, *Enhancing Human-Human Interactions through Emotional Responsive Ambient Media*, 2nd Workshop on Semantic Ambient Media Experience (SAME) at Aml 2009, Salzburg, Austria, November 2009
- Vogel, D. and Balakrishnan, R.: *Interactive public ambient displays: transitioning from implicit to explicit, public to personal, interaction with multiple users*. In: Proceedings of the 17th Annual ACM Symposium on User interface Software and Technology. UIST '04. ACM, New York, NY, 137-146 (2004)
- Mistry, P., Maes, P., and Chang, L.: *WUW - wear Ur world: a wearable gestural interface*. In: Proceedings of the 27th international Conference Extended Abstracts on Human Factors in Computing Systems. ACM, New York, NY, 4111-4116 (2009)
- Rico, J., Brewster, S.: *Usable gestures for mobile interfaces: evaluating social acceptability*. In: Proceedings of the 28th international conference on Human factors in computing systems (CHI '10). ACM, New York, NY, USA, 887-896, (2010)
- www.naturalinteraction.org