

What is a good interface?

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What makes a good interface?

- A good interface makes it **easy** for users to tell the computer what they want to do
 - For the computer to request information from the users, and
 - For the computer to present understandable information

Good interfaces are...

- Clear
 - ease of learning and using
- Familiar
 - allows users to apply previously learned knowledge to new tasks
- Simple
 - simple designs are easy to learn and to use and give the interface a consistent look

Good interfaces are...

- User-Controlled
 - the user initiates and controls all actions
- Direct and efficient
 - users must see the relationship between the actions they take and the objects on the screen
- Forgiving
 - users make mistakes, provide undo

Good interfaces are...

- Provide feedback
 - keep the user always informed
- Aesthetic
 - “The ugly will pardon me, but beauty is fundamental” Vinicius de Moraes

Key-words

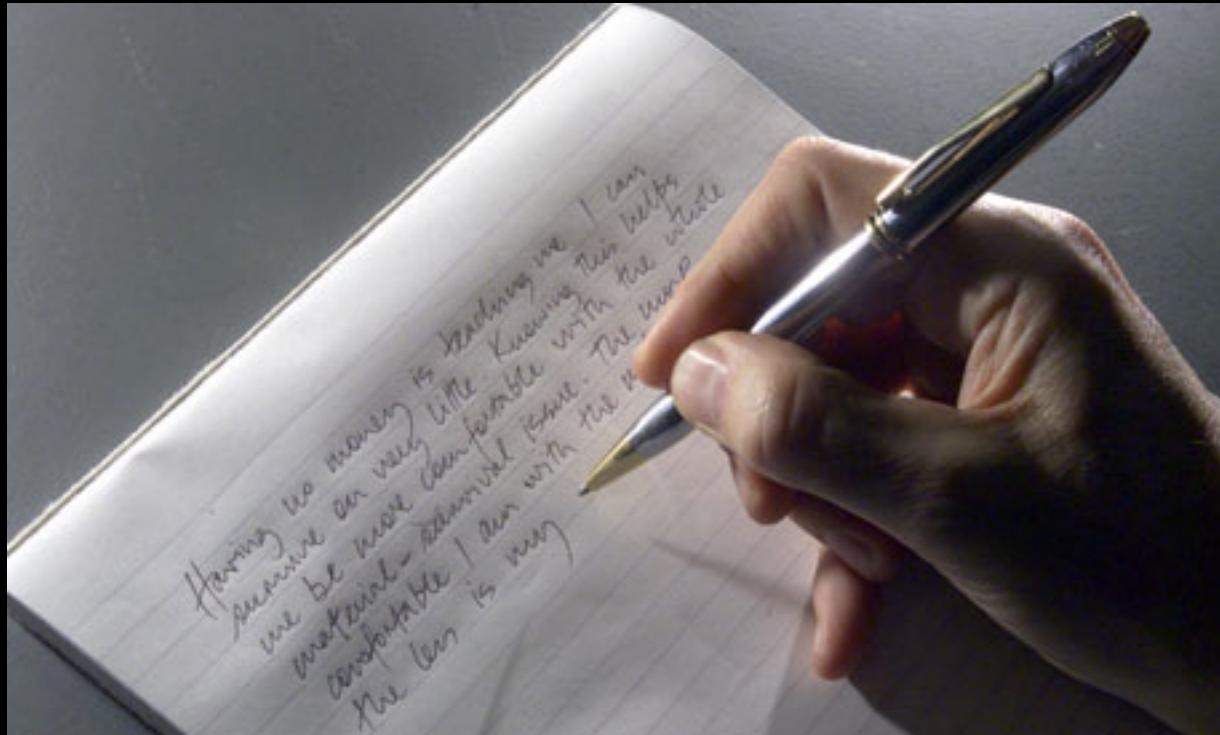
- Utility
- Usability
- User experience
- Accessibility

And yet...

- A good interface is transparent for the user
- But sometimes, interaction is the goal
- 5% of the world population need accessibility
 - Wrong!
 - 100% need accessibility

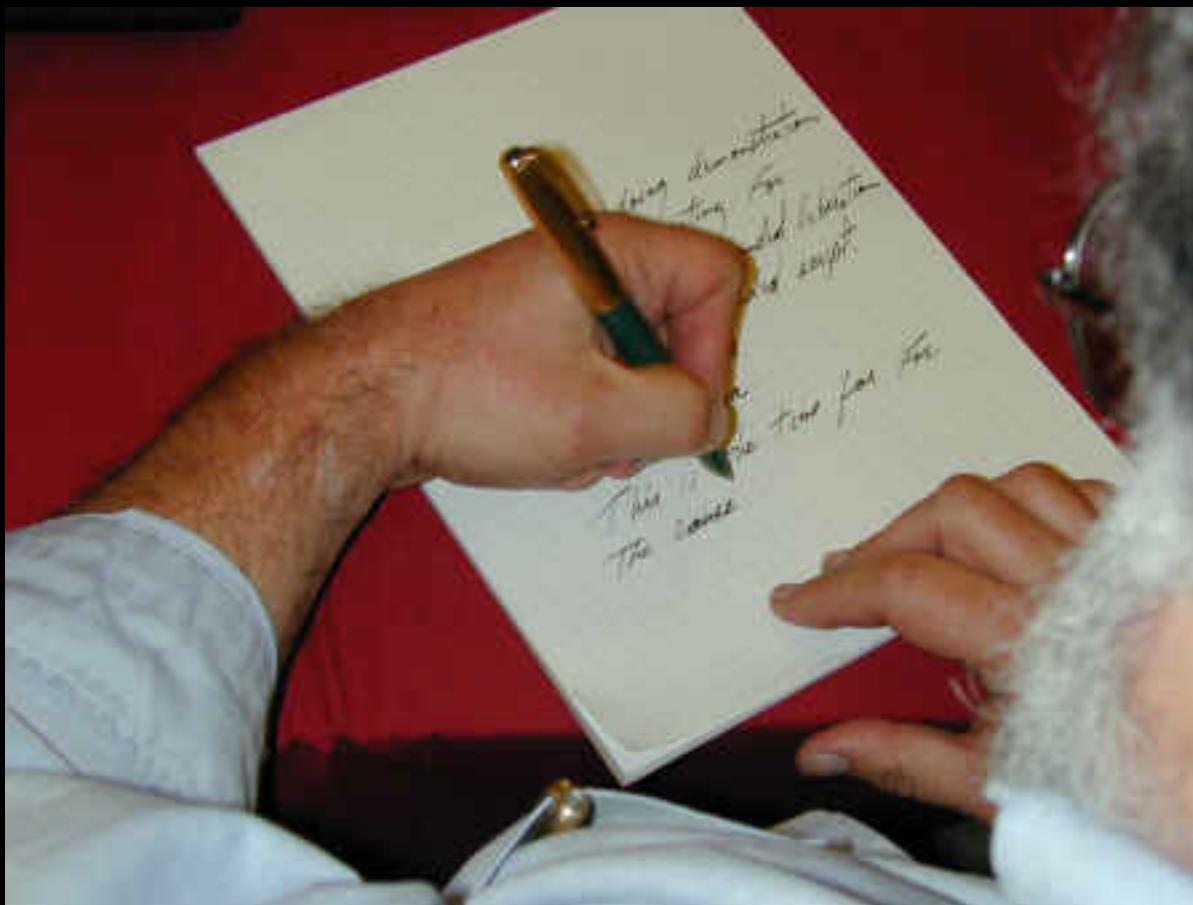
Let's see some scenarios...

Scenario 1: Writing



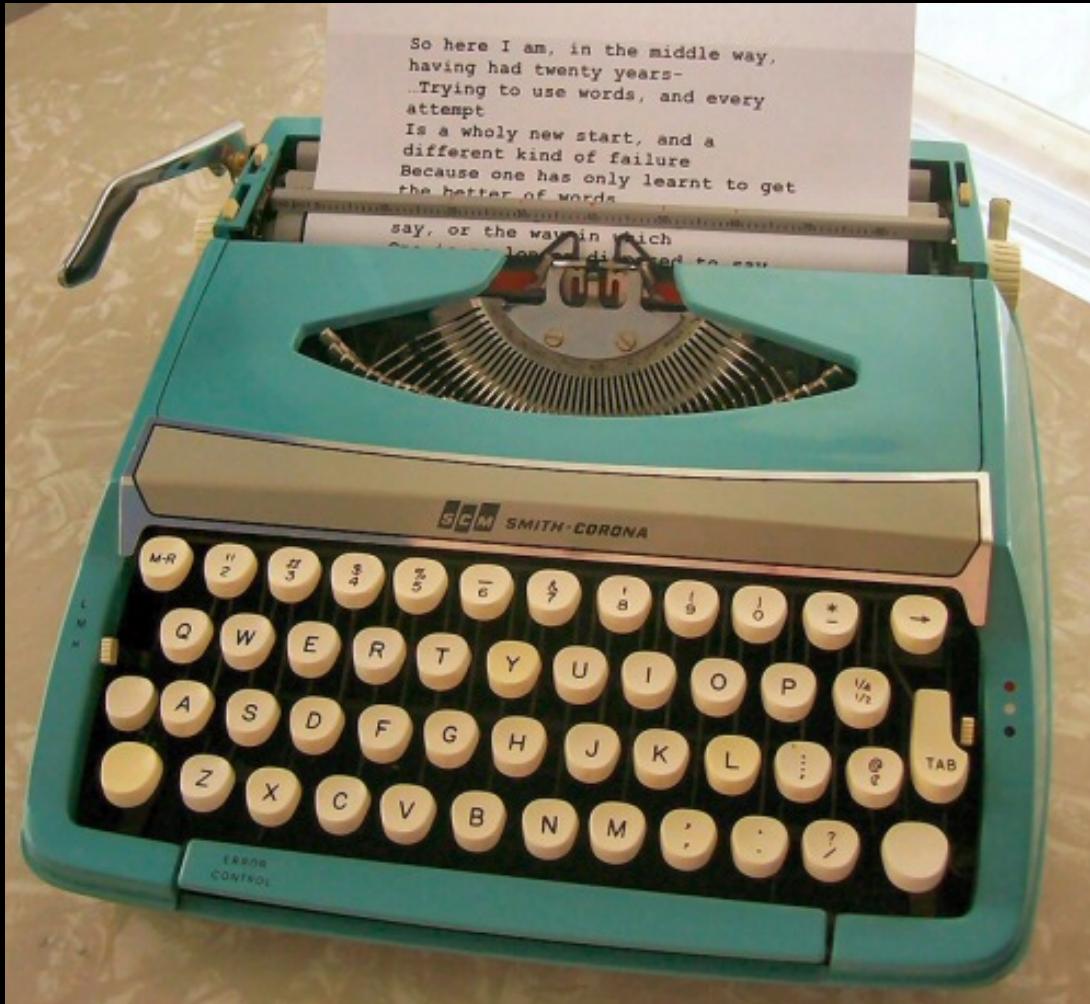
Clear?
Familiar?
Simple?
User-controlled?
Efficient?
Forgiving?
Feedback?
Aesthetic?

Scenario 1: Writing



Clear?
Familiar?
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Scenario 2: Writing



Clear?
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Scenario 3: Writing



Clear?
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Aesthetic?

Scenario 3: Writing



Scenario 4: Drawing



Clear?
Familiar?
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Efficient?
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Feedback?
Aesthetic?

Scenario 5: Drawing



Clear?
Familiar?
Simple?
User-controlled?
Efficient?
Forgiving?
Feedback?
Aesthetic?

Scenario 6: Drawing



Clear?
Familiar?
Simple?
User-controlled?
Efficient?
Forgiving?
Feedback?
Aesthetic?

But nobody want to use a computer!



New scenarios...

Smartphones



Tablets



And more...



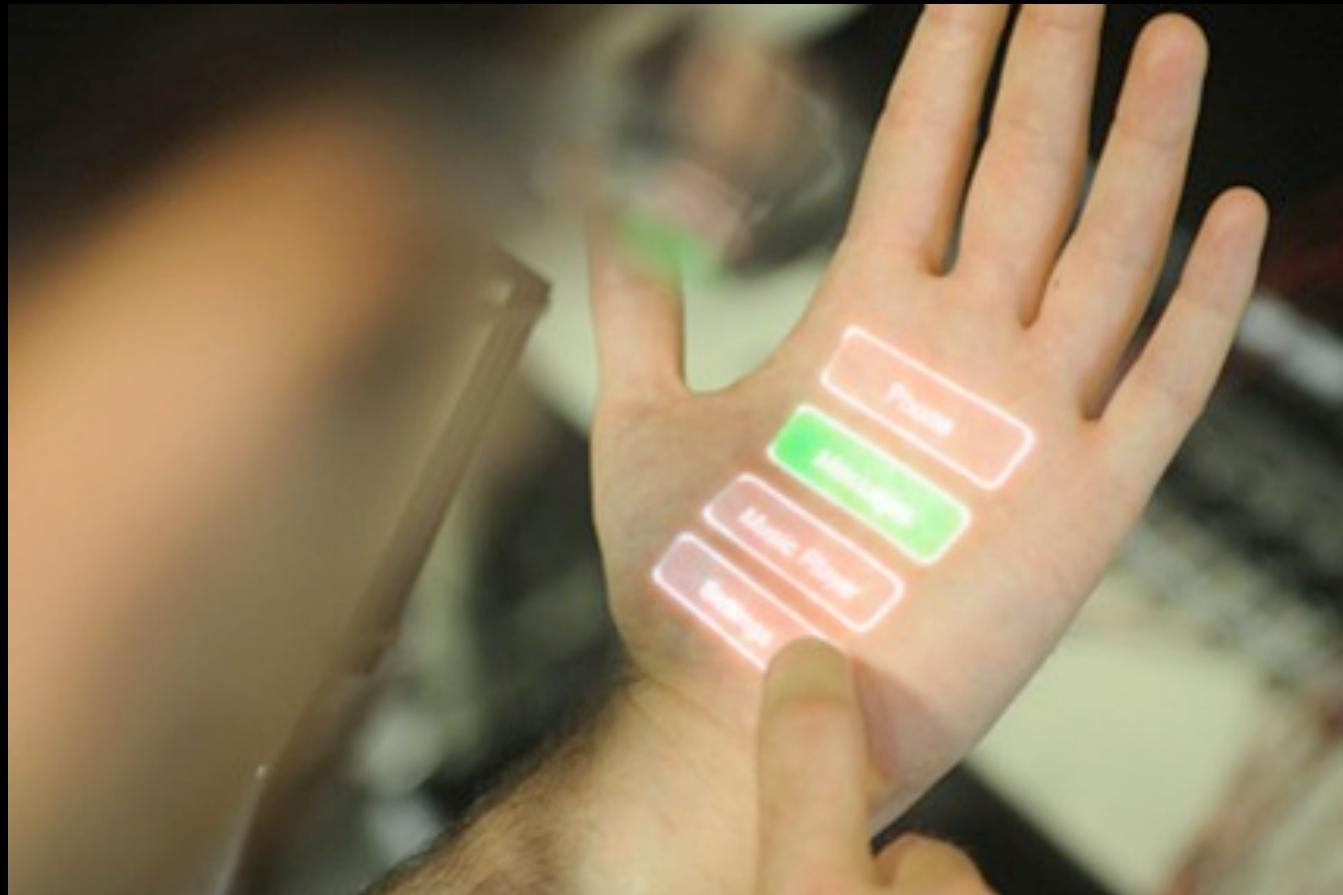
More dimensions...



More resolution...



Augmented reality



Brain-computer interaction





Almost everything is new

- Microcomputers (1980's)
- Unconditional use of mouse (1995 – Windows 95)
- Cellphones with multiple functions (2000's)
- Nintendo Wii (December 2006)
- iPhone (June 2007)
- Tablets (April 2010)
- Gestures interaction – Kinect (November 2010)
- Google glasses (not yet...)

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- Cellphones with multiple functions (2000's)
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**Things are changing fast and we
need to explore these new scenarios**

"We are a human-machine civilization. Everybody has been enhanced with computer technology"

Ray Kurzweil

What should we do?

- Keep it familiar?
- Or break the edges?

What is a good interface?

What should we do?

1. Try to understand the world where you are living
2. Become an early adopter of technology
3. Try to understand what people want
4. And what people doesn't want
5. And what people want, but doesn't know yet
6. Create, go and do it!

We should try, try, and try again...



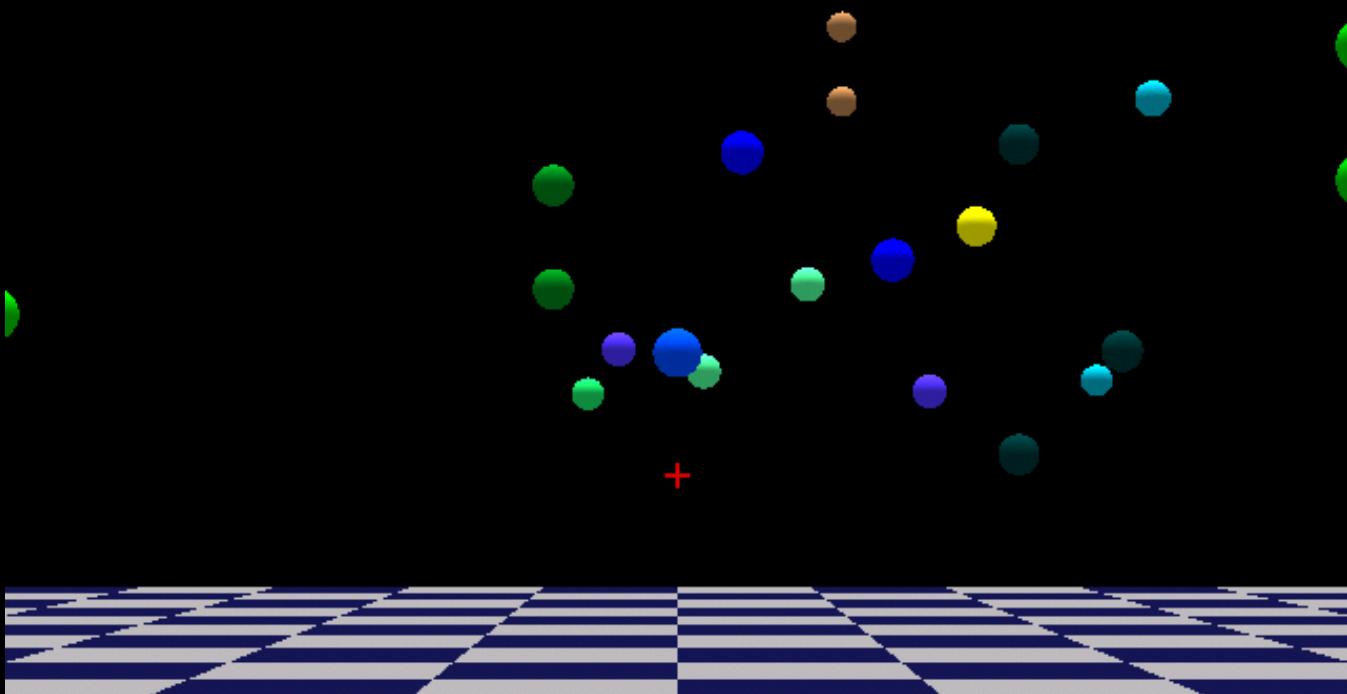
How to

- Identify a problem
- Propose a solution
- Evaluate it (for comparison)
- Share your conclusions
- Learn with your errors
- Try again

Case study: Conceiving 3D and non-conventional UI

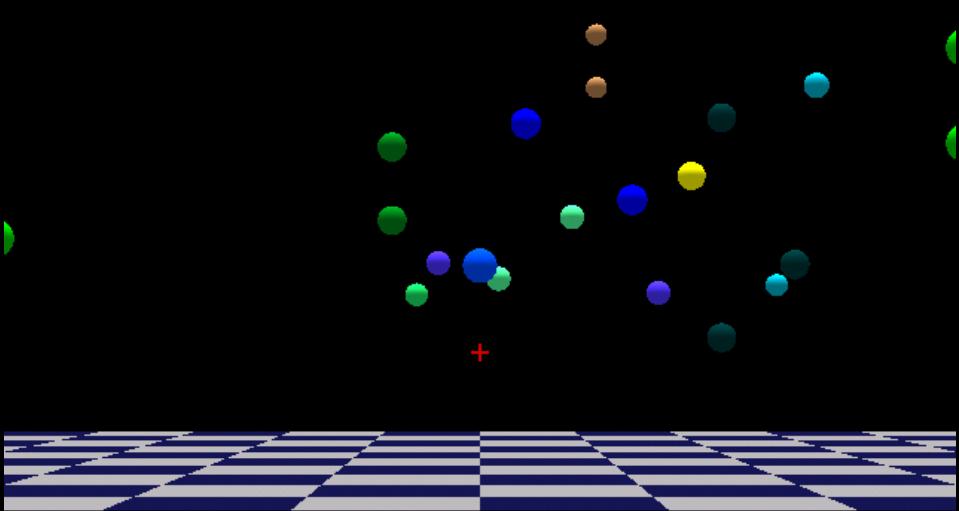
Conceiving 3DUI

- 1st step
 - Clearly define the goal application
 - Which task should you accomplish?



Conceiving 3DUI

- 2nd step
 - Choose (or propose) some input techniques and devices
 - Elaborate your test hypotheses



Conceiving 3DUI

- 3rd step
 - Implement a testbed application
 - Plan a set of user tests
 - Define the users profile



Conceiving 3DUI

- 4th step
 - Expose your hypotheses and planned tests for a group, to be critisized
- 5th step
 - Refine the testbed application and do the tests with some few users
- 6th step
 - Refine again and make the “serious” tests
- 7th step
 - Tabulate the results and present your conclusions to the world!

Eyescope

- Proposal
 - A new selection technique for applications that use Head Mounted Displays (HMD)
 - The selection is based on:
 - The eye direction and
 - A zoom tool



Eyescope

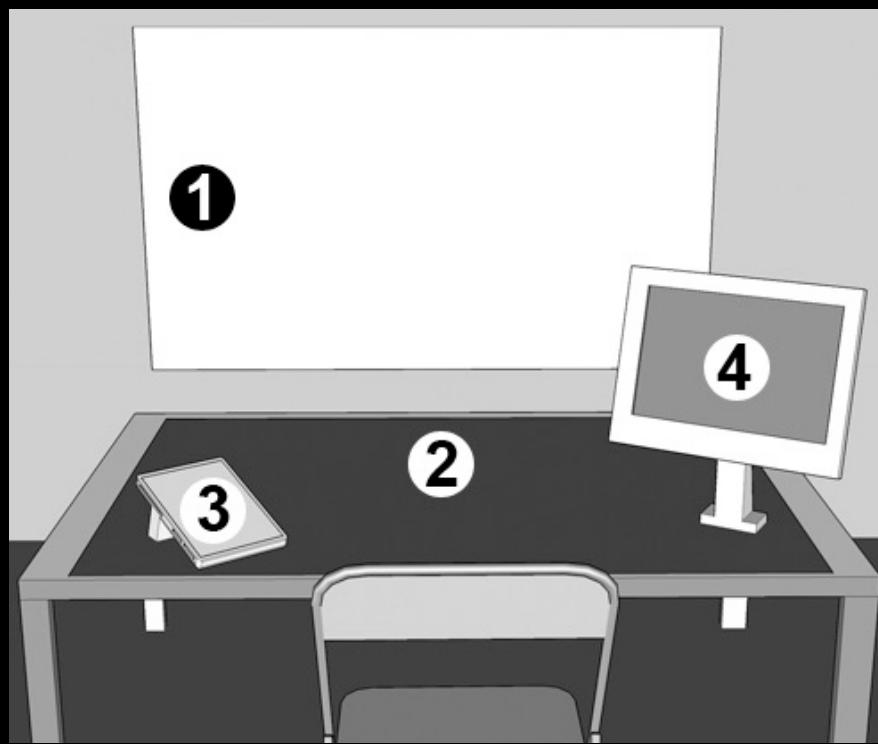
■ Advantages

- Precision: selection errors are minimized
- Velocity: selections are quickly made
- Simplicity: devices' manipulation and system feedback are intuitive
- Immersion: avoid the use of classic devices (mouse and keyboard)
- Comfort: Objects far from the user can be easily selected without the user translation
- No visual pollution (no menus, buttons, sliders or other widget)

Recent projects

Moving displays

- More and more people depend on both computers and information sharing



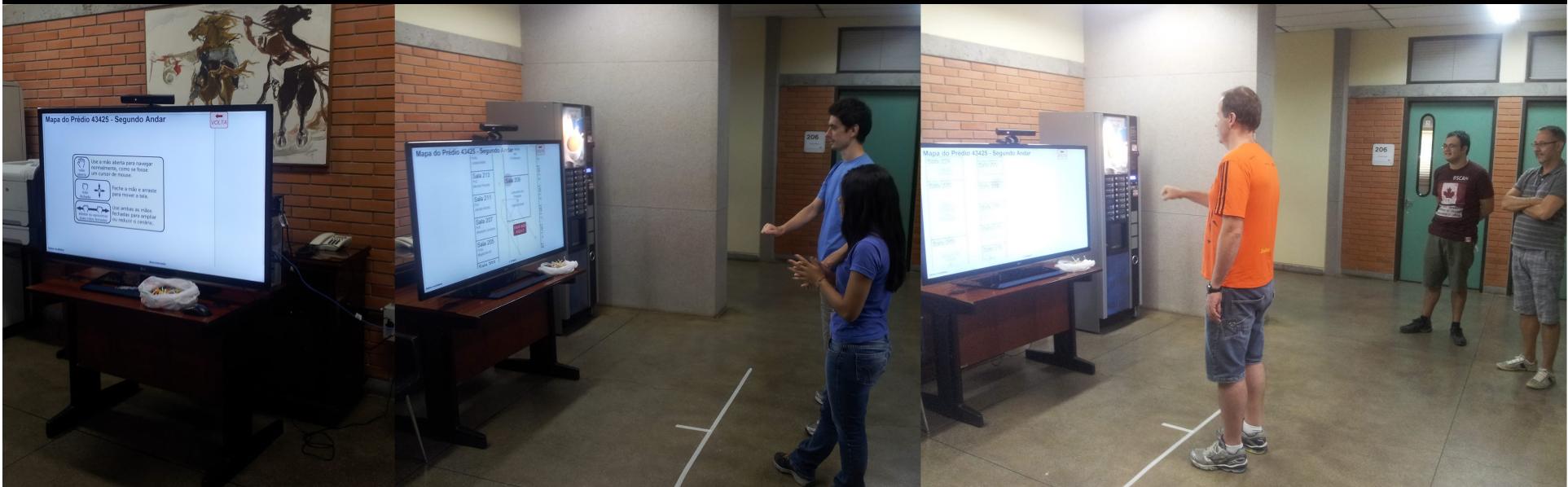
Spatially aware displays

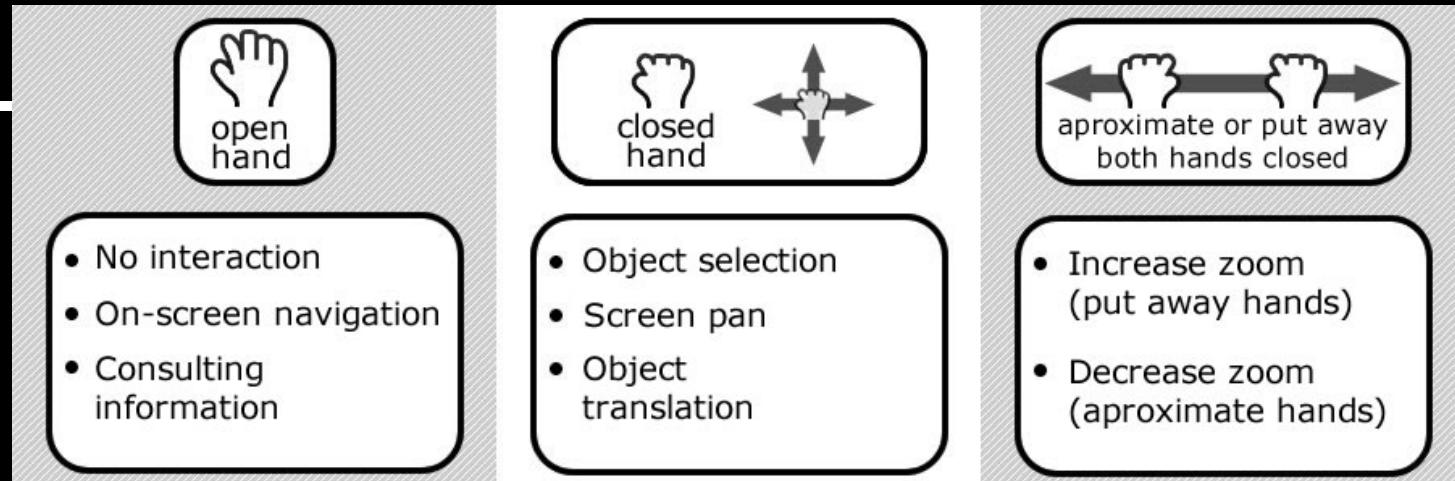


3-tabletgameSVR09_0002.mp4

MACIEL, Anderson ; Nedel, Luciana ; Mesquita, Eduardo M. ; Mattos, Marcelo H. ; Machado, Gustavo M. ; FREITAS, Carla M.D.S. . Collaborative Interaction through Spatially Aware Moving Displays. In: ACM Symposium on Applied Computing, 2010, Sierre, Switzerland. Proceedings of the 25th Annual ACM Symposium on Applied Computing. New York : ACM, 2010. v. 2. p. 1229-1233.

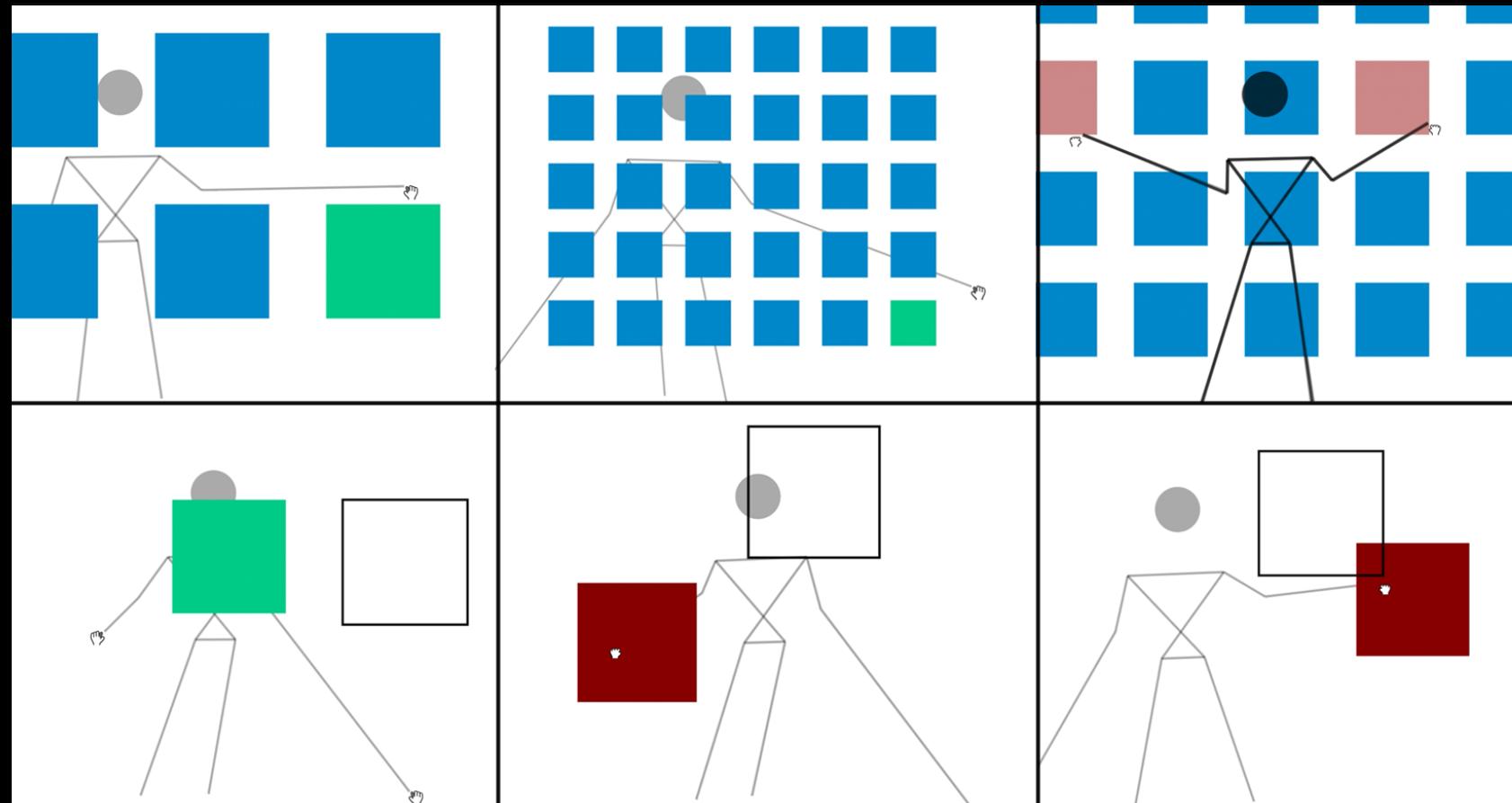
Deviceless Interaction: First tests using Kinect in public spaces

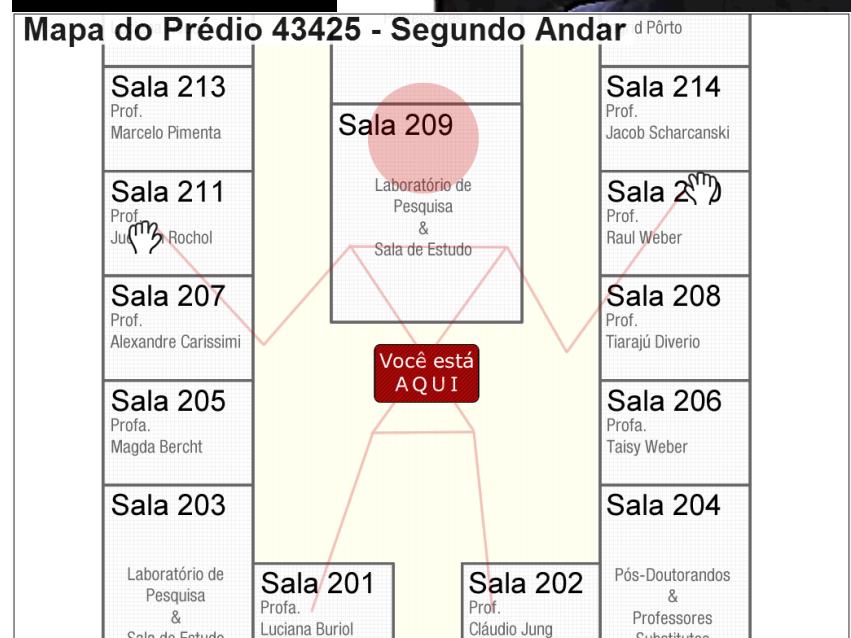
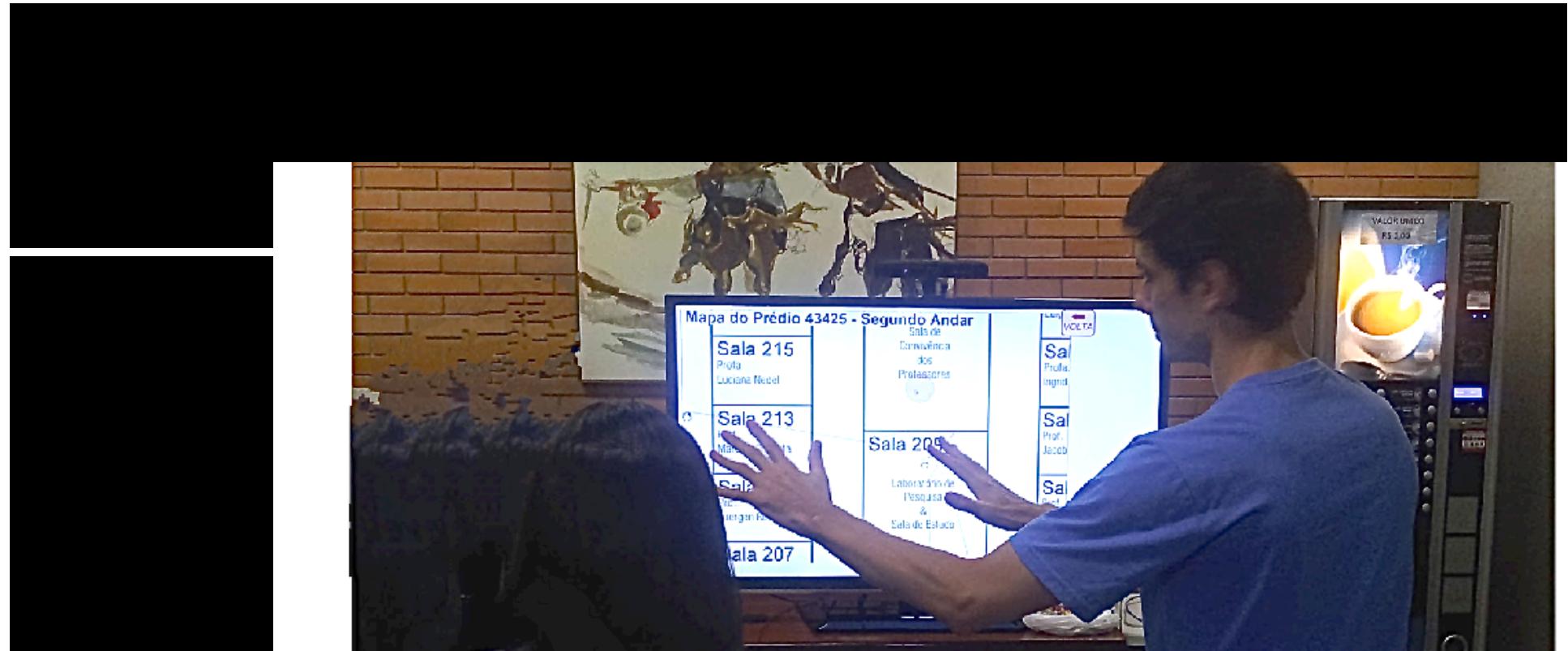




Motta, Thiago, Nedel, Luciana, Deviceless Gestural Interaction for Public Displays, Proceedings of SVR 2013.

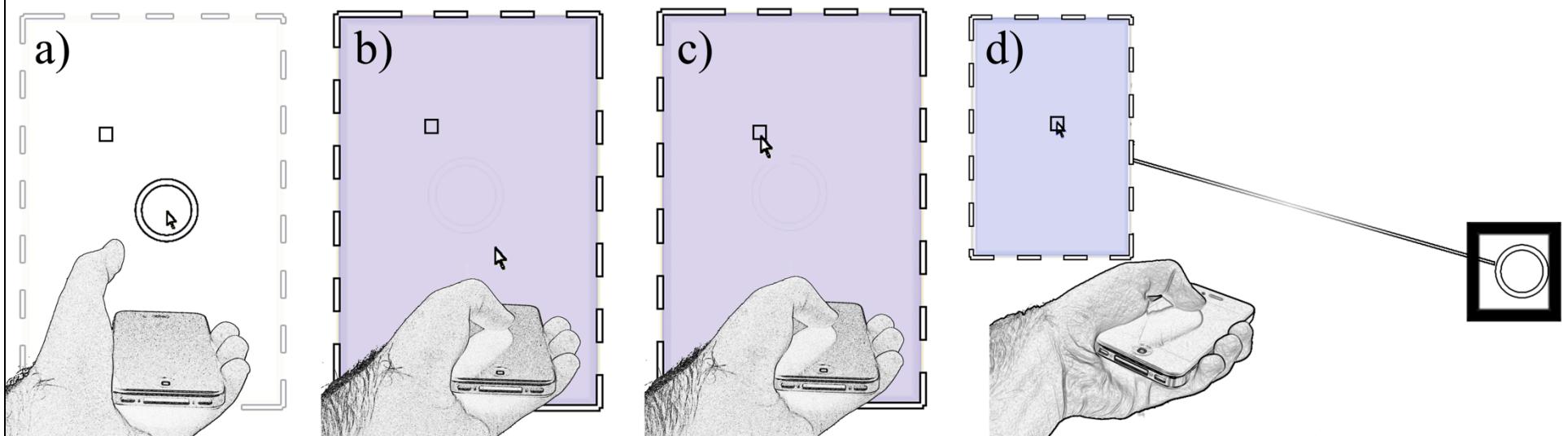
Motta, Thiago, Nedel, Luciana, Interaction with Public Displays Using a Natural User Interface Based on an Extended Version of Kinect SDK, Proceedings of Workshop of Thesis and Dissertations, SIBGRAPI 2013.





Comments

- We didn't want to use any specific input device for public displays (should be deviceless)
- Kinect is not precise at all, but can be used for some kind of tasks
- Smartphones and tablets can also be explored in a complementary way



Lop-cursor: Fast and Precise Interaction with Tiled Displays Using One Hand and Levels of Precision

- Levels of Precision Cursor (LOP-cursor)
 - Technique for high precision and fast pointing
- Two-legged cursor metaphor
 - Simultaneous control over 2 cursors

Motivation

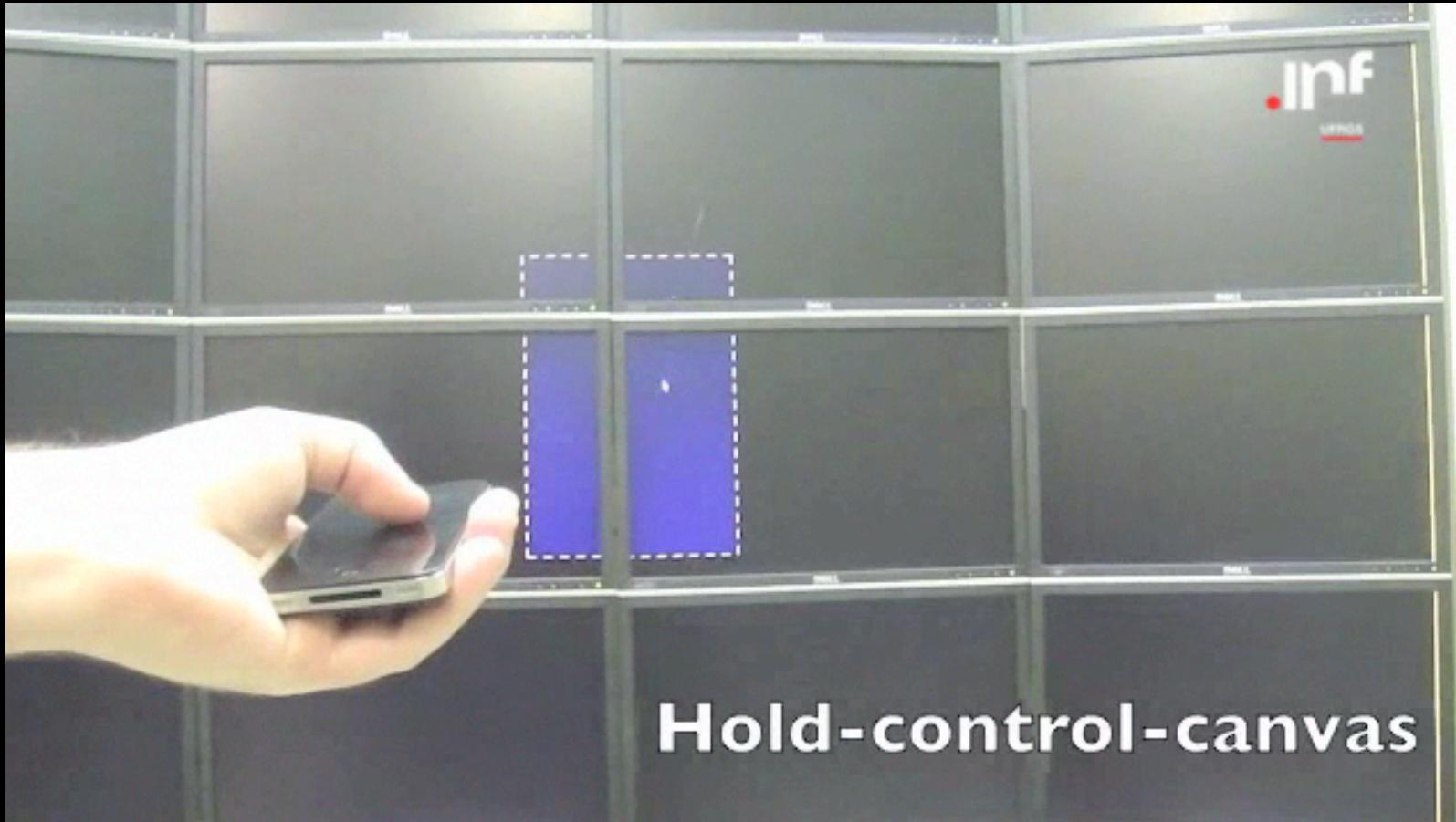
- at&t



Motivation



Lop-cursor



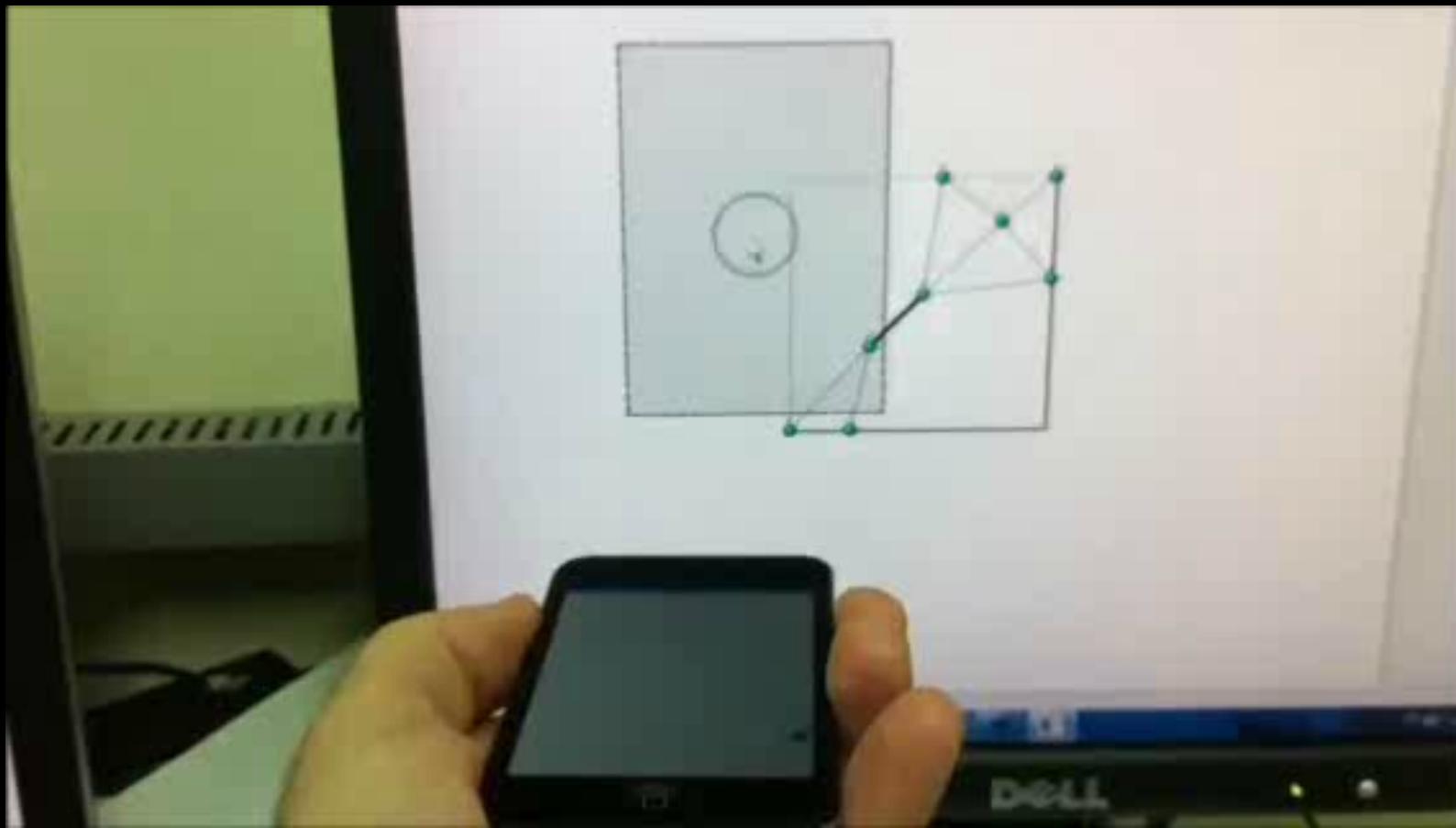
Hold-control-canvas

Debarba, Henrique, Nedel, Luciana, Maciel, Anderson. *Lop-cursor: Fast and Precise Interaction with Tiled Displays Using One Hand and Levels of Precision* In: IEEE 3DUI 2012

Comments

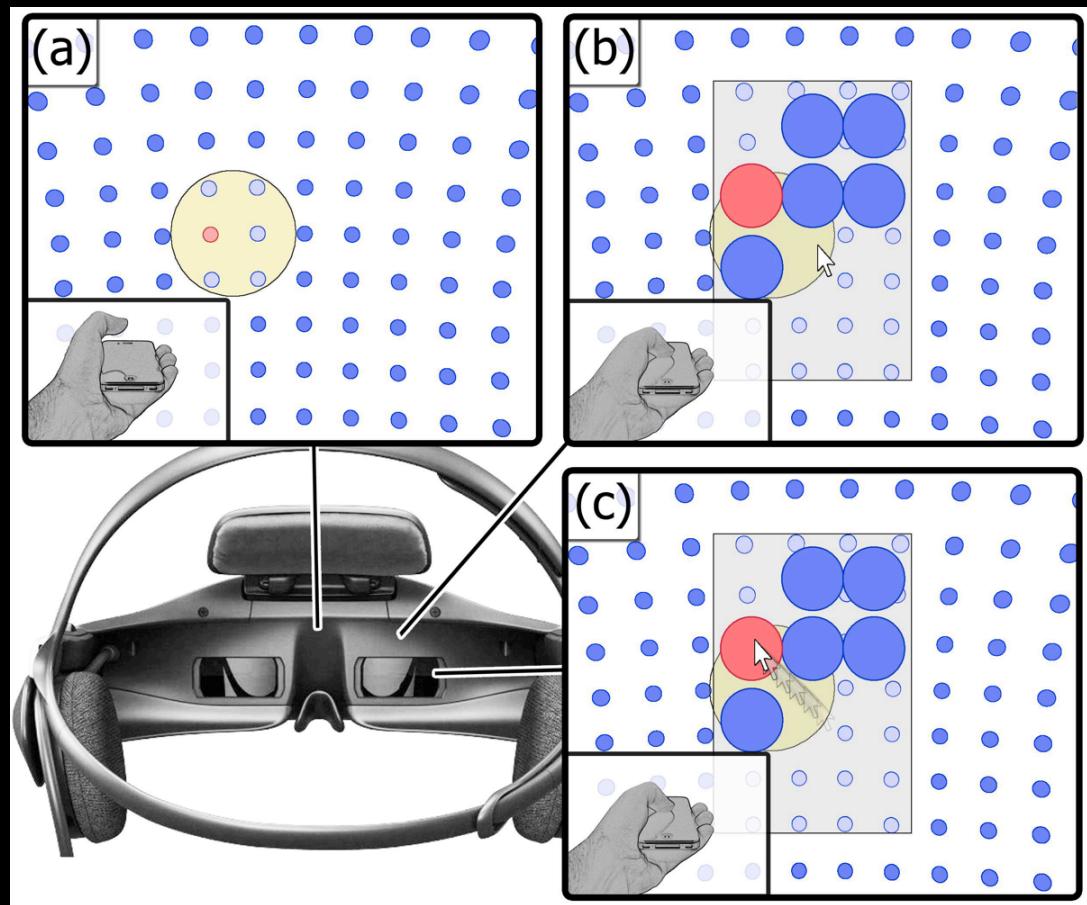
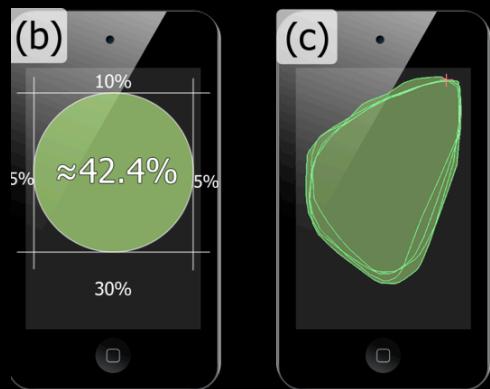
- The most precise technique we found, if compared with other existing solutions
- Comfortable, easy to learn and to use
- But... there is still ongoing work
 - Test and evaluate with real applications
 - Screen replication
 - It is not yet plug-and-play
 - Position tracking is lacking

Screen Replication

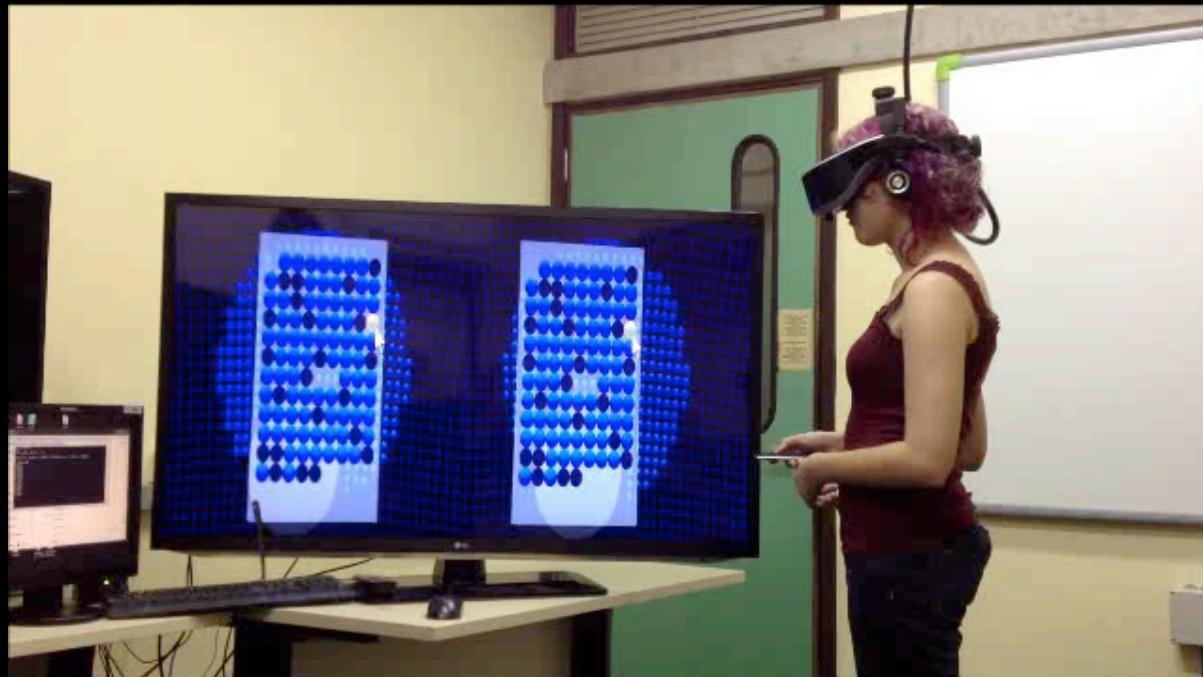


Disambiguation canvas

- Selection by progressive refinement
- Using a mobile device (smartphone) (a)
- Two steps:
 1. Volume-casting (b)
 2. Disambiguation (c)



Disambiguation canvas

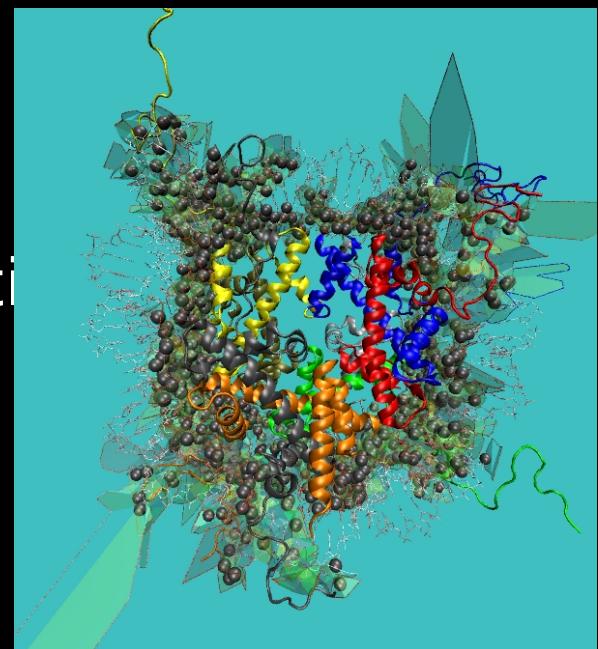


A HMD is used as visualization and virtual immersion device

Debarba, Henrique, De Grandi, Jerônimo, Boulic, Ronan, Maciel, Anderson, Nedel, Luciana. *Disambiguation Canvas* In: IFIP Interact 2013 (to appear)

Comments

- Better results than other techniques in terms of precision and speed
 - Ray casting and SQUAD
- But... there is ongoing work
 - Test and evaluate with real applications (molecules visualization)
 - Test with cluttered data (3D TV)



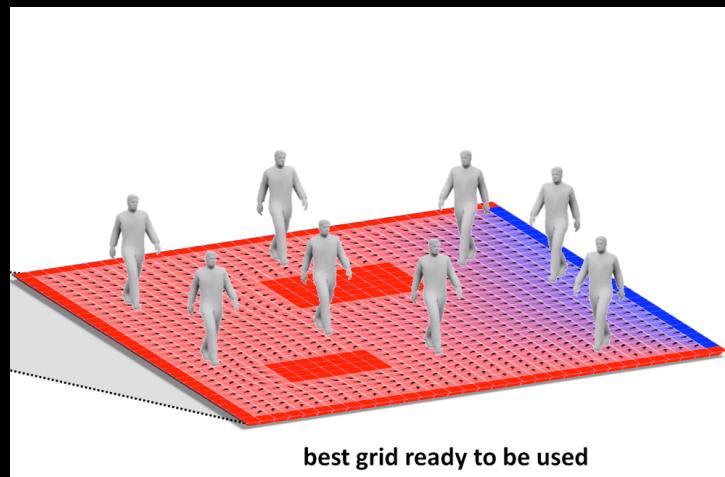
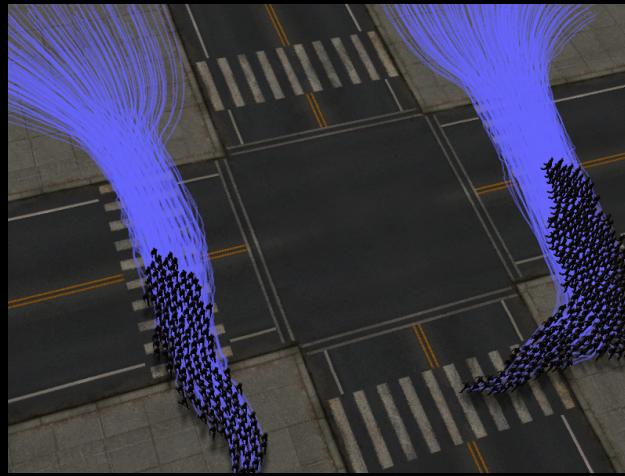
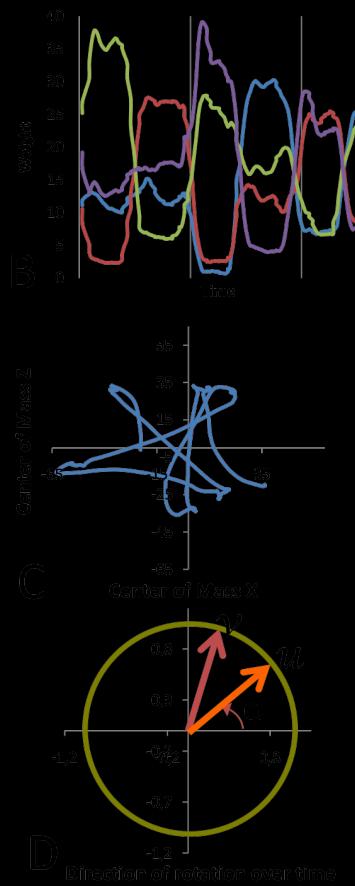
Interacting with the feet



FARIAS, M. A. ; TREVISAN, Daniela Gorski ; NEDEL, L. P. . Foot Navigation Technique for First Person Shooting Games. In: Scott Jacobs. (Org.). Game Programming Gems 7. Boston: Charles River Media, 2008, v. , p. 69-79.

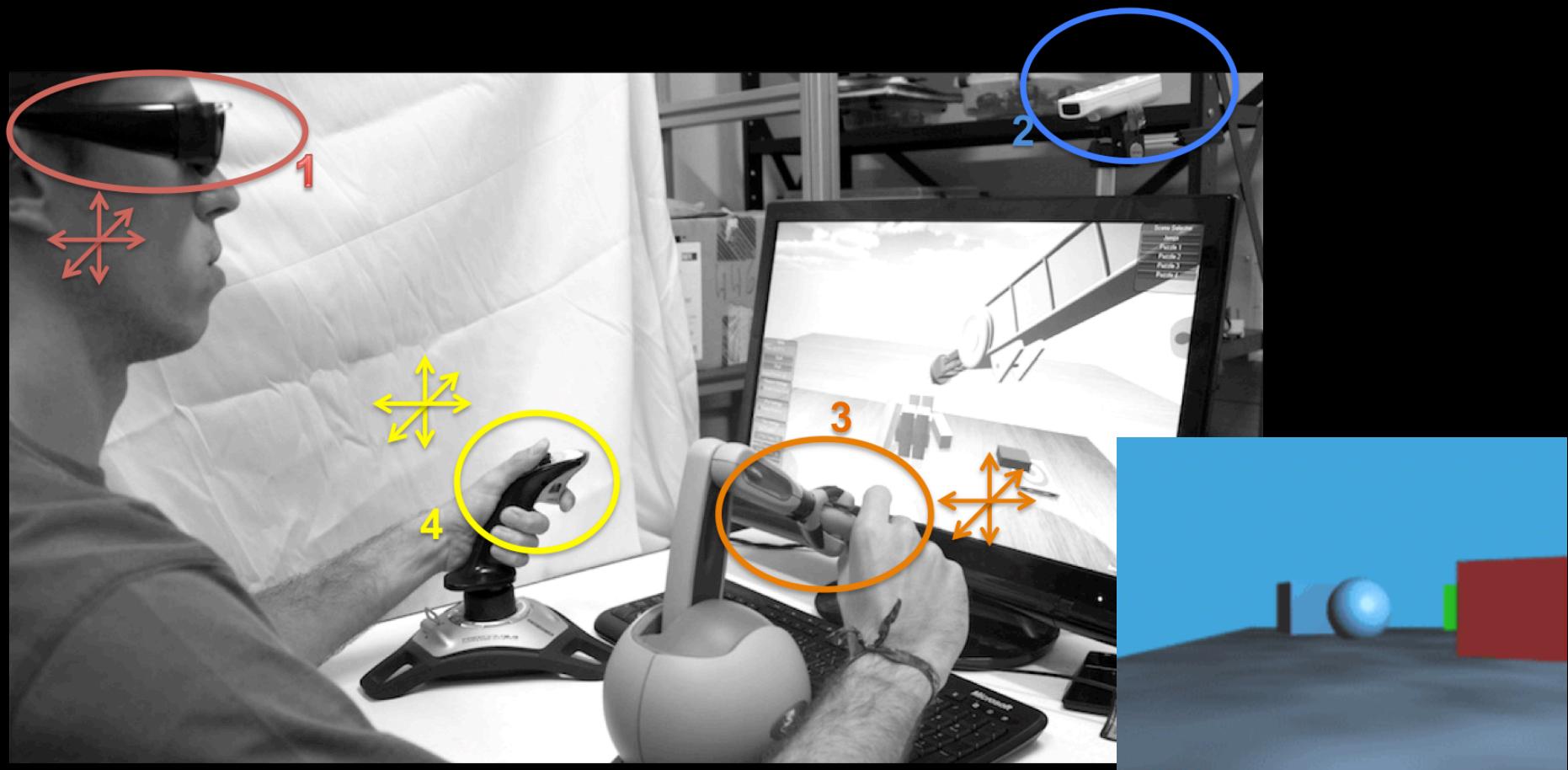
Erivaldo Xavier de Lima Filho ; Mateus Bisotto Nunes ; Comba, João ; Nedel, Luciana . Why not with the foot?. In: Simpósio Brasileiro de Jogos e Entretenimento Digital, 2011, Salvador. Proceedings of X Brazilian Symposium on Computer Games and Digital Entertainment. Porto Alegre: SBC, 2011. v. 1. p. 1-7.

The navigation problem



SILVEIRA, Renato ; DAPPER, Fábio ; PRESTES, Edson ; NEDEL, Luciana . Natural steering behaviors for virtual pedestrians. *The Visual Computer*, v. 26, p. 1183-1199, 2010.

Parallax and stereo view issues



Franz, Juliano, Maciel, Anderson, Nedel, Luciana. *Assesment of a User Centered Interface for Teleoperation and 3D Environments* In: ACM SAC 2013, Lisbon, Portugal.

Final comments

Final comments

- Good interfaces should be
 - Easy to learn and master
 - Comfortable
 - Effective
- 3D interfaces are not 3D graphics!
- Games are good testbed applications
- Try new stuff

Open problems

- Comfortable devices
- Really good displays
- Perfect indoor 3D tracking
- Markerless tracking
- Immersive VR application for long term real applications

A glimpse into the future

- “Smart” visualization
 - Fully interactive
 - Adaptable to different scenarios
 - Everywhere
 - Fulfilling real users’ needs
- Effective use of interactive visualization by everybody (people in general, industry, scientists, academia, ...)

Thanks to...

- Other authors

- Anderson Maciel
- Carla Freitas
- Eduardo Mesquita
- Gustavo Machado
- Marcus Aurelius Farias
- Daniela Trevisan
- Thiago Motta
- Matheus Bisotto
- Erivaldo Filho
- Juliano Franz
- Henrique Debarba

Thanks for your attention!