



# **RV - AULA 05 - PSI3502/2018**

**User Experience, Human Computer  
Interaction and UI**



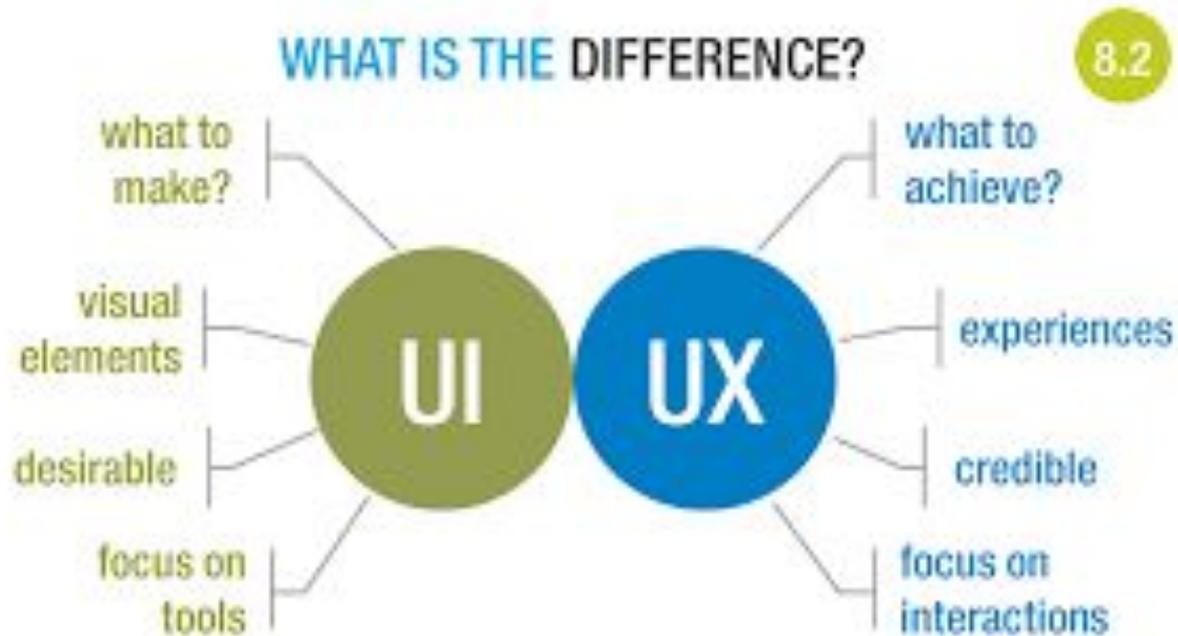
# User Experience



User experience (UX) is the overall impression that the user gets from the interaction with the system.

VR systems aimed at different types of applications might aim for very different user experiences.

# User Experience



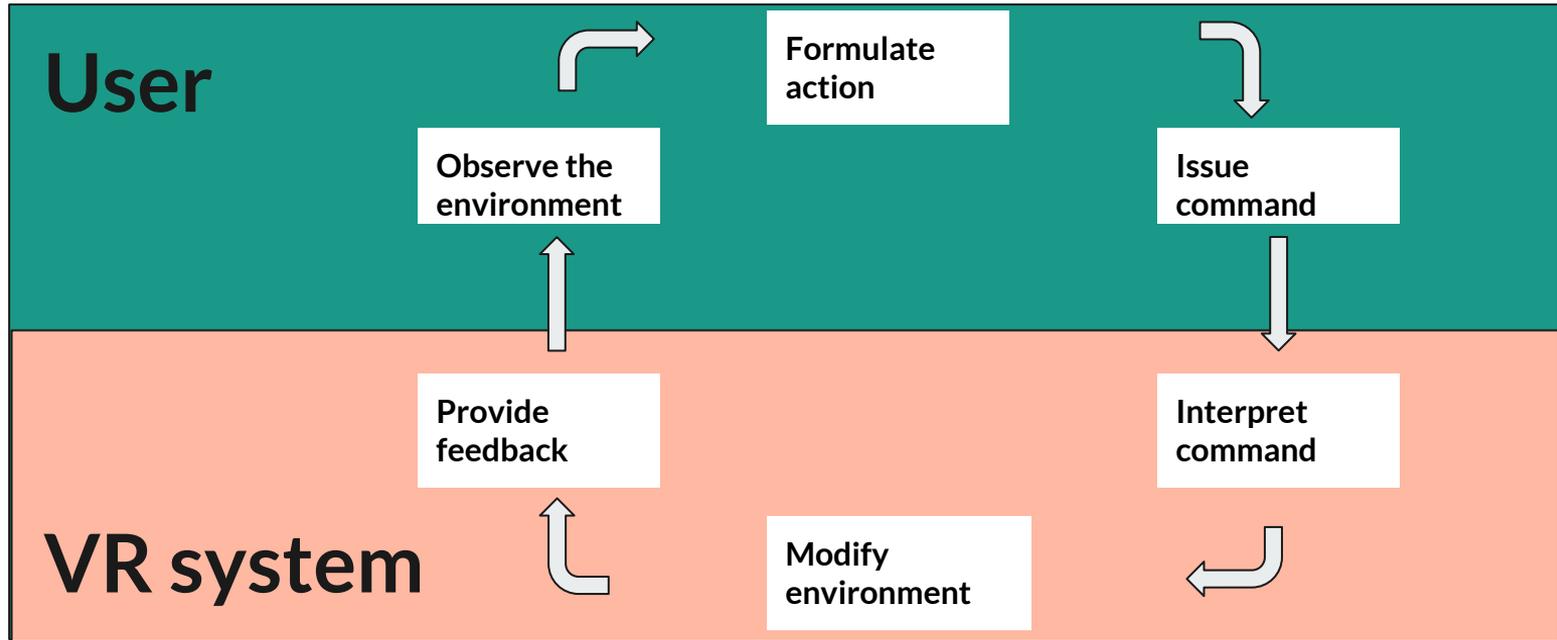
# Human Computer Interaction



User's intentions and actions are translated into **commands** that make sense to the system.

Interaction/feedback loop.

# Human Computer Interaction



# Evaluating User Experience



Cognitive Task Analysis (CTA)

Cognitive ergonomics, Neuroergonomics.

An intuitive UI design relies on the user's previous knowledge and expectations about the behavior of the system present in his mental space.

# Skeuomorphic Design

Skeuomorphism in design involves the use of one material to imitate the appearance of another material for purely decorative purposes.



# GUI Design for Virtual Environments



UI and VE: 2D and 3D graphics

Three level of design issues:

1. The design of 2D UI elements;
2. The design of 3D UI elements;
3. The design of 2D and 2D UI elements.

# Typical 3D Interaction Tasks

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1. *Navigation* of the virtual environment with its two subtasks: Wayfinding and Travel.
2. *Selection* of objects within the environment.
3. *Manipulation* of the selected objects.
4. *System Control* of the properties of the environment itself.
5. *Symbolic Input* of data in textual or numeric form.

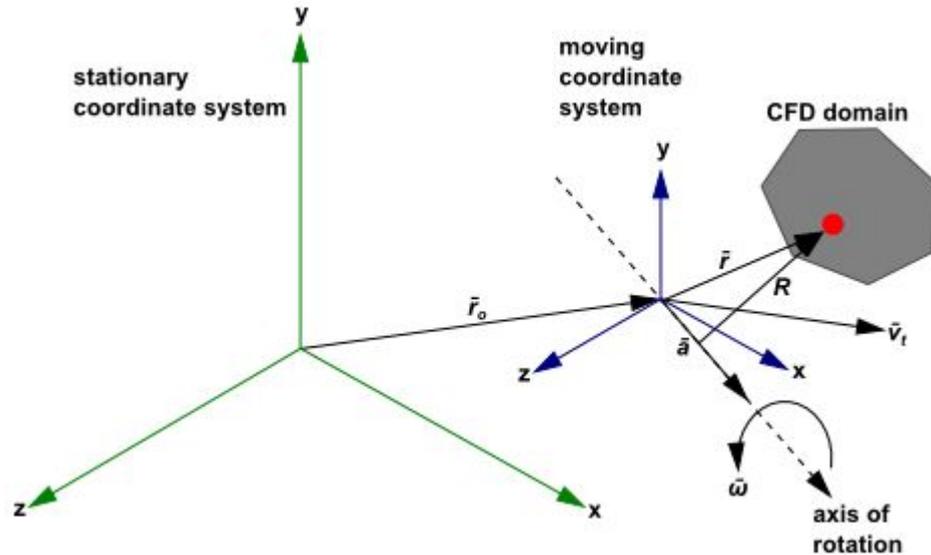
# Navigation



1. **Wayfinding:** cognitive process of choosing a destination and finding a path by which to travel from the present location to a new location.

2. **Travel:** motoric activity of actually moving from the present location to the new location.

# Reference Frames



# Reference Frames(1st person x 3rd person)



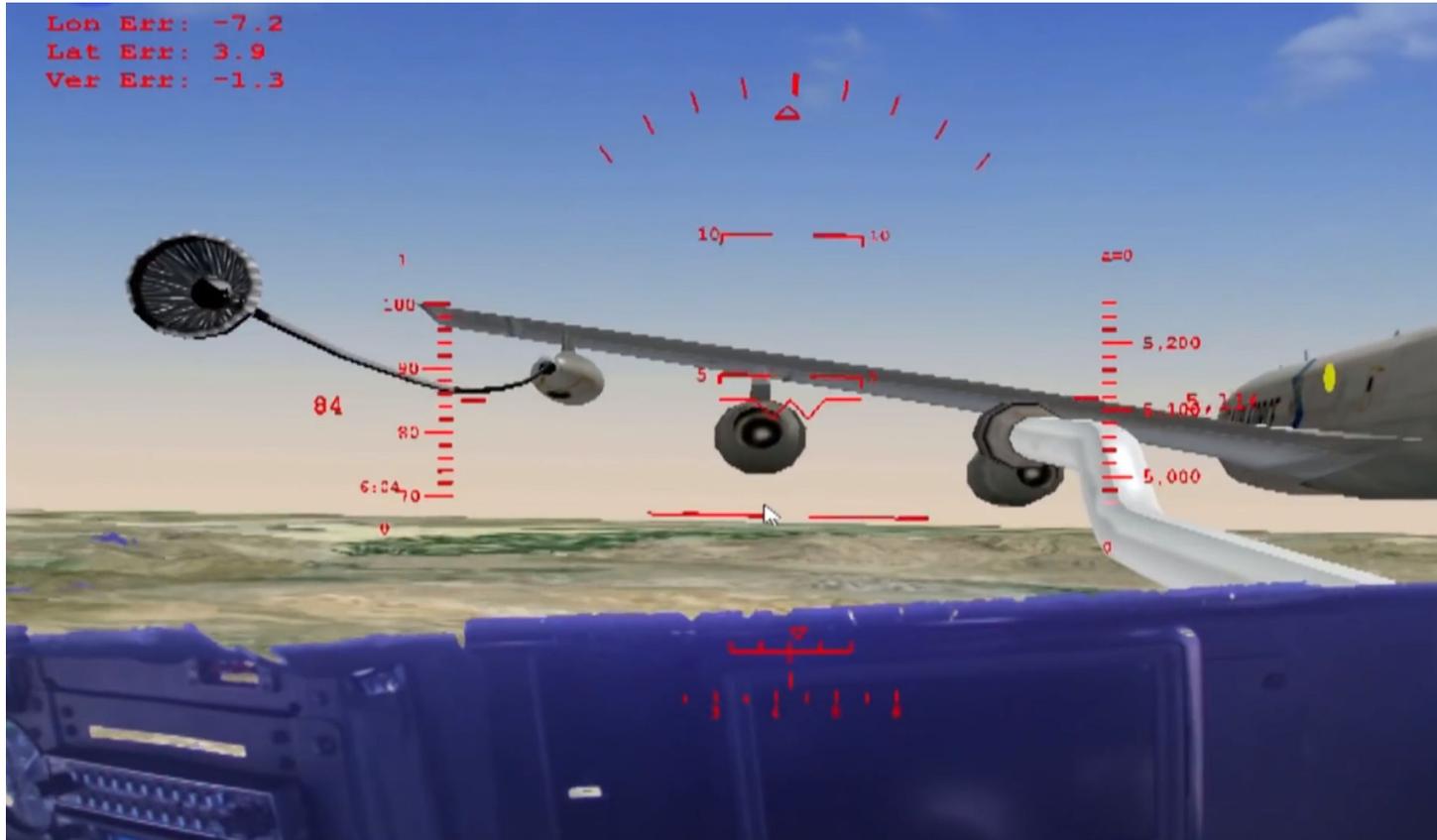
<https://michelsabbagh.wordpress.com/2015/08/27/the-important-differences-between-first-person-and-third-person-games//>

# Wayfinding and wayfinding help



Problems in VE: lack of restriction of the movement, lack of familiar wayfinding hints (directional information). The more different VE is from the real world, the more difficult wayfinding becomes.

Wayfinding help: 1) the virtual world should look like the real world (no flying, no moving through walls etc.) . 2) create a simple spatial organization. Also: maps, compasses, etc.



[https://www.nasa.gov/centers/armstrong/features/fused\\_reality.html](https://www.nasa.gov/centers/armstrong/features/fused_reality.html)

Flying metaphor

# Travel Tasks



Subtasks: initiating and stopping the movement, choosing the target location or direction of the movement, controlling the speed of the movement.

Explicit command: pressing a button, moving a controller, etc.

Some VEs may employ a constant movement metaphor: only the direction is controlled by the user.

In general, travel metaphor differ in terms of constraints imposed on the movement and time required for completing the action.

# Selection and Manipulation

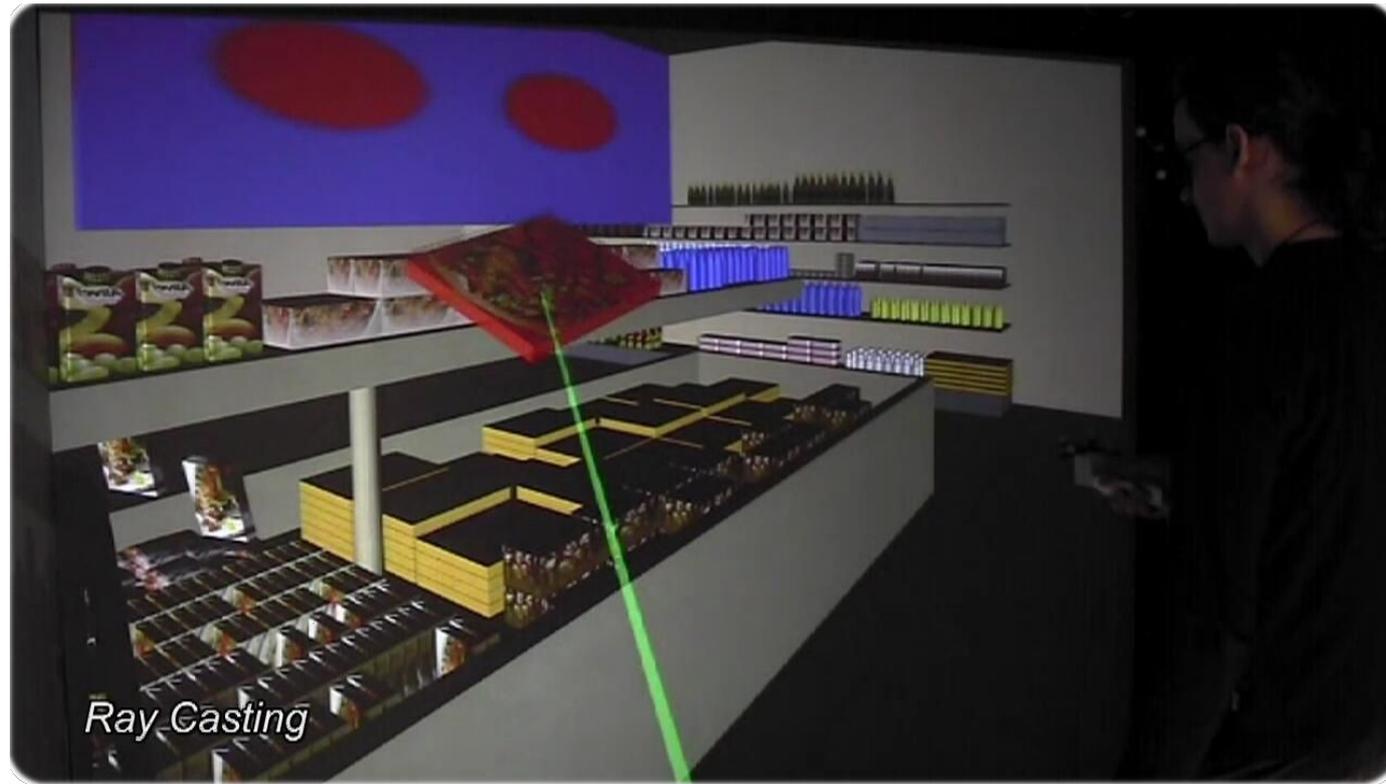


Selection and interaction are two related interactional tasks. They refer to the user's control over the individual elements within the virtual environment.

Selection in 2D x Selection in 3D.

Virtual Ray-Casting method.

Virtual Hand approach.



[https://www.techfak.uni-bielefeld.de/~tpfeiffe/lehre/VirtualReality/interaction/ray\\_casting.html](https://www.techfak.uni-bielefeld.de/~tpfeiffe/lehre/VirtualReality/interaction/ray_casting.html)

**Virtual Ray-Casting**

# System Control and Classification of System Control Methods

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Selection and manipulation are about changing properties of particular objects or elements of VE.

Control is about the user's interaction with VE as a whole.

Graphical menus, voice commands, specific tools, etc.

# Graphical Menu Design Issues



Proper placement: where in VE should a menu be placed and to which coordinate system should it be attached to?

> World and object referenced placement.

> Head referenced, body referenced, deviced-referenced placement.

Selection of items: 2D > computer mice. 3D > ?

Hierarchical organization.

# Voice and gesture commands

Voice commands:  
conceptual problems.

Gesture commands:  
dynamic gestures or  
static postures.



# Tools

Another example of skeuomorphism: try to exploit the familiarity that users have with everyday objects.



<https://www.youtube.com/watch?v=C3w9W5XFrBM>

# Multimodal UI



A multimodal UI approach combines several types of user controls in one system.

Voice commands + gestures; tools + graphical menu systems.

Vantages: decoupling of actions, flexibility, complementary behavior.

# Symbolic Input



Login information, credit card numbers, avatar name, etc.

Designing symbolic interaction in VR systems:

> use of a keyboard, virtual keyboards, gesture-based techniques, speech recognition.

# Referências



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