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User Interface (UI) is any method by which the user interacts with a device or experience.

In AR and VR, that means a whole bunch of things…

- It can mean the headset or computer
- Devices in the virtual or real world
- Avatars who act as people or animals
- Environment both seen and unseen

Grant recipient projects reflect the broadness

- Spatial information based on your personality
- Equipment testing
- Mixed reality
- Gloves/wands/voice and future?
- Adaptive information to improve performance
02. Wands – Are the basics good enough?
WHAT THEY ARE

About Your Touch Controllers

Your Touch controllers let you use your hands to interact in VR.

- Thumbstick
- Menu Button
- Grip Button
- X Button (Select)
- Y Button (Back)
- Trigger
- Oculus Button (Universal Menu)
- Thumbrest
- A Button (Select)
- B Button (Back)

Axis
What is the effect on cognitive load?

Our experience
- Fire in the OR
  - Teleport
  - Grab
  - Use
  - Point and click
- Usability testing
  - Initial testing
  - Tutorial
  - Tutorial testing

Study results
- Non-gamers struggle\(^1\)
- Users need outside instructions
- Users can’t remember controller’s main function
- Users couldn’t remember how to select an object
- They are good for learning\(^2\)
03.
The Promise of Gloves
The Reality?
WHY GLOVES?

What is the effect on cognitive load?

Profound affordances, aka immersion
• Feeling of presence\(^1\)
  • “Tricking” your mind into feeling that you’re there
  • Heightens awareness, attentiveness, memory

• Embodiment
  • Agency associated with manipulating content
  • Hand gestures may be special\(^2,3\)
  • Gestures build neural pathways, i.e. muscle memory
  • May reduce cognitive load\(^3\)
WHY NOT GLOVES

Drawbacks to hand tracking/gloves
• Suspension of disbelief
  • Latency
  • Drift
WHY NOT GLOVES

Drawbacks to hand tracking/gloves
• Suspension of disbelief
  • Latency
  • Drift
  • Occlusion

• Problems with high use
  • Most have crushable elements
  • How do you keep them sanitary?

• Cost
  • Some are inexpensive ~ $70
  • Up to over $4,000

And…
STATE OF GLOVES

There are a bunch! Some cool features!

healthscholars.com
Where is UI research going?

• Gesture
  • This is hand tracking
  • Requires users to learn gestures
  • Doesn’t aid if not congruent

• Mood
  • Require sophisticated equipment
  • Costly right now
  • No standardized way of assessing the data
  • Development of scenarios is costly

• Gaze
  • Tracking eyes
  • Pretty costly right now
  • Fairly high learning curve for users
  • Not very accurate
Can you do a voice UI?
What is a voice recognition user interface?

• Types
  • Conversation
  • Instruction

• Why it’s good
  • Cost
  • No real difference between users/non-users
  • Can mimic user’s actual actions well
  • Reduced cognitive load – we think
• Challenges
  • Accents
  • Enunciation/pronunciation
  • Recognizing phrases
  • Background noise
  • Latency
  • Intuitive design

STARTING SCENARIO Scenario7A
LEARNER
"are you feeling" (check_patient)
RECOGNIZED INTENT check_patient
LEARNER
"Phyllis synchronized cardioversion at 200 joules" (start_cardioversion_120)
RECOGNIZED INTENT start_cardioversion_120
CORRECT RESPONSE
STARTING SCENARIO Scenario7B
LEARNER
"synchronized cardioversion at 199 joules" (start_cardioversion_120)
RECOGNIZED INTENT start_cardioversion_120
INCORRECT RESPONSE
INCORRECT RESPONSE
LEARNER
"Phyllis synchronized cardioversion at 200 joules" (start_cardioversion_followup)
RECOGNIZED INTENT start_cardioversion_followup
CORRECT RESPONSE
APP DESIGN
USER EXPERIENCE

Getting users used to a voice UI
• How do you know when you can talk?
  • Problems with listening all the time
  • UI design with avatar gaze
  • UI design with gaming elements
• How do you know what to say?
  • Model commands early
• How do you give feedback?
  • When do you give it
  • It matters how you say it

Multimodal voice UI
• What is it?
• Do you need it?
• How do you keep cognitive load reasonable?
05.

Wands and Voice

Practical experience
ROBERT PUTFARK
EMS Captain
Arvada FPD
06.

Questions
Come back for the
Next Session
3:15 PM