CSE 165: 3D User Interaction

Lecture #16:
3D Menu Widgets

Upcoming Deadlines

- Sunday, February 28th at 11:59pm:
  - Homework project 3 late deadline
- Monday, March 1st at 4pm:
  - Discussion project 4
- Sunday, March 7th at 11:59pm:
  - Homework project 4 due
- Sunday, March 14th at 11:59pm:
  - Homework project 4 late deadline

3D UI Presentations

- Milanka Trang:
  - Exploring a Mixed Reality Framework for the Internet-of-Things
- Thomas Lauer:
  - SLAM vs Lighthouse tracking
- Ashwin Rao:
  - SimX

Labels

- Describe individual widgets or groups
- Need to be legible:
  - Font
  - Font size
  - Color
- Switchable label sets for multi-lingual applications
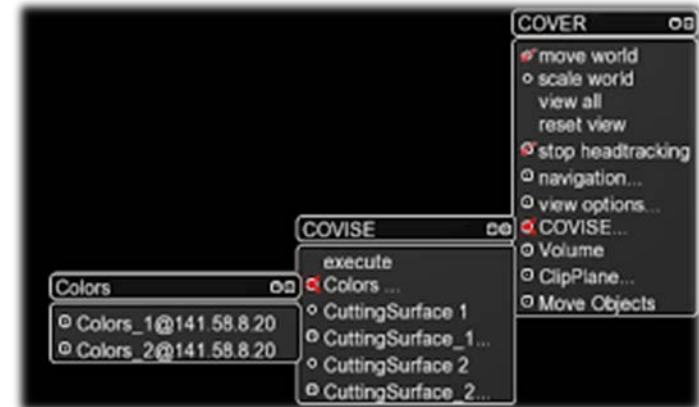
Action Buttons

- No state
- Trigger action when pressed

Radio Buttons

- Can be selected or not
- Visually organized in groups, often in framed box
- In each group only one radio button can be selected

Check Boxes

- Two states: checked or unchecked
- Independent of other check boxes
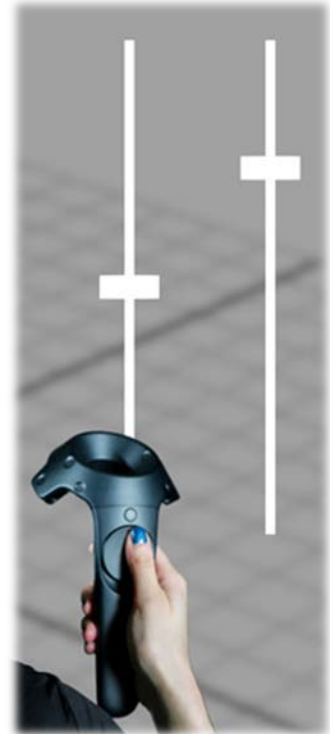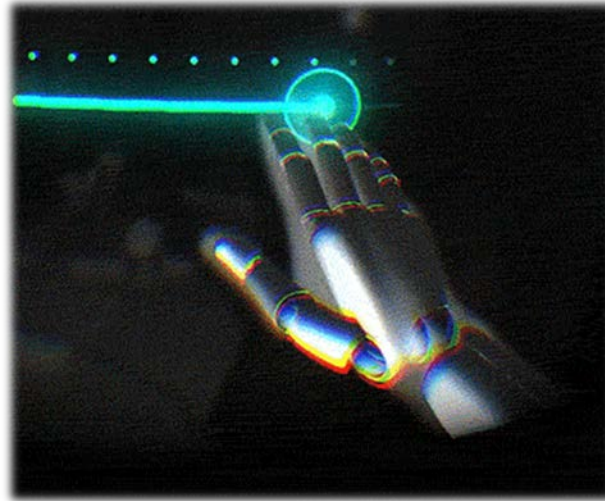
What do you want on your burger?
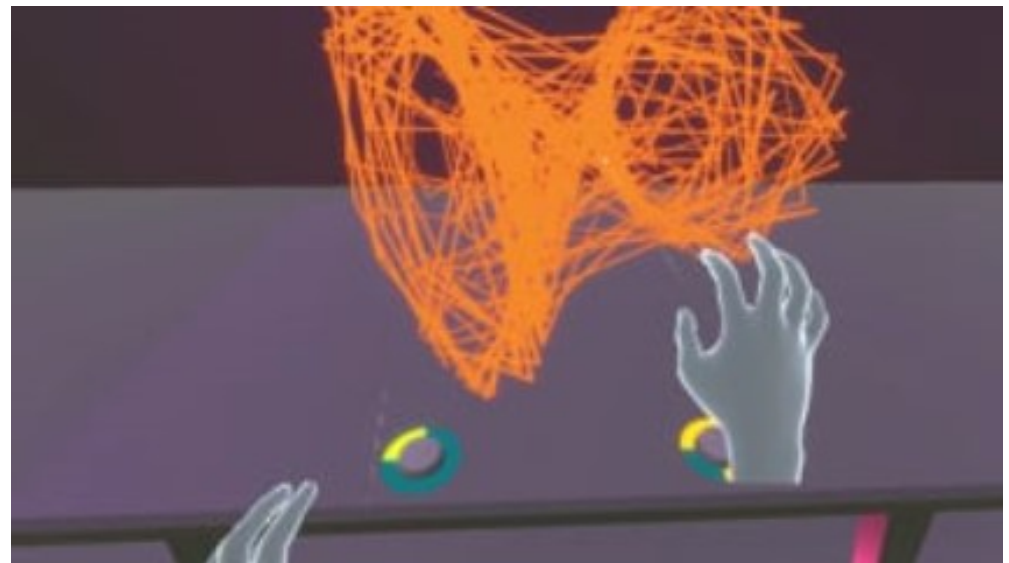
- ☑ Cheese
- ☐ Tomato
- ☑ Lettuce

Sliders

- Intuitive use
- Horizontal or vertical orientation
- Limited at low and high end
- Narrow but long
- Twitchy when used with raycast

Dials

- Compact size
- Options for limits:
  - Limited low end
  - Limited high end
  - No limits
- Intuitive interaction
- High precision
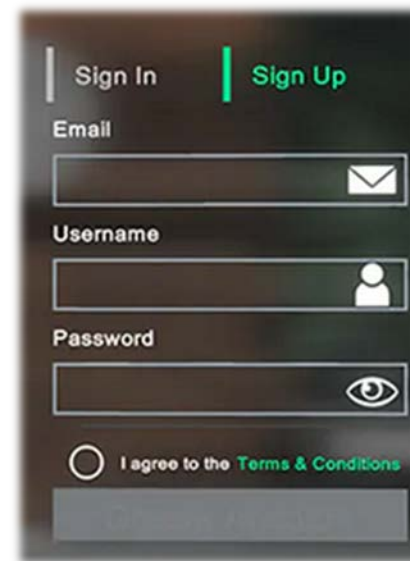- Great for scrolling through data

Choice Lists

- Single or multiple selections allowed
- Unlimited list entries
- Only subset of items is shown, rest can be reached by scrolling

What burger do you want?

- ○ Hamburger
- ✓ Chicken burger
- ○ Veggie burger
- ○ Mushrooom burger
- ○ Beef burger
- ○ Bacon burger
- ○ Bunless burger
- ○ Ostrich burger

❌

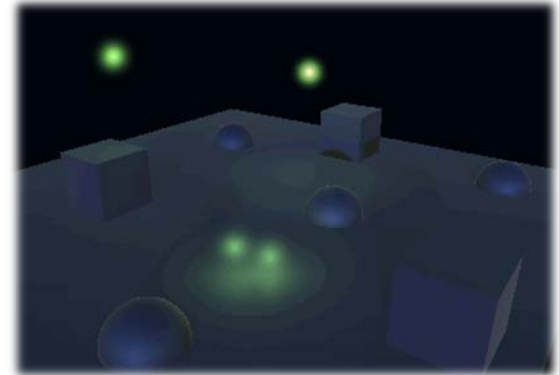What burger do you want?

Chicken burger ▼

✓

Menus

- Radial
- Drop-down
- Dialog window
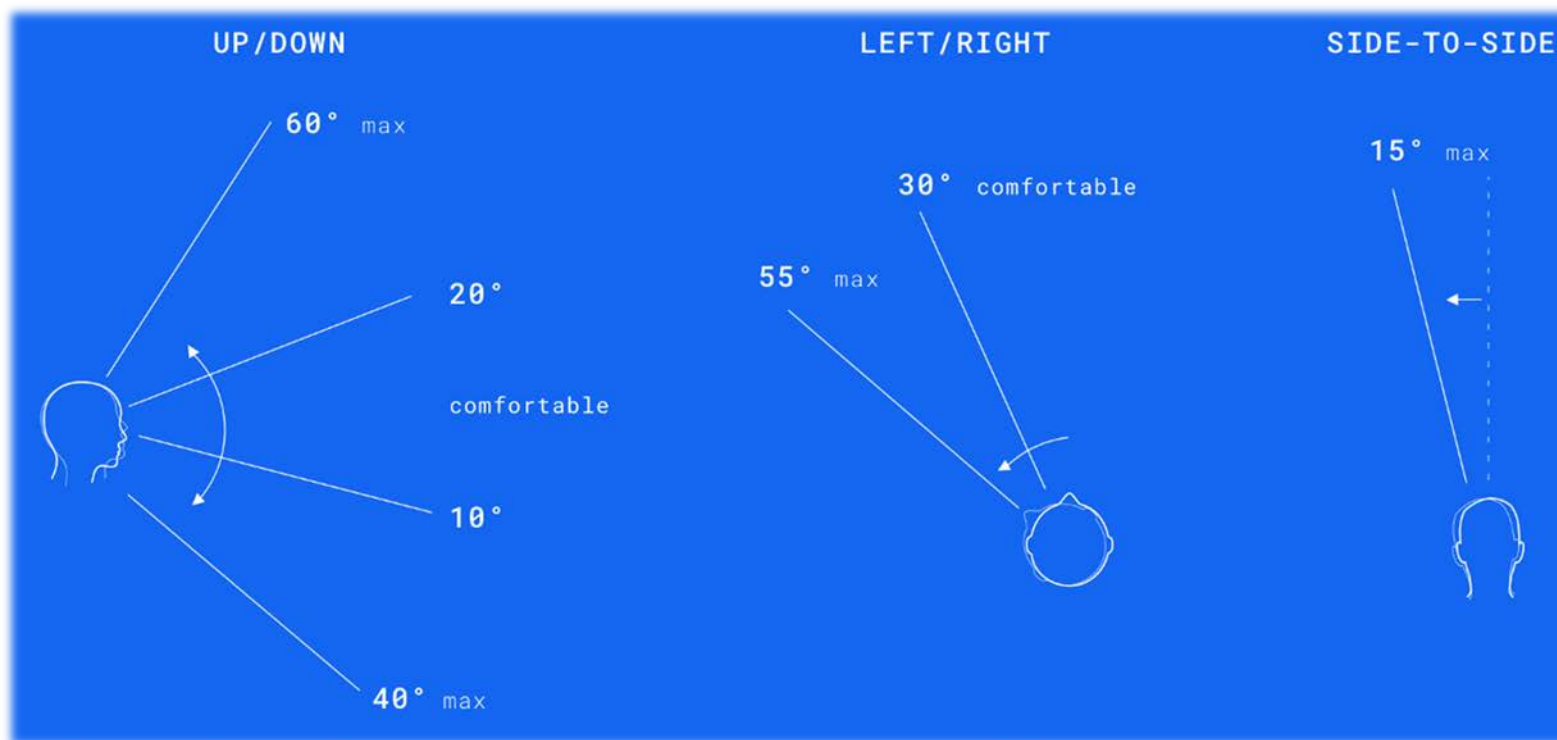- Submenus

User Hints

- Provide cues that an object is
  - Selectable
  - A focus
  - In-progress
  - In a certain position relative to the viewer
- Representation
  - Borders
  - Sparkles
  - Arrows
  - Glows
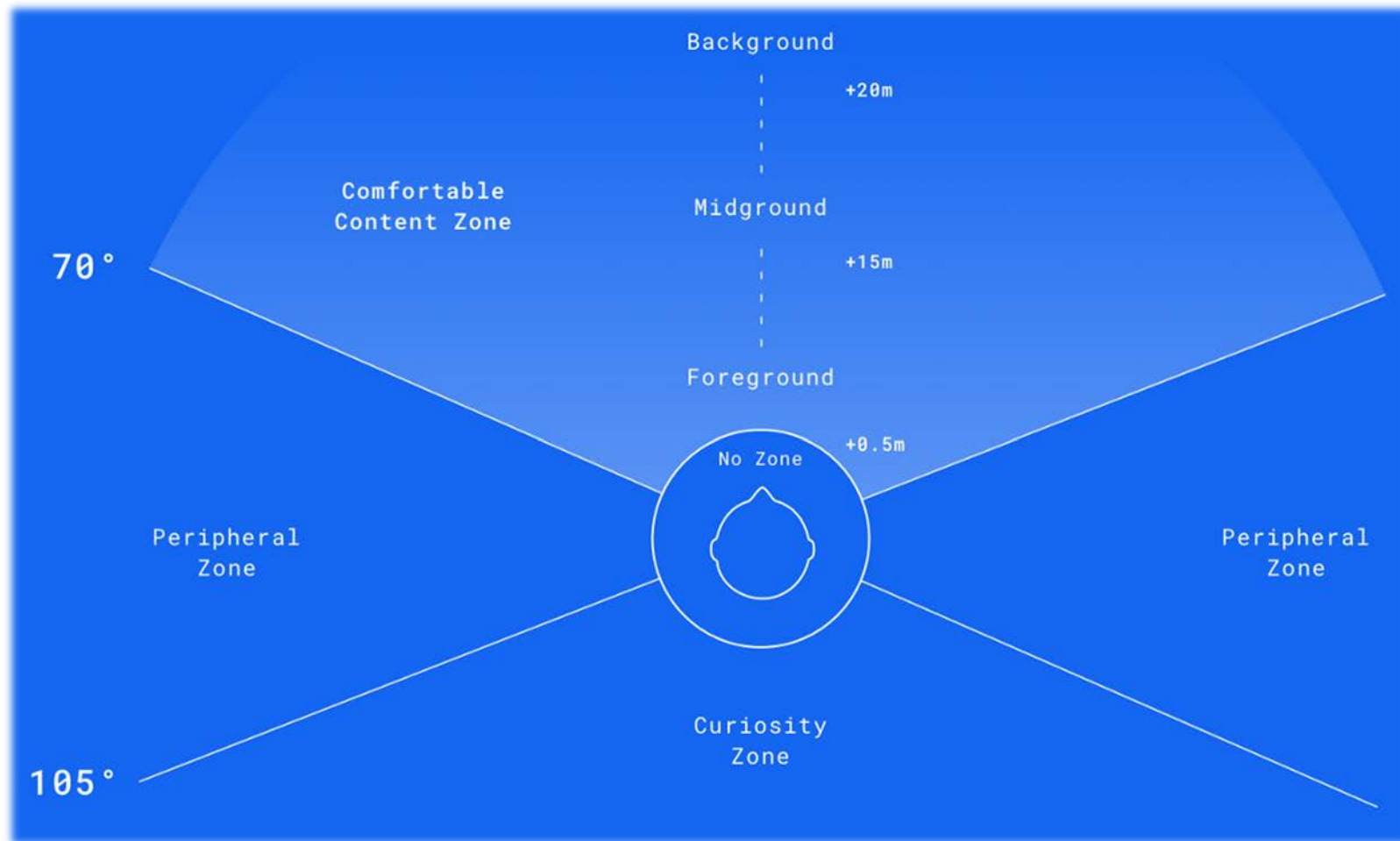 - Navigational cues
  - Animation

Coordinate Spaces

- Menus can be placed in different coordinate spaces:
  - World
    - Anchored in room or world coordinates
    - Easy to find
    - Possible occlusion of other objects in the world
  - Hand
    - Attached to a hand/controller
    - Travels with user
  - View
    - Attached to head/viewing space
    - Can be uncomfortable to always move with head
  - Object
    - Attached to the object the menu applies to
    - Intuitive association of menu and affected object

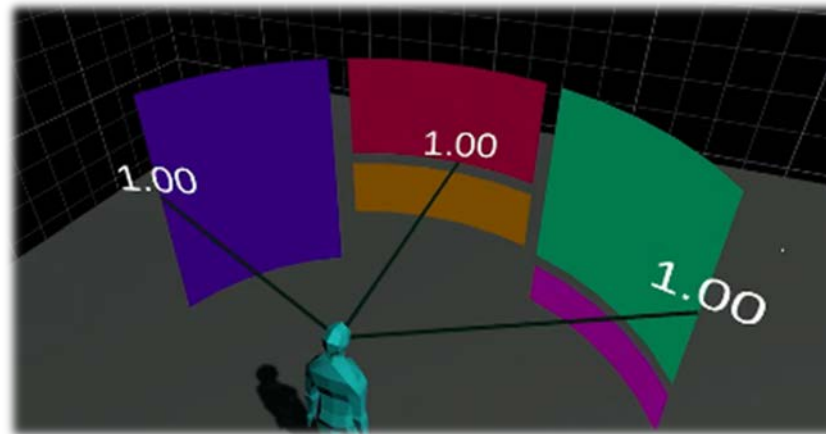# Comfortable Range of Motion

Viewing Zones

UI Design Considerations

- From Learn.Unity unit 6.2:
  - https://learn.unity.com/tutorial/unit-6-best-ui-practices-for-vr?uv=2018.4#5d969338edbc2a2d9fcf7792

User Comfort

- From Learn.Unity unit 6.3:
  - https://learn.unity.com/tutorial/unit-6-best-ui-practices-for-vr?uv=2018.4#5d969339edbc2a5ecf787577

More Information

- Unity specific implementation tips:
    - https://learn.unity.com/tutorial/unit-6-best-ui-practices-for-vr?uv=2018.4#5d96933bedbc2a6084598933
- https://arvrjourney.com/laundry-list-of-ux-patterns-in-vr-ar-24dae1e56c0a
- https://chaitanyashah.com/hand-interactions-exploration
- Comparing Spatial Interaction Modalities for 2D-Widgets in Productivity Applications in Virtual Reality