# CSE 165: 3D User Interaction

Lecture #15:
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
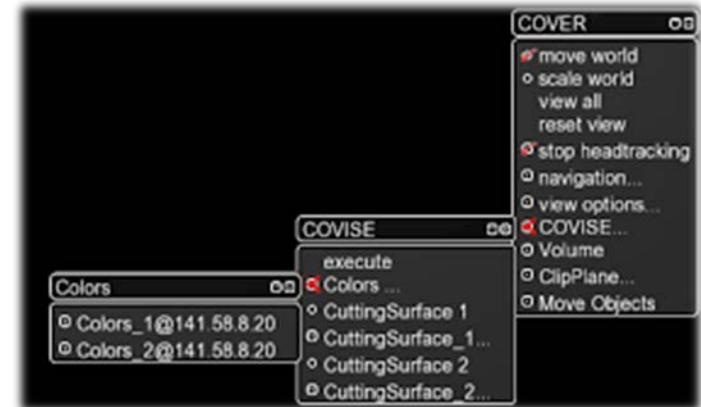
# Action Buttons

- 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

What burger do you want?

✓ Hamburger

◯ Chicken burger

◯ Veggie burger

# Check Boxes

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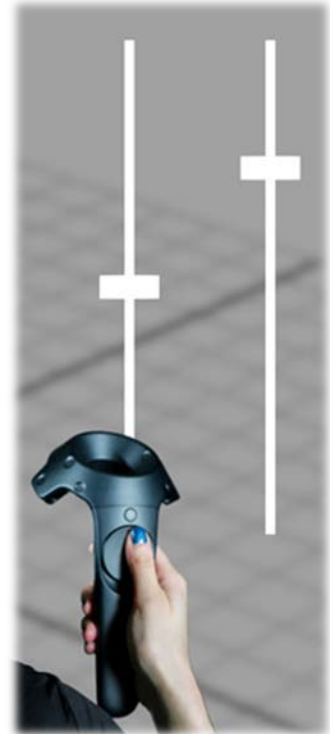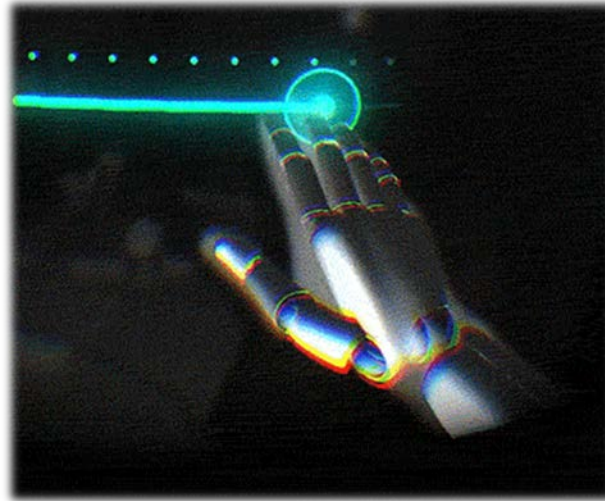
What do you want on your burger?
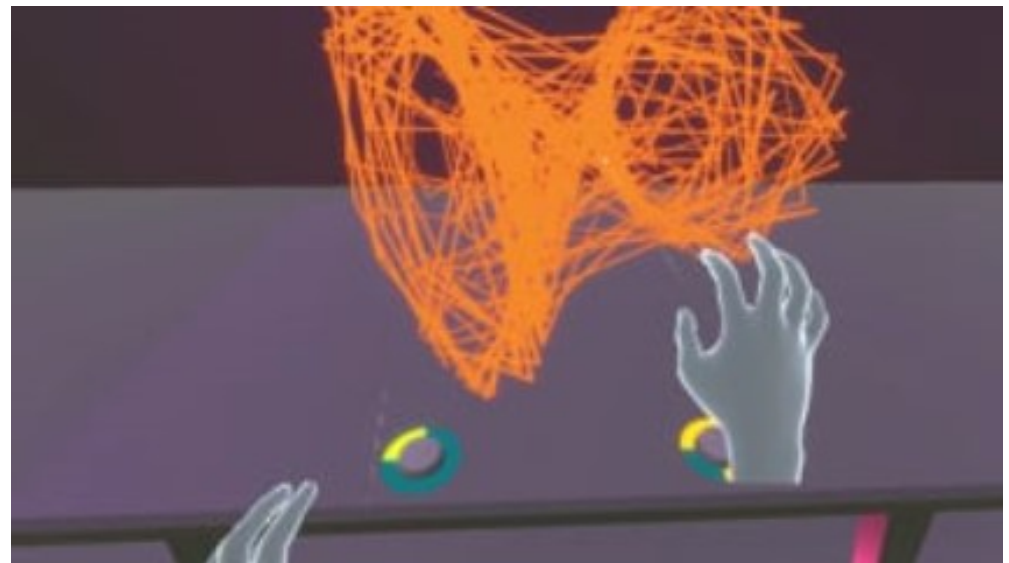
☑ Cheese

☐ 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
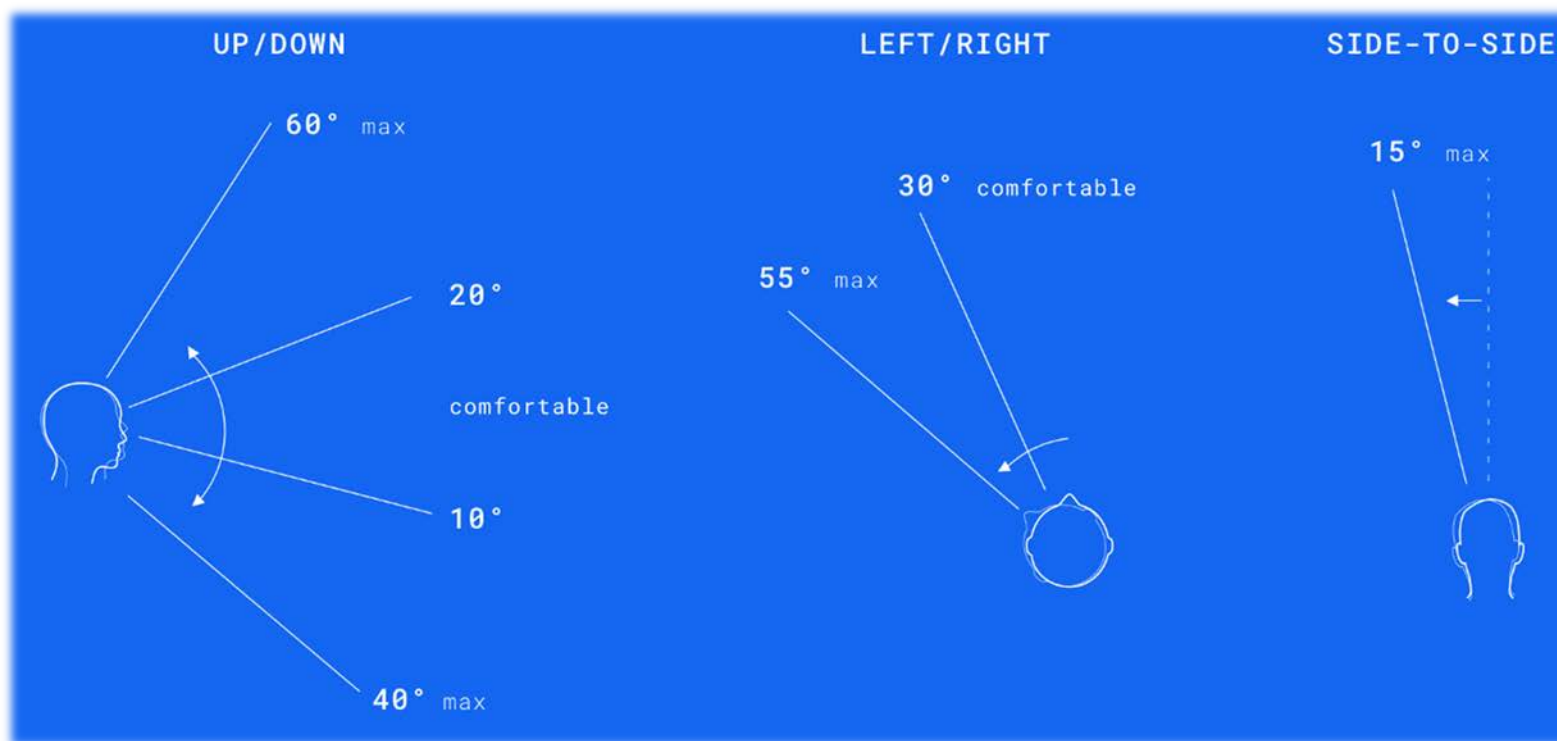- Submenus
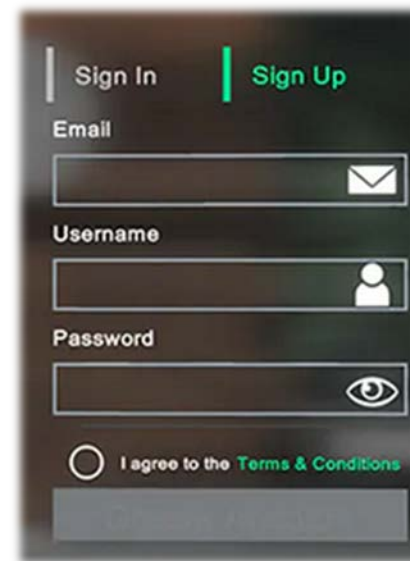
# User Hints

- 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
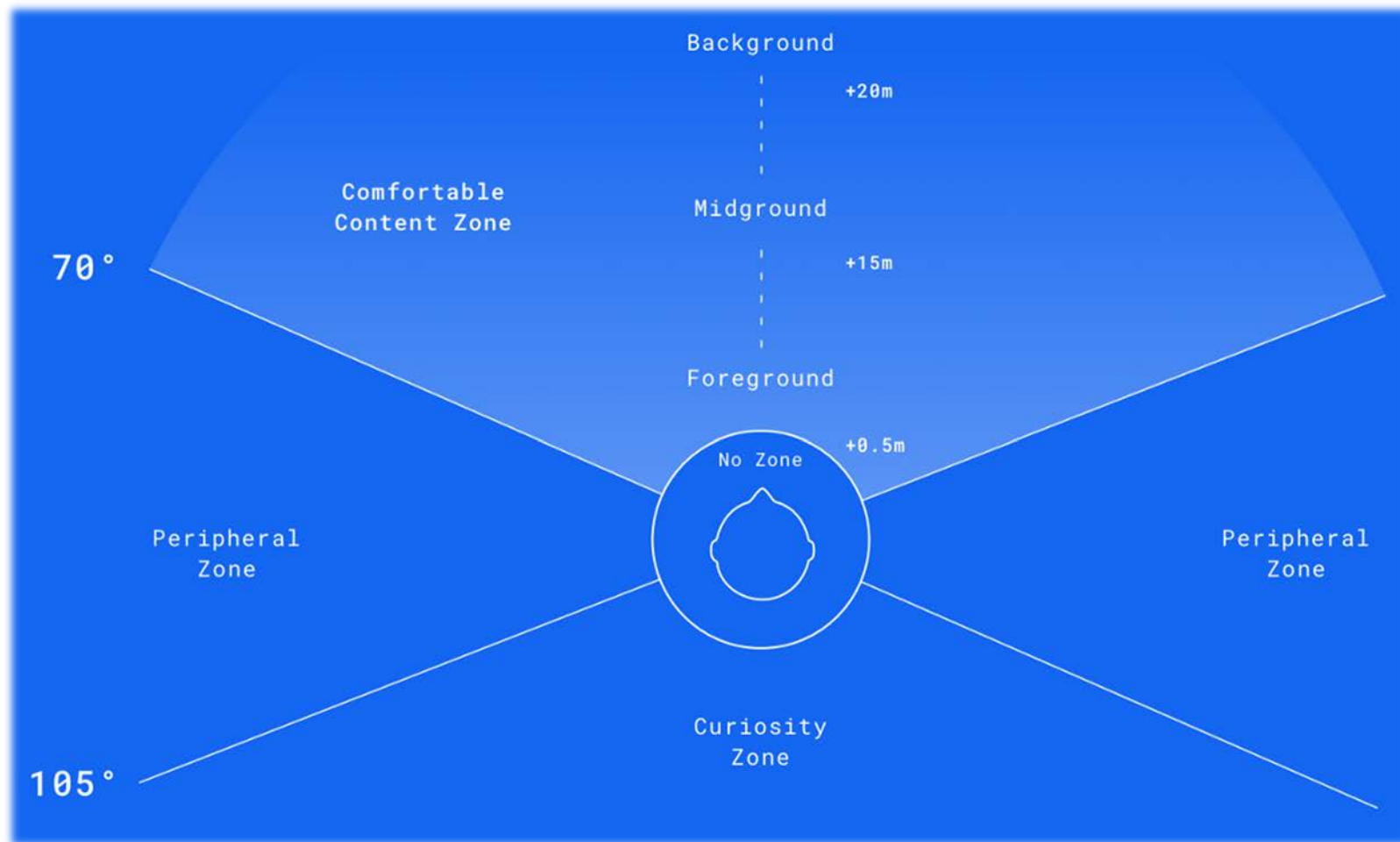  - Animation





Feed a Bone to Select

# 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

# More Information

- 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