Assignment 2
Ryan Blocker
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CS464
Fransisco Ortega

Exercise 5.1: List of technologies and domain pairs that I am interested in currently.

Consumer Laptop - Manipulating 3D objects in Computer-Aided Design
- **Novel Elicitation Goal:** Explore novel multi-touch gestures tailored for 3D manipulation of objects in computer-aided design and, focusing on precision and ergonomics.
- **Potential Hurdles:** Overcoming the bottlenecks of touch interfaces compared to traditional mouse and keyboard setups.

Internet of Things - Controlling Large Networks of Devices from a Single Device
- **Novel Elicitation Goal:** Develop voice commands or gestures for managing complex IoT networks, focusing on controlling a large number of devices and ease of control.
- **Potential Hurdles:** Providing responsive voice/gesture commands in different and potentially loud environments.

Augmented Reality - Exploring Gestures to be More Inclusive for Those with Learning or Physical Disabilities
- **Novel Elicitation Goal:** Design gestures that are simple and intuitive, minimizing physical strain and accommodating a wider range of motion capabilities.
- **Potential Hurdles:** Balancing simplicity and functionality, ensuring gestures are both accessible and capable of performing complex tasks.

Smartwatch - Exploring How Smartwatches Can Be Improved While the User is Exercising for Increased Usability
- **Novel Elicitation Goal:** Investigate touchless gestures or voice commands that allow users to interact with smartwatches without physical contact, tailored for scenarios with high movement or moisture.
- **Potential Hurdles:** Achieving high accuracy in gesture recognition in an environment with significant body movement and a high chance for incorrect user input.

Promising Technology and Domain Pair
- **Augmented Reality and Accessibility:** This pair stands out to me because of its significant potential in making AR inclusive, and achieving both a technical and social impact.

Exercise 5.2: Considering the technology/domain pair of Augmented Reality and Accessibility. I have come up with a list of input methods that are compatible with this technology:

- **Voice Commands:** The benefits of voice commands include hands-free control over the system. So this is extremely beneficial for users with limited mobility.
- **Eye-Tracking:** To even utilize this technology you must be able to see therefore this method addresses the entire population of users that can use this device. So this method is non-invasive and requires minimal physical interaction.
- **Simple Hand Gestures:** Designed to be performed with minimal movement. Some examples of simple gestures might include single finger tap, palm open, swipe motions, pinch or spread, or even closing your fist.
- **Head Gestures:** This is something I have only ever seen in certain video games in virtual reality but I believe it could be a useful method of input for users with upper-body mobility constraints.
- **Facial Expressions:** Can trigger actions based on user-expressed emotions or facial gestures.

Ranking:

1. Eye-Tracking
2. Voice Commands
3. Simple Hand Gestures
4. Facial Expressions
5. Head Gestures

In the ranking system above, Eye-Tracking is placed first due to its accuracy and minimal physical requirement, making it highly accessible for users with limited mobility. Voice Commands are next because they allow hands-free operation which is crucial for users who cannot use their hands effectively. Simple Hand Gestures are third because, while inclusive, they still require some physical mobility. Facial Expressions and Head Gestures require less precision but can be less intuitive and slower for navigating complex commands, so I placed them lower in the list.

Exercise 5.3: For Augmented Reality focused on accessibility here is a list of referents for this elicitation study:

In this study, the "referents" are actions or commands that my participants will respond to. These referents are the main way we will understand how users naturally want to interact with augmented reality, Here's a deeper look into each referent category for AR, tailored to improve usability for users with disabilities:

Basic Navigation:

- Referents: Pan, Zoom, Select, Translation, Scaling
- Description:
    - Pan: Move the view or focus left, right, up, or down.
    - Zoom: Enlarge or reduce the view of an object or scene.
    - Select: Choose an object or option within the AR environment.
- Purpose: These actions allow users to navigate and interact within the virtual space of AR, which is essential for getting different parts of an application or content.

Application Switching:

- Referents: Change between different programs or views
- Description: Switch from one application to another, such as from a navigation mode to an information mode, or from a standard view to a detailed view.
- Purpose: Enables users to adapt the AR interface to different tasks or needs, enhancing flexibility and user control over the device.

Volume Control:

- Referents: Adjust audio feedback levels
- Description: Increase, decrease, or mute the volume of audio feedback in the AR device.
- Purpose: Essential for users with hearing impairments or when using the AR system in different environment noise levels, ensuring the audio is always at the desired level.

Text Input:

- Referents: Enter or dictate text through minimal gestures or voice
- Description: Input text by either speaking or using simple gestures designed to minimize effort, such as drawing letters in the air or selecting from an on-screen keyboard.
- Purpose: Text input is necessary for communication within the AR environment or for entering data, making it accessible helps users with motor disabilities.

Each of these referents is chosen to represent a task when interacting with the AR system that a user with disabilities might need to perform often. The study's goal is to find out how users prefer to execute these actions using AR technology. Do they prefer gestures, voice commands, or a combination of both? How can these actions be performed with the least physical mobility and mental load? The data from this study will help our own understanding of these preferences when designing an AR interface that is intuitive and accessible, ultimately making the technology more usable for everyone.