Research Questions

1. Can users effectively differentiate between system-generated sounds and background environmental noise?
2. Does the change in pitch within the sonification allow participants to accurately interpret changes in the environment, such as object proximity or location?
3. How do the sonifications impact participants' abilities to mentally map and navigate a space without visual cues?
4. Do participants find the auditory feedback pleasant and non-intrusive to their experience without difficulties in regular usage?

These questions are aimed at assessing the usability and effectiveness of the auditory feedback system for visually impaired individuals, partcularly in providing necessary spatial information and enhancing the user experience without overwhelming sensory input.

Participants & Recruiting

Participants will include a diverse group of friends and family members that are sighted individuals who typically rely on visual cues for navigation, simulating the experience of a newly visually impaired person. This approach ensures the system's standards accommodate users without prior development of heightened auditory senses. Recruitment will involve a simple invitation via phone call or messaging platforms.

Measures

- **Quantitative Measures:** Response times to changes in sonification, accuracy in identifying sonified information, and success rates in completing tasks.
- **Qualitative Measures:** Participants' verbal feedback, comments during the session and post-evaluation interviews.

Protocol

1. **Introduction and Consent**
    a. **Procedure:** Greet participants upon arrival and provide an overview of the evaluation process. Explain the purpose of the study, what will be expected of them, and how their data will be used.

b. **Materials:** Informed consent forms.
c. **Duration:** About 5 minutes.

2. **Pre-Evaluation Training**
    a. **Procedure:** Introduce the sonification system to the participants. Explain how to interpret different sounds and what each sound represents within the context of navigation and object identification.
    b. **Materials:** User guide on sonification cues, demo sounds.
    c. **Duration:** 10 minutes.

3. **Task Execution:**
    a. **Procedure:** participants perform tasks that simulate real-world scenarios. These tasks should be designed to test the effectiveness of the sonification in aiding navigation and object recognition.
        i. Task 1: Navigation through a virtual environment using only audio cues.
        ii. Task 2: Identifying objects on sonification.
    b. **Materials:** Computer with the simulation software, headphones.
    c. **Duration:** 20 minutes per participant.
    d. **Data Collection:** Record the time it taes for each task, the errors made, and any feedback provided by the participants during tasks.

4. **Video Assisted Evaluation**
    a. **Procedure:** After completing the audio-only tasks, show participants a video of the same scenarios they just navigated or interacted with. After viewing, ask them to perform similar tasks to see if their performance improves with visual context.
    b. **Materials:** Pre-recorded scenario videos, same setup as task execution.
    c. **Duration:** 20 minutes per participant.

5. **Post-study Assessments**
    a. **Procedure:** Conduct a structured interview or focus group sesion to gather qualitative feedback on the user experience. Administer a survey to quantitatively measure user satisfaction, perceived utility, and cognitive load.
    b. **Materials:** 10 minutes per participant.

c. **Data Analysis: T**ranscribe interviews, code qualitative data for themes related to usability and satisfaction, and use statistical software like Excel to analyze survey responses.

Analysis

Quantitative Analysis: Measure response times, accuracy in identifying sonified information, and task success rates; input data into Excel for statistical analysis.

Qualitative Analysis: Record and analyze participant observations and interview responses to identify themes and areas of frustration.

Thematic Coding: Identify common themes in feedback for potential design improvements.