Survey - Wearable Sound Awareness & Localization

Section 1 - Demographics

1. Age (text box)

2. Gender

a. Male
b. Female
c. Non-binary
d. Prefer not to answer

3. Is your hearing loss congenital (i.e., from birth)?

a. Yes
b. No

4. [If 3b] At approximately what age did you begin losing hearing? (numeric entry)

5. What would you say is your level of hearing in your best ear?

a. Normal
b. Mild: <30 dB (difficulty hearing whispers, water dripping, leaves rustling)
c. Moderate: 31-50 dB (difficulty hearing conversations)
d. Moderately Severe: 51-70 dB (difficulty hearing crying, vacuuming)
e. Severe: 71-90 dB (difficulty hearing dogs barking, pianos)
f. Profound: 91 dB or more (difficulty hearing trucks, motorcycles, sirens)
g. Don't know

6. Do you use any of the following hearing devices?

a. Hearing aid
b. Cochlear implant
c. Other (open-ended)
d. None
e. Don't know

7. What is your preferred method of in-person communication? [checkboxes]

a. Oral (spoken) communication
b. Sign language
c. Writing
d. Other (open-ended)

8. Are you a speech-reader (lip-reader)?

a. Yes
b. No

9. When having a face-to-face, 1-on-1 conversation, approximately what percentage of the other person's speech do you understand while wearing your hearing device(s) and with speech-reading?

a. Less than 20% (almost completely unintelligible)
b. 21-40% (barely intelligible)
c. 41-60% (somewhat intelligible)
d. 61-80% (mostly intelligible)
e. 81% or greater (almost completely intelligible)

10. Do you use any of the following devices? Check all that apply.

a. Smartphone (e.g., iPhone, Android phone)
b. Smartwatch (e.g., Apple Watch, Samsung Smartwatch)
c. Head-mounted display (e.g., Google Glass, Oculus Rift)
d. Other wearable device: (open-ended)

Section 2 - Interest in sound awareness and sound qualities

In this section, we would like to learn about your preferences for sound awareness.

1. To what extent is it important for you to be aware of sounds occurring around you?
(Not interested, Slightly interested, Somewhat interested, Very interested, Extremely interested)

2. To what extent are you interested in being aware of the following types of sounds?
(Not interested, Slightly interested, Somewhat interested, Very interested, Extremely interested)

a. Outdoor mechanical background noises (e.g., cars passing, construction)
b. Indoor mechanical background noises (e.g., refrigerator hum, keyboard)
c. Nature background noises (e.g., bird chirp, wind)
d. Presence of other people (e.g., footsteps, drinking water)
e. Voices not directed at you (e.g., one person meeting another person)
f. Voices directed at you (e.g., a person talking to you)
g. Urgent alerts directed at you (e.g., fire alarm)
h. Non-urgent alerts directed at you (e.g., door knock, phone ring)

3. Do you use any mobile or wearable devices (e.g., smartphones, smartwatches) or computers (e.g., laptops) to help you be aware of sounds?

a. Yes
   If yes, please describe what devices you use and how. (open-ended)
b. No

4. To what extent are you interested in the following aspects of sounds?
(Not interested, Slightly interested, Somewhat interested, Very interested, Extremely interested)

a. Loudness (i.e., how loud the sound is)
b. Direction (i.e., where the sound came from)
c. Source of sound (i.e., what the sound came from)
d. Duration (i.e., how long the sound has been occurring)
e. Changes in pitch or sound patterns
f. Other (open-ended)

Section 3 - Imagining Devices to Support Sound Awareness

The following sketches show three different devices: smartphone, smartwatch, and head-mounted display. Imagine that each device has the ability to constantly monitor and identify the sounds around you, and to inform you about those sounds, either through visual or vibrational feedback. Examples include, a visual popup or vibration could occur when an important sound is detected, or the device could provide you with an overview of the current sounds around you.

1. For each of the following statements choose the "sound awareness" device that you would find the most…
(Matrix of multiple choice options: Smartphone, Smartwatch, Head-mounted display)

b. Socially acceptable
c. Easy to glance at
d. Useful
e. Preferred overall

2. Which device would you prefer the most for each type of sound?
(Matrix of multiple choice options: Smartphone, Smartwatch, Head-mounted display, I would not prefer any of these)

b. Outdoor mechanical background noises (e.g., cars passing, construction)
c. Indoor mechanical background noises (e.g., refrigerator hum, keyboard)
d. Nature background noises (e.g., bird chirp, wind)
e. Presence of other people (e.g., footsteps, drinking water)
f. Voices not directed at you (e.g., one person meeting another person)
g. Voices directed at you
h. Urgent alerts directed at you (e.g., fire alarm)
i. Non-urgent alerts directed at you (e.g., door knock, phone ring)

3. In general, for what sounds do you think a sound awareness device like this would be most useful? (open-ended)

Section 4 - Supporting Oral Conversation

In this section, we ask about preferences for features that support oral conversation. In particular, we focus on captioning text or parts of text.

1. To what extent would you be interested in having full captions?

(Not interested, Slightly interested, Somewhat interested, Very interested, Extremely interested)

2. **To what extent would you be interested in having only keywords of the conversation rather than full captions (e.g., topics, unique words, or nouns)?**
(Not interested, Slightly interested, Somewhat interested, Very interested, Extremely interested)

3. **Which device do you think would be best for showing captions or keywords during spoken conversations?**

a. Smartphone
b. Smartwatch
c. HMD

4. **Why did you choose the device you did for the previous question?** (open-ended)

5. **If a device only showed some keywords, what type of words would you find most useful?** (open-ended)

Section 5 - Overall: Comparing form factors and modalities

Recall the three devices introduced. The smartphone, smartwatch, and head-mounted display are capable of showing notifications that you can see (visual) or that you can feel (vibrational). In this section, we ask about your opinion of these types of cue (visual or vibrational).

1. **When do you think visual feedback would be most useful?** (open-ended)

2. **When do you think vibrational feedback would be most useful?** (open-ended)

3. **What would be the ideal setup if you could choose visual and/or vibrational feedback on the same or different devices for a sound awareness solution?**

a. Visual feedback: [radio buttons]
    - On smartphone
    - On smartwatch
    - On HMD
    - No visual feedback desired

b. Vibrational feedback: [radio buttons]
    - On smartphone
    - On smartwatch
    - On HMD
    - No vibrational feedback desired

4. **Why did you choose that setup?** (open-ended)

Section 6 - Filtering and Notification

Given your ideal sound awareness setup…

1. Should the device(s) notify you of all sounds or should some sounds be filtered out?

a. I want to know about all sounds.

b. I want some sounds filtered out.

If so, what kind of sounds would you want filtered out? (open-ended)

2. How would you want the device(s) to notify you about sounds?

a. Sounds immediately displayed to you as they are detected.

b. Sounds saved and available for a later time.

c. Sounds only displayed on demand, for example, when you press a button on the device.

d. Some sounds displayed immediately, others on demand.

If so, please describe. (open-ended)

Section 6 - Social perceptions of sound awareness devices

We are interested in your thoughts on social perceptions of the smartphone, smartwatch or HMD sound awareness solutions we introduced.

Try to envision the experience of using the device in each of the following social situations. Rate the extent to which you agree with each statement.

1. When you're by yourself.

For each subquestion: Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree

a. The device would be useful.

b. The device would be socially acceptable.

2. When you're with close family members or friends.

For each subquestion: Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree

a. The device would be useful.

b. The device would be socially acceptable.

3. When you're with work colleagues.

For each subquestion: Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree

a. The device would be useful.

b. The device would be socially acceptable.

4. When you're with people you don't know.

For each subquestion: Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree

a. The device would be useful.
b. The device would be socially acceptable.

5. Overall, do you think that where you are or who you're with would affect whether you would want to use the device? If so, how? (open-ended)

Section 7 - General

1. Do you have any other comments about the survey or technologies mentioned that you'd like to share? (open-ended)