Haptic Stimulation (Exploratory to Developing)

Background

- [Process](#)
- [Subgroup Handbook](#)
- [Scratchpad](#)

Outcome:

Haptic feedback and input can be adjusted and/or turned off.

Goal

Users have the ability to adjust or turn off haptic input and output

What to do / Outstanding considerations

Define:
- **haptic feedback**: tactile information provided by an interface to a user to inform them of [stuff]
- **haptic input**: tactile information provided to an interface by a user to [do a thing] (this would be done by the Haptic Input subgroup)

- **We are focusing on haptic feedback. Haptic input should be a different subgroup**
- **Haptic is not a true alternative**

User needs

- Users can continue to have full use of content, after adjusting or turning off haptic stimulation (e.g., via sound, visual prompts, or other input methods)
- Users can both turn on and turn off haptic stimulation
- Users can control haptic stimulation granularly/discreetly (independently by application)?
- Users can control the qualities of the haptic stimulation (ex. strength, duration, style, location, source, timing/delay/pause)
- Users have system-level control of haptics which the user agents respect (rewrite!)
- Users are told in advance that haptic stimulation is part of the experience [and have an ability to turn it off]
- `prefers-reduced-haptic-feedback`?
- `prefers-reduced-haptic-input`?

Examples of haptic stimulation

- Phone vibrating for incoming call (or message); equivalent is ringing(sound) or information displayed

- ○ Accessible alternative to ringer
- Typing feedback or other forms of reinforcement (haptic is additive to a user interaction, but the user is still aware of performing an interaction)
- In a video game/XR, the controlling might vibrate as a warning; we suspect that this is an enhancement to sound (i.e., there's
- Turn prompts when driving; vibrates to turn, reinforcing text displayed on the watch; Arguably the haptic is primary on the watch , but it's complementary to the audio from the mapping application
- Is haptic the default prompt on a watch? (e.g., a new text comes in)
- Clicking feeling as scrolling through items, etc.
- Morse code seems like one potentially example of more meaningful communication through vibration. Are there other examples where haptic could be a 'true' equivalent? A quick shake vs a long shake, or a double shake.
- [Apple's new haptic music feature](#)
  - ○ Not an accessible alternative to the content, but analogous or complementary
  - ○ Maybe an accessible alternative for Deaf people, but not hard of hearing people?
  - ○ Accessible alternative to a notification of music playing
- Haptic time on Apple watch — vibrating number of hours?
- Medical device vibration (i.e. insulin pumps with UI screens) to represent warnings/prompts to check blood glucose, or the number of insulin units being injected
- DBox or other sensory seats in a movie theatre, where the seat shakes or moves in response to what is happening on the screen. User can control intensity (quality) but has not control over "meaning"

Method decision tree

[*Create a decision tree of scenarios. This should provide a logical path to the appropriate method. Always finish with a catch-all path. The method text should link to the method description further down the document.*]

1. Is haptic feedback part of the experience of the application?
   - ○ Yes, continue
   - ○ No, passes/meets
2. Can the user turn haptic feedback on/off?
   - ○ Yes, continue
   - ○ No, fail (see [Haptic feedback can be turned on and off](#))
3. Is haptic feedback the only form of feedback?
   - ○ No, continue
   - ○ Yes, fail (see [An alternative is provided for haptic feedback](#))
4. Is the meaning of haptic feedback made clear to the user?
   - ○ Yes, continue (**passes prerequisite/bronze**)
   - ○ No, fail (see [The meaning/purpose of haptic feedback is clearly described](#))
5. Is the user warned in advance about the use of haptic feedback?
   - ○ Yes, continue (**passes prerequisite/bronze**)

- No, fail (see [Users are prompted about the use of haptic feedback](#))

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6. Can the user turn haptic feedback on/off at the application level?
   - Yes, continue (**passes baseline/silver**)
   - No, fail baseline/silver (see [Haptic feedback can be turned on/off on a per-application level](#))

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7. Can the user assign haptic feedback to different meanings?
   - Yes, continue
   - No, fails #7 (see [Haptic feedback can be assigned on a per-trigger basis](#))
8. Can the user adjust the sensations of haptic feedback?
   - Yes, passes
   - No, fails #8 (see [The qualities of haptic feedback can be adjusted](#))

Method list

Haptic feedback can be turned on and off

Level

Prerequisite/Bronze

Method

A mechanism is available to turn on and off haptic feedback.

Techniques

- Ecosystem (e.g., Playstation network; Google) — cross-device-level setting
- (Operating System/Platform) - Control is present in settings to turn haptic feedback on and off.
- (Application, web-based or otherwise) - Control is present in application settings to turn haptic feedback on and off.
- User agent - Browser-level control…
- Technology e.g. CSS, prefers-reduced-haptics (made up).(see [CSS/tactile braille and haptic](#))
- Device - a hardware or software switch for controller, phone, watch, etc

An alternative is provided for haptic feedback

Level

Prerequisite/Bronze

Method

An alternative to haptic feedback is provided to convey equivalent information

Exception

When haptic feedback is used as an accessible alternative for another form of feedback

Techniques

- Visual cue, ex. Notification or pop-up , visual effect, symbol
- Auditory cue, ex. Chime or beep

The meaning/purpose of haptic feedback is clearly described

Level

Prerequisite/Bronze (?)

Method

Users can find documentation on meaning of haptic feedback

Techniques

- Easily-locatable documentation
- Dialog with label appearing with haptic
- [The prompt](#) includes documentation of haptic feedback meanings

Users are prompted about the use of haptic feedback

Level

Prerequisite/Bronze

Method

The user is warned in advance about the use of haptic feedback.

Techniques

- (Application, web-based or otherwise) - A notification or message about the use of haptic feedback is displayed upon setup, login, or toggle. If control of haptic feedback is possible, users should also be directed to them.
- Device or operating system - A notification or message about the use of haptic feedback is displayed upon setup, login, or toggle. If control of haptic feedback is possible, users should also be directed to them.
- Page-level - A notification or message about the use of haptic feedback is displayed before the user encounters it

Haptic feedback can be turned on and off on a per-application basis

Level

Baseline/Silver

Method

The user has granular control of haptic feedback on an application level.
What this means: although the author needs to respect platform level settings, they could provide granular ability for the user to 'override' these settings if they want: 1) turn off/on at the application level and 2) adjust settings and assignments at the application level

Techniques

- (Authors) Provide a control to toggle haptic, and make its default state align with the platform haptic settings
- (Operating System) - Control is present in settings.
- (Application, web-based or otherwise) - Control is present in application settings.
- User agent - Browser-level control…
- Technology e.g. CSS, prefers-reduced-haptics (made up).(see [CSS/tactile braille and haptic](#))

Haptic feedback can be assigned on a per-trigger basis

Level

Enhanced/Gold

Method

The user has granular control of haptics on a per-trigger level. For example, the user could assign haptic feedback for enemies approaching and not for taking damage.

Techniques

- (Operating System/Platform) - Control is present in settings, and affects the platform haptic feedback API
- (Application, web-based or otherwise) - Control is present in application settings.
- User agent - Browser-level control…
- Device - a hardware or software switch for controller, phone, watch, etc. Unless there is a range selector, this is more likely to only be turning on/off, not for adjusting.

The qualities of haptic feedback can be adjusted

Level

Enhanced/Gold

Method

Users can control the presentational qualities of haptic feedback. Such as:
- The strength of the feedback
- The duration of the feedback
- The pattern/style of the feedback
- The location of the feedback on the body
- The delay of the feedback
- The frequency/grouping of the feedback

Techniques

- (Operating System/Platform) - Control is present in settings to adjust qualities globally, which affects the platform haptic feedback API
- (Application, web-based or otherwise) - Control is present in application settings.
- User agent - Browser-level control…
- Device - a hardware or software switch for controller, phone, watch, etc. Unless there is a range selector, this is more likely to only be turning on/off, not for adjusting.

Potential assertions

- We have researched the use of haptics and applied the results.
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Meeting Minutes

Use this for decisions, in-process scratchpads, and other rough notes.

9 July 2024

Attendees: Wendy Reid, Mike Gower, Mart Ann Jawili, John Toles, Avon Kuo, Jake A
What we did:
- Set up the background information for the outcome:
  - As a group we decided to expand the language of the outcome to be inclusive of haptic input as well as haptic feedback
- Wrote a few of the initial methods and filled in some of the techniques
- Discussed areas where we have questions or need more information
Questions to answer:
- Is it possible to establish a guideline for thresholds of haptic stimulation (both frequency and intensity), and a reduced maximum for a 'reduced' level? Is this an assertion?

- Is device manipulation of any kind haptic? Is tilting a device a form of haptic input? Some of us thought "no", but in that case, where is that covered, and is it similar enough in decision trees and outcomes that we can combine into one outcome?
- Is fall detection a form of haptic input? Is knocking?
- Is forced feedback on a steering wheel haptic or motion; seems to unify the two (comment from Theo on WG playback)

16 July 2024

Attendees: Mary Ann Jawili, John Toles, DJ Chase, Avon, Jonathan
- Reviewed outcome and goal; listed uses or haptics we're aware of, and noted some potential research
- Began to fine-tune methods and list known techniques; got as far as 'Haptic…can be turned on and off'
- Questions to answer: are we supposed to be identifying future research or gaps?
- Mary Ann is going to look into the apple haptic music feature, and also report back on the notion of the level of 'equivalence'; there is some suspicion that haptic may not provide a true equivalent in many situations

23 July 2024

Attendees: Mary Ann Jawili, John Toles, DJ Chase, Avon Kuo, Mike Gower, Charles Adams
- Mary Ann reported on Apple music haptics; in beta. It should work on other music apps. It's meant to supplement the music.
- (Haptic input vs haptic feedback was once again briefly touched on)
- Completed the methods for 'Haptic feedback can be adjusted'; need to spend some time discussing techniques (the current ones were just added from 'haptic feedback can be turned on/off)
- **Presentation/quality vs meaning/assignment of haptics** (see *Haptic feedback can be adjusted*)

30 July 2024

Attendees: MJ Jawali, Chuck Adams, Mike Gower
- Updated the techniques for 'Haptic feedback can be adjusted'
- Completed reviews of remaining existing outcomes; marked one as likely to be removed, and added a potential new one
- Began the Method Decision Tree (not completed)

20 August 2024

Attendees: MJ Jawili, Wendy Reid, John Toles, Chuck Adams (as "Spare Chair")
- Scheduled new time (Mondays 12-2pm Eastern)
- New facilitator (DJ)

- **Deliverables still needed:**
  - Decision tree
  - ~~Advice on where things fit into prerequisite/baseline/enhanced – tags on methods~~ already done (didn't realise)
- Deleted the following (preserved here for record purposes):
  - Clarify that touch input is not haptic input
    Is device manipulation of any kind haptic? Is tilting a device a form of haptic input? Some of us thought "no", but in that case, where is that covered, and is it similar enough in decision trees and outcomes that we can combine into one outcome?
    Is fall detection a form of haptic input? Is knocking?
    Is forced feedback on a steering wheel haptic or motion; seems to unify the two (comment from Theo on WG playback)
    Glenda pointed out on WG feedback that there are some good articles such as https://www.immersion.com/what-are-haptics/ AND an ISO standard on this https://www.iso.org/standard/61362.html
    Investigate: Able gamers and others creating video game standards that may define haptic usage and conventions. AbleGamers - Combating Social Isolation Through Play
    XR accessibility user requirements https://www.w3.org/TR/xaur/

    Discussion point: Is haptic a 'true' alternative. Most examples we can think of is an enhancement/augmentation. It's gross communication, generally, not fine.
- **Next meeting:**
  - Go over comments left on doc since this meeting
  - Match the decision tree to each of the methods

26 August 2024

Attendees: DJ Chase, Avon Kuo, John Toles, Wendy Reid, Mike Gower (second half)
- Resolved comments
- Worked on decision tree
- Finished method list
- **Work still needed**:
  - Decision tree
  - Research on thresholds for potential `prefers-reduced-haptic-feedback` media query
  - Research on harm-based thresholds (like Three Flashes or Below Threshold)
- **Next meeting**:
  - Resolved comments left since this meeting
  - Make sure all methods are represented in the decision tree

3 September 2024

Attendees: Avon, DJ, MJ, Mike

- Finished decision tree
- Resolved comments
- Added "The meaning/purpose of haptic feedback is clearly described"
- **Work still needed**:
  - Research on thresholds for potential `prefers-reduced-haptic-feedback` media query
  - Research on harm-based thresholds (like Three Flashes or Below Threshold)
- **Next meeting**:
  - Go over research?

9 September 2024

Attendees: Avon, DJ, John

- Went over Avon's research; added notes
  - Moved "Users are prompted" to prerequisite/bronze