AUDIO-HAPTIC INTERACTION: HAPTICS IN MOBILE MUSIC PLAYERS

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OVERVIEW

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   1. Feel What You Hear
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1. INTRODUCTION

- Audio-haptics have not been widely used in music players.

- Haptics considered enhancing the user experience with mobile phones
  - Why not with music players?

- Using different modalities can divide the cognitive load.
2. AUDIO-HAPTICS

• Sound = touch at a distance [Chang and O’Sullivan, 2008]

  ➢ Therefore, combining audio and haptics feels natural.

• Vibro-tactile feedback has been used in mobile phones for years.
3. HAPTICS IN MOBILE MUSIC PLAYERS

- The use of traditional mobile music players strongly relies on audio-visual feedback.
  - Searching tracks is usually done visually in a list
  - Or skipping tracks and listening whether it’s the desired one.

- Haptics have not spread into music players yet.

- However, there are a few examples:
  - Feel What You Hear
  - Auto haptic
  - Touch Headphones
3.1. FEEL WHAT YOU HEAR 1/3

- Developed by Lynne Baillie, David Beattie and Lee Morton.

- In Glasgow Caledonian University, 2011.

- Music player application for Samsung Behold II
  - Android 1.5
  - TouchSense 3000 haptic effect system by Immersion
3.1. FEEL WHAT YOU HEAR 2/3

- Two functions:
  1. Haptic feedback during audio playback
  2. Haptic preview of audio track (eyes- and ears-free)
3.1. FEEL WHAT YOU HEAR 3/3
3.2. AUTO HAPTIC 1/2

- Featured in Samsung Galaxy SIII smart phone

- By Immersion Corporation

- Automatically generates haptic feedback by monitoring application’s audio track.

- Ability to create custom ringtone vibrations.
3.2. AUTO HAPTIC 2/2

- User taps the circle to create unique vibration patterns.

- The feature is not well known since it has not been properly introduced to users.
3.3. TOUCH HEADPHONES 1/2

- Philips Research Laboratories in Eindhoven, Netherlands

- Haptic controls to interact with a music player

- Earpieces have capacitive touch buttons (one per each)

- Commands based on tapping patterns.
3.3. TOUCH HEADPHONES 2/2

<table>
<thead>
<tr>
<th>Tapping pattern</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single tap</td>
<td>Pause</td>
<td>Play</td>
</tr>
<tr>
<td>Double tap</td>
<td>Previous track</td>
<td>Next track</td>
</tr>
<tr>
<td>Hold</td>
<td>Volume down</td>
<td>Volume up</td>
</tr>
</tbody>
</table>

- Western convention of right (progress) and left (reverse)
- Play/pause are the most needed so therefore the simplest pattern
- Automatic locking control
4. DISCUSSION

• The haptic music player takes the audio-haptic interaction in good use.
  • However, it is only a prototype tested with a relatively small amount of participants.
  • Further testing and developing needed.

• Auto haptic has potential because Samsung Galaxy SIII has sold over 30 million.

• Haptic music player combined with Touch Headphones might provide interesting a user experience.
5. CONCLUSIONS

• The use of audio-haptics in music players should be studied more and brought to wider audience.

• Feels natural to combine audio with haptics since they are closely related modalities.
6. REFERENCES