

AUDITORY ASSISTANCE FOR TIMING PRESENTATIONS

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ABSTRACT

Every presentation has to end at some point. Signaling the approaching end of the presentation time in conferences is often accomplished by showing signs with the remaining time written on it, i.e., by visual contact. The idea of this project is to investigate if it is possible to present this information acoustically and if the lecturer profits from this representation compared to the usual one.

1. INTRODUCTION

Auditory display of time can be experienced in everyday life, day by day. The most common example would be a clock tower, ringing at midnight. Due to the long history of such a time display, ringing bells are practically natural parts of the soundscape, accepted and perceived consciously or subconsciously as part of everyday life.

A possible application of an auditory display sonifies the remaining speaking time at conferences. Such an approach has been implemented, e.g., at the 41th DAGA-conference in Nürnberg, Germany, which used "signaling watches" [1]. According to unofficial comments of attending colleagues, the used sound was considered quite annoying and requires improvement. Another more musical approach is used, e.g., at the Academy Awards where the desired end of an acceptance speech is indicated by music fading in.

This pilot study aims to create a possible sound design for this application scenario and optimize the design in terms of transmitted urgency, appropriateness and annoyance.

One possible method of transmitting the information of time is to, e.g., spatially map the sound, as implemented by Zoon et al. [2]. The chronoroom clock maps the time information to a certain position, i.e. the sound source wanders in time around the walls of a specifically equipped room. This results in a localization challenge for the listener, and an extensive hardware effort. In our project, the information of time should be perceived through the sound design alone.

Since the information does not represent an absolute time but a chronological position in an ongoing process, this project could be seen as something as an auditory progress bar (APB). Previous

research introduced five contents of an APB: Initiation, progress, heartbeat, reminder and completion [3]. Furthermore a better performance can be achieved, if an increasing element is added [4]. The pilot study of J. Fagerlönn [5] compared musical warning signals to abstract warning signals and auditory icons. The results indicate that musical warning signals are able to communicate a sense of urgency. Abstract signals result best in terms of appropriateness and urgency, while auditory icons were considered best in terms of annoyance. The perceived urgency of warning signals has been the subject of a study by J. Edworthy [6]. This study suggests the use of pitch and speed in sound design to achieve the impression of urgency.

The presented study evolved from a student's project in the context of a sonification seminar. An auditory cycle of a full day was created through ambient sounds which represent a certain time span. Compressed into a length of 45 seconds, this sound was played in front of an audience and participants were asked if it is possible for them to identify the day time at certain points within the cycle. Based on the first results of this experiment, the application of an auditory assistance for timing presentations came into mind.

2. SOUND DESIGN

For this application, regarding an APB, only the sounds for reminder and completion are part of the auditory display, since progress and heartbeat are self-evident and initiation seems un-

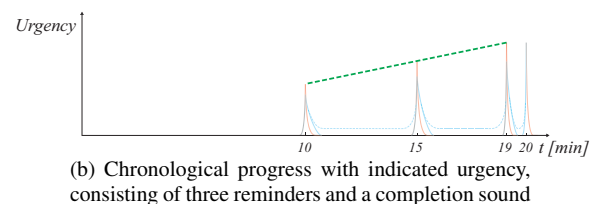
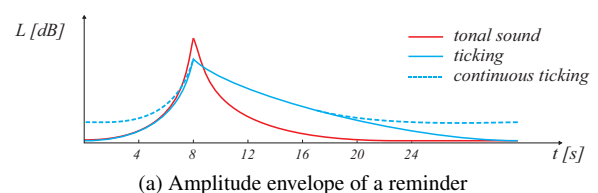


Figure 1: Schematic representation of the structural nature of the sound design



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necessary in this context. The desired sound design represents a mixture of auditory icon and abstract warning signal to achieve both transmitted urgency and low annoyance. The basic idea of the sound's nature is shown in Fig. 1 which symbolizes the following features:

- Considering a twenty minute speech, reminders occur after ten minutes, five minutes before end and one minute before end
- The amplitude envelope of each reminder sound should increase exponentially towards its representing time and decrease afterwards
- The reminders should increase in pitch and in ticking rate to indicate increasing urgency
- The concluding sound represents the aimed end of the speech, and the ticking part ends abruptly

An auditory display exclusively consisting of auditory icons with reference to, e.g., an alarm clock may also be sufficient. However the goal of this design is to inform rather than alarm the lecturer and to create a non-intrusive sound which does not disturb the presentation. To achieve this, the design aims to combine auditory icon and abstract warning signal to one informing sound. The chosen auditory icon should establish the intended affiliation with time and in combination with the abstract warning signal the result should be restrained but informative.

The sound design is based on different recordings of hit wine glasses. This sound is chosen because of its tonal relatedness to a clock tower and aims to imitate the affiliation with time. Each reminder consists of two parts: A tonal part to attract attention, and an ticking part to indicate urgency. The tonal part again consists of an increasing and a decreasing section. The increasing section is generated with the sound of a hit wine glass played in reverse, after which's peak is directly followed by a pitch shifted glass sound.

Each reminder includes a different rate of ticking, which accelerates gradually towards the time of notification and decelerates afterwards. To communicate a sense of urgency, the maximum ticking rate increases from one reminder to the next. While the increasing section of both tonal and ticking part share the same duration, the decreasing section differs in that relation. The gradual deceleration of ticking happens at a slower rate than the tonal part. Thus the ticking appears audible for a longer period, which should secure the perception of the communicated content. Additionally the reminders increase in pitch from one to the next to strengthen the sense of urgency.

The concluding sound differs slightly from the reminders. Only the highest rate of ticking increases in terms of loudness towards the ending time, which then is displayed by one decaying sound without ticking. Presentation time is over.

To display the sounds, two speakers facing the lecturer are used. Due to the closeness to the sound source, it should be possible to ensure that the sound is still clearly audible and not lost in the room ambience.

The four used sounds (neglecting the correct time gaps) can be found online at <http://iaem.at/kurse/ss15/sonifikation-sound-of-science-se/sounds-timing>.

3. EVALUATION AND DISCUSSION

First tests were performed in the course of four short presentations during a seminar. The sound design at this point included simul-

taneous amplitude decay of both tonal and ticking sound. Feedback on the perceived urgency showed great variation, while it was considered pleasant and not annoying. Since the displayed information on urgency seemed unclear, the sound design was improved by prolonging the decay of the ticking sound, making it more audible. This measure seemed conclusive, since the ticking sound is supposed to carry the main information on urgency. A further test during a presentation of a master thesis confirmed the improvement in terms of the perception of urgency, while it was still considered pleasant and not annoying during the lecture. But still listeners considered to prolong the ticking sound even more to achieve better results, which led to the current state of design.

This sound was designed for the main application of timing presentations. But since this design displays the chronological position in an ongoing process, many other applications are thinkable. One application could be an auditory display during exams, where a subtle reminder of the remaining time may be of help. Another possibility can be the use in form of an mobile app for a personalized situation. Basically appliance to any situation which has a predetermined duration is imaginable.

4. OUTLOOK

The implemented sound design will be applied at ICAD 2015. It is envisaged to collect feedback from presenters, session chairs and the audience regarding the discussed factors, i.e. urgency, appropriateness and annoyance.

5. ACKNOWLEDGMENT

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6. REFERENCES

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