**Design of sounds**

The notifications sounds were designed as “families”, which means that each type of notification (tweet, email, etc) has four different sub notifications based on priority. So there are four different email, text message, voicemail, tweet, and missed call notifications. The idea behind this is that the user will understand that type and importance the notification has the moment they hear it.

1. **Tweets** are represented by auditory icons that mimic the sounds of a bird tweeting. This seemed like a natural way to represent the notification because Twitter’s mascot is a bird, and you receive “tweets”. As the priority increases for each tweet, the pitch, duration, and repetitions of the tweet increase.[[1]](#endnote-1)
2. **Emails** of lower priority have a descending tone, while the emails of higher priority have an ascending tone. Priority 1 and 2 are one note that changes pitch, but priority 3 and 4 have vibrato added to give the user a sense of urgency.
3. **Voice Mail** is a simple “do” noise that increases frequency with increased priority.
4. **Missed Calls** are also represented by auditory icons that mimic the sound of a phone ringing. The more urgent that call, the faster the tempo and higher and frequency the user hears.
5. **Text Message** starts as a simple “do-do” for priority 1, and increases in tempo for higher priority. As the urgency of the message increases, the number of notes increases, which will capture the user’s attention for a longer period of time
6. **Content Summaries** are represented by an earcon. If the content of the message was negative, the user will hear a short tune of descending tones. Ascending tones tells the user that the content of the message was positive. The tone that goes up, then down, but ending in the same location implies that the message was neutral. The purpose of this is to give the user some idea about the message when they are in a setting that text-to-speech is inappropriate. [[2]](#endnote-2) [[3]](#endnote-3)
7. **Heartbeat** is represented by a wind chime due to its ambient sound.[[4]](#endnote-4)

**Context: Gym**

The user has the most mental capacity to focus on hearing events, since they are just jogging on a treadmill, focusing on keeping a steady breath. The most text to speech was used in this scenario so they can hear everything. The events and their senders are heard sonified. It is not necessary to play the event notification sounds because the user should be able to distinguish between a text, tweet, voicemail, and email, with their respective priorities, based off the context from the message. Since missed calls do not have a message, the notification sound is just played.

**Context: Walking**

Since the user can focus most, but not all, their attention to hearing events, text-to-speech is utilized to give them more information about a notification. But only email, and text messages are heard. Only the message themselves, not the sender are sonified. I do not want to overload the user to a constant stream of speech that they get distracted. The reason I choose only email and text messages is that they tend to represent a conversation between the user and another person, so this would not be too far off from talking on the phone. All other events use their normal notification sounds. If the number of event streams is greater than 3, this can be too much for the user and might cause a cocktail party effect.v. To remedy this, if more than three event streams are chosen, only level 3 and 4 priority events are heard.

**Context: Socializing**

Since the user will be hearing many audio streams, text to speech is not an appropriate presentation of information[[5]](#endnote-5), so only short notification cue are used. Since the user cannot hear the incoming messages, they can hear the content summary after the appropriate notification sound is heard. As before, in order to lessen the amount of information coming in, if a user selects more than 3 event streams only priority 3 and 4 will be heard. If the user engaged in conversation, unimportant events, like spam email, are not necessary to hear at the time.

**Context: Presenting**

Since the least interruptible only the most urgent notifications need to be heard, so only notify when priority level is 4. Also, there will be no text to speech presentation to distract the presenter. In order to decrease the number of distractions, the only sounds for the notification are the notification themselves, and no extra information, i.e. they will not hear content summary, number of retweets, number of favorites, senders, etc. Since each notification is presented at its bear minimum, there is less possibility of the cocktail party effect, so the number of event streams a user wants to hear does not affect the engine.

1. http://designingsound.org/2016/11/auditory-icons/ [↑](#endnote-ref-1)
2. http://sonification.de/handbook/index.php/chapters/chapter14/ [↑](#endnote-ref-2)
3. http://www.dcs.gla.ac.uk/~stephen/earcon\_guidelines.shtml [↑](#endnote-ref-3)
4. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.20.9323&rep=rep1&type=pdf [↑](#endnote-ref-4)
5. https://pdfs.semanticscholar.org/1112/39b19e9f50f3cf302213f312c968eb6b229a.pdf [↑](#endnote-ref-5)