

## Spatial Auditory cues for the visually impaired

Navigation and spatial awareness is an issue for the visually impaired, and they are required to rely on other mediums to gain awareness of their surroundings. Common ways that this is done is with sound and touch. I've devised a way that visually impaired people are able to use both those senses to be more aware of the environment that they are in.

I have devised a series of alerts that suggest to the user how safe and stable the surface on the ground is. The alerts consist of a series of beeps that put the user in an emotional frame of mind when they hear it. I have decided to create a simulation of the program being used by a blind person at the beach.

The sounds are to be heard through an earpiece that the user is wearing, which is in turn wirelessly connected to the walking cane that they are carrying around.

The idea is that whenever the user taps the cane on the ground, the user hears a different beep alerting them of how stable the ground is. Below is a simple analysis of each sound and how it relates to its function.

-Proceed (flat ground)

A very simple and calming beep, as to alert the user that it is safe to proceed.

-Proceed with caution

Higher pitched and slightly more alarming than the normal proceed sound, so that the user is constantly made aware that the ground isn't necessarily flat or stable.

-Change of surface

4 short, sharp sounds in quick succession are created not to alarm the user but to tell them that there is a change in the surface ahead.

-Stop

2 longer, deeper beeps were created so that the user would think twice. Being longer and deeper, I had intended for the noises to make the user feel heavier and bogged to the ground so they did not want to proceed.

-Water ahead

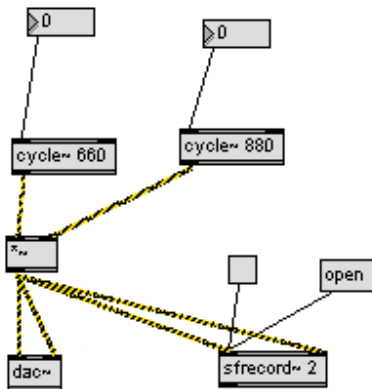
Long, sharp and high pitched to really alarm the user. It's slow to suggest to the user that there is a thick and undesirable substance ahead, and the waveform suggest that there is movement in the vicinity of the user.

The reason that I have created these sound functions is to alert and warn the user of the surfaces ahead so that they can pace themselves accordingly and proceed with caution if necessary.

The sounds that I have come up with have all been created and recorded in MaxMSP with a very basic patch that I created, and then altered in Pro Tools so that they sound like they are in context.

## MaxMSP

Primarily used to create sounds, by adjusting values such as pitch, frequency and amplitude. A simple srecord~ was used to save the sounds, which were imported into Pro Tools for further manipulation.



## Pro Tools

This was mainly used to add fading and reverb to sound, but I also used it to repeat the sounds at the right tempo and to limit the duration of sounds. Pro Tools was more primarily used in creating the simulation of the sounds, where I added in background noises such as the sound of the man (user) walking along different surfaces, the sound of other people at the beach, as well as environmental sounds such as wind, water and animals.

I like the way that the sounds have been put with the interface, so that the user can control when and how often they want to hear an alert, and how it can easily be turned off. I also like how this technology can be embedded into technologies that are already being used by the visually impaired, they simply have another tool that they can use to sense their surroundings.