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Sound Sonification
Assignment 1
Documentation

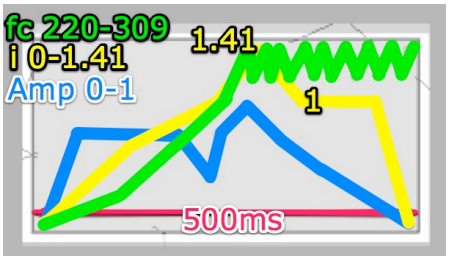
A relatively new form of mobile technology is the touch phone. Prized for its aesthetic form it is gradually growing in popularity. Unfortunately, the development and research of future concept phones composed of touchable materia is exceptionally slow, and as such, one of the most modern forms of mobile technology is such a visual-based phone, with no standards in Audio User Interface (AUI) and often lacking in that area with its overall interface. The purpose of introducing a useful AUI to a touch phone is to hopefully introduce its importance within touch devices, spotlighting its ability to aid people in multiple situations and relieving stress undertaken by the mobiles sole reliance on the visual sense. Such an AUI would also be compatible and easily adaptable to all phones, button based phones, as well as touch capacitive buttoned phones.

Described here is a brief overview of the entire design and sounds it encompasses, each based on a button, the sounds explored below include the 'dial pad' (1-9,*,0,#), 'clear', 'hang up' and 'call'. Sounds are designed for international use (no specific language). The AUI relies on the presence of a physical interface (the phone), for e.g. sounds of buttons on the left side of the phone have a greater left balance. The interface was designed with users of varying familiarity with the AUI in mind (as such, the AUI naturally works with the user's learning ability). Most sounds are created so that they can loop indefinitely, this aids in a users discovery of sounds without activating the actual button. To do so, one usually double taps instead of holding the button (there are exceptions for buttons such as 'Hanging Up' and 'Clear' as well as 'Call' ('Special Buttons'), which can simply be held as well). The holding of such 'Special Buttons' issues a different sound to when their actions are executed, providing a warning (a sort of failsafe) to the user that the button is currently being pressed, (i.e. the user is able to respond if they are accidentally touching the hang up button during a call).

The 'dial pad' is the largest categorization of sounds in this documentation. Its purpose is to provide an identifiable methodology for the user to browse different buttons. This category has the heaviest reliance on the physical phone, shifting balances Left and Right by 70% so a user can identify positions of sounds easily, especially with headphones. All looping notes have a frequency of 550ms, a fast speed for the user to comprehend their position, static notes however, can reach till 1100ms, having a smooth decrescendo as the sound ends. The 'number pad' (1 to 9), has an AUI based off the centre button '5' as a simple basic note ('C'-middle C) which provides much more efficient navigation than a linear scale 1-9. Variations stems in the y-axis (row 1 has a carrier frequency ('fc') of 'A'-above 'C', row 3 is 'F' below 'C'), as well as the x-axis with rhythmic/volume patterns, like a crotchet-minim and vice versa to point users in the direction of the center. Side columns(1,3) also consist of different in-harmonic ratios to distinguish them from each other and especially the central(257) column. The fourth row of keys (*,0,#), consists of representative sounds and centers around an 'fc' of 'A' below 'C' to unite them . The '*' has a harmonic ratio ('i') that dies down to simulate a slight *ting*, or bell sound. '0' has an 'i' close to zero, and produces a relatively bland sound. '#' begins with a tuned 'fc' of 'A' which gives way to a pink noise generator, simulating a short 'ash' sound.

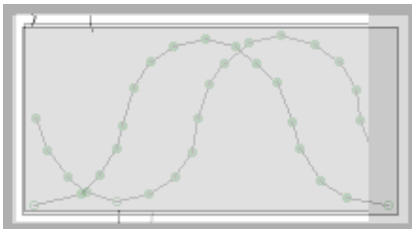
All 'Special Button' Sounds consists of a minimum of two sounds, a sound that is looped three times before executing a final sound. Often the looped sound acts as a confirmation for the user of their intended action, and of course can be double tapped to skip straight to the final sound, and hence, action. This is the case for the 'Calling' button. Since 'Special Button' sounds are a much smaller category than 'dial pad', I shall use graphical aides in dissecting them and the rationale behind them (graphs of simple sounds descending out will not be shown).

Graph of fc,i,amp v.s. time for ‘Call Loop’



The shorter sound, induces a seemingly quicker pace, as users are increasingly impatient. Whilst the protruding peek produced by volume acknowledges pitch peek, distinguishing the sound. ‘Fc’ movement is analogous to traditional ringing, establishing familiarity with a sound. The rising ‘fc’ represents the the nature of the button. The final sound, ‘Calling’, is much the same, with a more evident ringing sound induced by a main ‘i’ of 1.9, ‘fc’ rises higher, and is longer & louder, this makes it more dominant, separating it from its looped counterpart.

The ‘Hang Up’ looped sound is quite similar to the ‘call’ sound. Volume follows the same characteristic whilst harmonic ratio (‘i’) jumps between 1,3 and 2. Its ‘fc’ also rises by a semitone. All together, this produces an inharmonic and blunt sound that can also serve as a warning to the user. The final sound however differs quite a bit and acts more like the opposite of the final ‘call’ sound. Peeking at only an ‘i’ of 1, and lowering an 8ve in pitch, it maintains a much smoother tone than its looped companion, but is tied to it by the unnaturally vibrating aspect hidden in both which induces a sense of ending as representatory of the button.



The last of the sound groups are those belonging to the ‘Clear’ button. Such sounds need to represent the deletion of a certain number of characters. The sound loop for this button consists of no harmonic ratio nor pitch. It is composed of the morphing of a Pink Noise Generator with a cutoff frequency traversing from 300-1500, as well as general amplitude, from 0-1. Their traversal over time is depicted on the right overlayed ontop of each other. If graphed against each other, they would produce a circle. The consequent combination of these two characteristics leads to the sound of a blowing wind, synonymous with characters/numbers being blown away, or deleted. All sounds of the ‘clear’ button are very similar, with the a double tap issuing a shorter sound that indicates the clearing of one character, while the final sound, represented by a greater duration and gain, represents the clearing of all characters.

Hopefully such Audio User Interfaces will begin to be implemented into touch phones as time goes on and standards set for their existence in both touch and mobile technology.