Teletongue: A Lollipop Device for Remote Oral Interaction

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ABSTRACT

In this paper we present Teletongue, a lollipop device that provides remote oral interaction between two people. This project is a work in progress; each lollipop device is currently physically connected via an Arduino, where one lollipop senses the licking "gestures" and the licking "sound" of the user while the other lollipop vibrates accordingly to the gestures and playbacks the recorded sound. In the future we will be connecting the two devices via the ZigBee protocol to realize true remote interaction. Whilst many current devices that support intimate relationships with others (including so-called sex toys or teledildonics) are for special uses and are somewhat out of our everyday lives, the goal of this work is to provide a natural way of enhancing and enjoying intimate relationships that blends in to our everyday life. In this paper we explain the background and the motivation for our work, then present the design process and the system design of Teletongue.

INTRODUCTION

With the world becoming more and more global, many couples around the world are having to spend time far away from each other. New technologies and smaller sensors are being used to create devices that aim to support intimate relationships and to allow partners to feel each other remotely. IoT sex toys, otherwise known as teledildonics, are a good example of such device. Current teledildonics, however, are made to be used in bed and in privacy, and are quite daring for those who have no experience of using sex toys. Thus the usage of teledildonics become special, if not too special to use on a regular basis. Even the usage of regular sex toys can be daring for some. For devices that aim to support intimate relationships, this specialness is certainly not a desirable factor.

In this paper we propose Teletongue, a lollipop device that provides remote oral interaction between two people. We aim to create a teledildonic device which couples can use in everyday life, even in public, so that they can enjoy intimate interactions wherever they are. For this we focused on the act of kissing and licking, which many have no problem doing outside of their home. For it to be a normal, everyday device, it also needed to be an object that everyone is familiar with, and something that people have no problem putting into their mouth. A lollipop was one such ideal object.

Teletongue consists of two lollipop devices. One lollipop records the licking sound and senses the licking gestures, while the other lollipop vibrates accordingly to the licking gestures and playbacks the licking sound. The overview of Teletongue is shown in Figure 1.

Figure 1. Overview of Teletongue

EXISTING ORAL INTERACTION

INTERACTIVE ORAL PHYSICAL INTERFACE

Kissenger [1] is a pair of devices that augments remote communication in the form of kiss to support intimate relationship. The focus of Kissenger is to enhance affectivity of remote communication and give the illusion of togetherness through real-time haptic transmission.

Compared to previous works with a similar approach, Intimate Mobile [9] uses mobile phone as the medium, while Kissenger tries to add the missing dimension in existing technology related to kissing; the tangible form of kissing. The team went through several design iterations to

provide a comfortable, welcoming and tangible device that can trigger natural and romantic interaction of kissing. It is important to note that to fully experience Kissenger there are certain conditions necessary, such as real time communication through phone or video call.

The second prototype of Kissenger is made out of a material that mimics real lips and are small enough to be carried around. However, it is not something that people can use in public subtly. The device is, in a way, specialized for couples to transmit their intimacy in a private environment.

INTIMATE INTERFACES IN HUMAN-COMPUTER INTERACTION

In this era of modern lifestyles, we often encounter the lack of physical interaction from one another. From children and working parents to partners or lovers, we easily get separated by distance. In such busy lives, there is a strong need for love and physical interaction, even if it is transmitted through internet.

There are a lot of hugging device is in the Human-Computer Interaction area lately. Huggy Pajama [2] is a novel wearable system that enables parents and children to hug each other through a doll and a haptic pajama that is connected through the Internet. It features air pockets actuating to produce the artificial hugs, heating elements to produce warmth, and color changing patterns to indicate distance and separation and trigger communication expressions.

With Hug Over a Distance [6], the main focus is to send an "emotional ping" with a piece of wearable computing that provides light pressure and warmth to resembles a hug [6]. The result of the experiment was astonishing. The couples are actually not comfortable with the vest (that triggered "hug") the team provided. Most of the people expressed that they missed the mutuality [6], and said that it feels "weird" because the vest triggered the pressure in the upper torso. But overall it opened their minds towards the aim of the research.

Moving over to more intimate objects is the Sensing Bed [8], that is intended for couples in a long distance relationship. Sensing Bed senses the body position of one person and transmits the warmth to another bed. Since it comes in pairs, Sensing Bed is more private and intended for an established relationship. This system was made through findings about the importance of touch and warmth, as part of communication to support social interaction.

Other than hunger and thirst, another essential desire for human beings is the desire for contact comfort, even an artificial touch. [11]. Although both the Huggy Pajama and the Hug Over a Distance do not accurately recreate the experience and the emotion of a real hug or warmth, with

the right context and representation, neurological perception will bring self-attribution that can make people believe the artificial contact is real. Such devices can also contribute to healthy emotional development by using haptic communication for contact comfort through distance to give more opportunities of showing love [2].

LOLLIPOP SHAPED DEVICE

Lollipop as an edible item that's familiar to people of all ages can be an interesting form of device. PopLolly by Tomorrow Lab [10], for example, is an edible music player device that is connected to your phone via Bluetooth. Users are able to listen to the music through their mouth by sending the vibration from your mouth to your ears. We believe that using commonly known forms such as a lollipop will decrease people's reluctance in putting an electronic device into their body, in this case their mouth. Experimenting with the shape of the lollipop itself would also generate different experience for the person who consume it.

DESIGN PROCESS

In order to create a natural oral interaction, we were initially interested in using a lollipop, since we all know that it is an object that we put into our mouths. The first idea that we started off with was to put a microphone into the lollipop so that we can listen to the user's licking movements. With this in mind, we started off by making a lollipop that literally has the shape of an ear, so that it almost feels like the user is licking an ear. We modelled a human ear with 3D modelling software Maya, which we then 3D printed with Makerbot Replicator 2x. Figure 2 below shows the rendered 3D model and Figure 3 shows the 3D printed model.
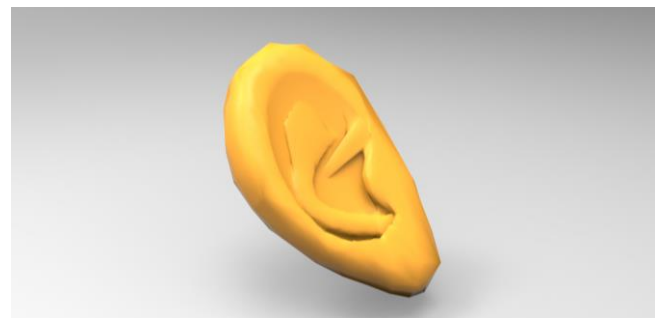

Figure 2. Rendering of 3D ear model

Figure 3. 3D printed ear model

Using the 3D printed model, we created a silicone mold of the ear. We first created a box out of plastic toy blocks, which we stuffed with oil clay to make the removing process later easier. We then placed the 3D print inside the box, applied consumer body shampoo as the mold release and poured RTV-2 silicone rubber. These processes are shown in Figure 4.

Figure 4. Mold making process

With the silicone mold ready, we created our original candy with the recipe shown in Figure 5. It is important to include corn syrup since the lollipop will not harden properly without it. After placing a USB microphone inside the mold we poured in the candy, creating an ear shaped lollipop with a concealed microphone as shown in Figure 6.


Figure 5. Candy recipe

Figure 6. Ear shaped lollipop with microphone

This first prototype of Teletongue provided us with a key insight that audio feedback of the licking movement is not enough to support intimate relationships. Although the sound itself was interesting and perhaps arousing, there certainly were issues in creating an immersive experience.

To further develop the prototype, we used the Idea Hexagon framework proposed by Ramesh Raskar from MIT Media Lab [3]. With this framework, we brainstormed ideas from diverse angles. The sketches from this ideation are shown in Figure 7.

Figure 7. Initial sketches using the Idea Hexagon framework

From these ideas came the second prototpe of Teletongue, which consists of not only microphones but an Arduino version of Touché [4], which enables more precise touch sensing than regular touch sensors. We also created a pair lollipop as the output device, which consists of vibrators. The second prototype is shown in Figure 8.
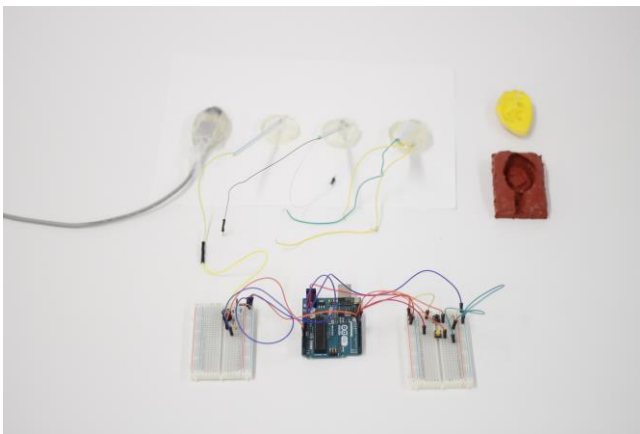

Figure 8. Second prototype

SYSTEM DESCRIPTION

Based on the design process, the requirements of the Teletongue system is a follows.

- A pair of lollipops that are edible (and of course, tasty). The current form of the lollipops is in the shape of a human ear to signal that the lollipop is recording sound and that it is meant to support intimate relationships. By adding the Touché sensor however, this message is not necessarily correct, so there will be further development on the form.

- Both lollipops are connected to an Arduino, which processes the sensed data from one lollipop and outputs the processed values into the other lollipop.

- One lollipop acts as the input device. It contains a USB microphone to record the sound of the licking, and an Arduino version of the Touché sensor to sense the licking gestures. The Touché is able to distinguish a *normal lick* (without the lollipop entering the user's mouth), and a *full lick* (the lollipop entirely inside the user's mouth).

- The other lollipop acts as the output device. It contains a vibrator, which vibrates lightly with a light lick, and vibrates strongly with a full lick. The licking sound is currently provided directly from the computer that is connected to the Arduino, so the user also wears the earphone that is connected to this computer.

The overall block diagram of Teletongue is shown in Figure 9.
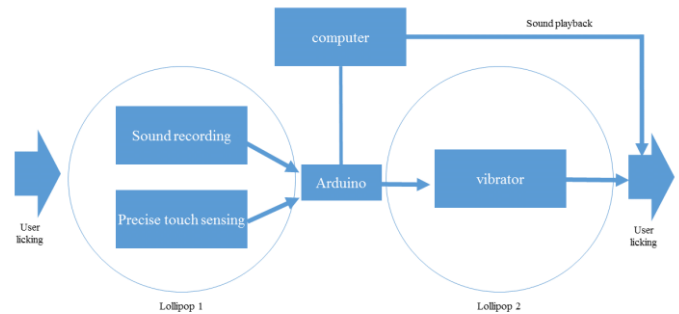

Figure 9. Block diagram

FUTURE WORK

As mentioned, this project is a work in progress. Currently the two lollipops are connected via an Arduino and a computer, but in the future we will be connecting the two via the Zigbee protocol so that the same experience can be provided remotely.

We are also confident that lollipops, being an object which most people have no problem putting into their mouths, have a lot more potential. For example, instead of putting a microphone and a touch sensor inside, if we put a 360 camera and LED lights, we will be able to look inside a person's mouth as though we are inside the mouth. This may be useful for dentists, for children will no longer have to go through the rather stressful process of opening their mouths wide; instead they just need to lick a lollipop.

CONCLUSIONS

In this paper we presented the concept and the design process of Teletongue, a lollipop device that provides

remote oral interaction between two people. We described how prior oral interaction devices and teledildonics are mosty focused on private or special uses, unlike Teletongue, which users can enjoy anywhere, even in the public. As a work in progress, we must continue to develop Teletongue. We will be connecting the two remotely via the Internet so that users can enjoy Teletongue anywhere, then move on to testing on real life couples. We hope that Teletongue will be the first step to a more open and casual usage of sex toys and teledildonics, one that is not embarrassing, but one that is comforting and bonding.

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