iScream!: Towards the Design of Playful Gustosonic Experiences with Ice Cream

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ABSTRACT

In this demonstration, we present *iScream!*, a novel gustosonic experience that generates unique digital sounds as a result of eating ice cream. The system uses capacitive sensing to detect eating actions and based on these actions, it plays out six different playful sounds to facilitate a playful eating experience. Our aim is to support a playful way of eating because we believe that interactive

Figure 1: The user is playing with iScream!.

technology offers unique opportunities to facilitate novel engaging eating experiences. Ultimately, with this work, we aim to inspire and guide designers working with interactive playful gustosonic experiences, which open up new interaction possibilities to experience eating as play.

KEYWORDS

Food sounds; Play; Human-food interaction

INTRODUCTION

Eating and play engages our senses and serves as a vehicle for social bonding, this work explores this phenomenon though digital sound [2]. Research on sound-related experiences of eating has demonstrated that sound can play an important role since our perception of food is profoundly affected by sound [9]. For example, we perceive the freshness of a potato chip by the quality of its crunchy sound. Crunchier sounds make chips feel fresher and more palatable [8]. Moreover, Ambient sounds and music in relation to the eating environment also influence our experience of food. For instance, loud, fast-paced background music can increase people's eating speed in a restaurant setting. Furthermore, Spence et al. [9] showed that our perception of sweetness could be suppressed by a loud noise, while our perception of the taste umami is enhanced with a loud noise. These linkages between the act of eating and listening within a combined multisensory experience are referred to as "gustosonic experiences" [10]. As such, many restaurants now use sound as if it were an extra ingredient to contribute to a rich dining experience. For example, the dish "Sound of the Sea" served in The Fat Duck restaurant encourages the diner to listen to the sound of ocean waves while eating a seafood dish, creating an immersive eating experience. Drawing inspiration from this, we believe there is an opportunity for investigating food sounds as part of eating experiences, and in the next section, we discuss "play" in this regard.

OPPORTUNITIES TO PLAY WITH FOOD

Gastronome Brillat-Savarin (1835) notes that pleasures associated with eating constitute some of the life's most enjoyable experiences [3]. We believe eating and play go well together because eating is inherently fun as food can provide people with pleasurable experiences. Unfortunately, we note that most of the works in the field of Human-Food Interaction (HFI) seem to focus on building corrective technology [5] that does not consider the playful aspects of eating, as they mainly aim to fix eating

problems or support healthy behaviours. For example, technologies have been developed that aim to help people make the right food selection, improve eating habits and balance nutrition. In contrast, Grimes et al. [5] argued to develop "celebratory technologies" instead, these are technologies that support positive aspects of people's interactions with food to support enjoyable eating experiences. Similarly, Chisik et al. [4] defined a gastroludical experience as one that involves the physical sensations associated with eating combined with digital technology to create new games to play with food. Wei et al. [11] proposed to extend digital cooking games to edible food as the output for virtual games, connecting playfulness with active participation in eating experiences. Motivated by these works, we present *iScream!*, a playful gustosonic experience that generates playful digital sounds as a result of eating ice cream. We believe that we need a positive perspective on how to build playful technologies around food. This stance informs our aim to explore the celebratory form of eating through experiencing eating as play.

RELATED WORKS

Previous works in the field of HFI have proposed different ways of exploring playful interaction with food. For example, Koizumi et al. [6] introduced "Chewing Jockey," a novel headset that detects jaw movement and plays back augmented chewing food sounds. Similarly, Polotti et al. [7] designed a sonically augmented dining table called "Gamelunch" that allows people to experience continuous sound feedback while having lunch. Moreover, Arnold et al. [1] developed a virtual reality game that uses the chewing noise as a game controller to enrich a VR game experience. These works have contributed to improving the food experience, but the sound-related food research seems to focus mostly on the instrumental benefits including the augmented perception of food texture, enhancing the crossmodal experiences of eating or using sound like a game interface. These works teach us that interactive technologies can enrich our playful eating experiences. However, knowledge about the design of gustosonic experiences is still limited. As a result, we propose the following research question: "How do we design gustosonic experiences that integrates the inherent playfulness of eating?" To answer this question, we present *iScream!*, which we explain below.

ISCREAM!

iScream! stands for ice cream screams. *iScream!* is an exploration of a gustosonic system that dynamically generates digital sounds when the user eats ice cream. *iScream!* detects eating actions through capacitive sensing. The microcontroller board (ESP-32) sends the sensed data to a Touch Designer via Open Sound Control (OSC), which then generates sounds. We use vanilla ice cream in combination with a laptop-controlled synthetic sounds system. We did not want any wires to distract from the eating experience, so our system is wireless. We 3D-printed a plastic ice cream cone using Ultimaker3, which hosts all hardware. The ice cream is connected to an ESP-32 board via a hidden
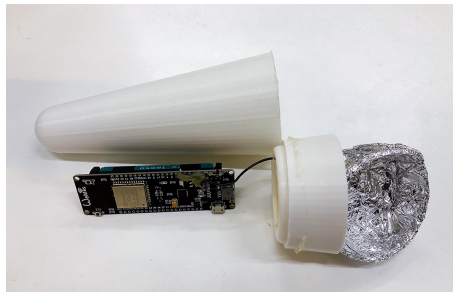

Figure 2: Our 3D-printed cone contains a wireless ESP-32 microcontroller connected to removable aluminium foil that then makes contact with the ice cream, so that the hardware is reusable yet hygienic.

Demonstration at CHI:

For CHI 2019, we will invite participants to experience *iScream!* though eating ice creams that we will bring along. We will also clean up afterwards. As at previous CHI's, we will ask attendees to fill out an ACM waiver form for eating, this will include an ingredient list to make people aware of allergy potential (we will use non-nuts ice-cream, for example). We can serve multiple servings at the same time; so can accommodate a high throughput of attendees.

piece of aluminum. We normalized the capacitance value within the interval of 0.0 to 1.0 in Touch Designer. This capacitance value varies depending on the amount, content and position of ice cream in the 3D-printed cone. The sound was triggered when the detected capacitance value was above a 0.65 threshold. This threshold value was identified after 20 trials with different eating patterns. We selected six playful sounds based on the possible playful user experiences they may facilitate. We set the volume to 75db and also allow participants to alter the volume if needed. The user is free to perform any eating action, for instance, biting with teeth or licking with lips and tongue, which results in a variation of food capacitance values. The detected food capacitance value is then mapped to playing sounds. Each user generates different kinds of sounds. The process stops after the ice cream is eaten.

CONCLUSION

In this paper, we present *iScream!*, a novel gustosonic eating experience in the form of ice cream that makes unique sounds when being eating, in order to further our understanding of how we can experience eating as play.

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