Funbrella: Making Rain Fun

Ai Yoshida   Yuichi Itoh   Kazuyuki Fujita   Maya Ozaki   Tetsuya Kikukawa

Ryo Fukazawa   Yoshifumi Kitamura   Fumio Kishino

Graduate School of Information Science and Technology, Osaka University*
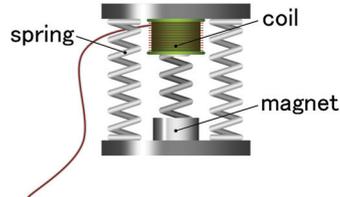
Figure 1: *Funbrella*

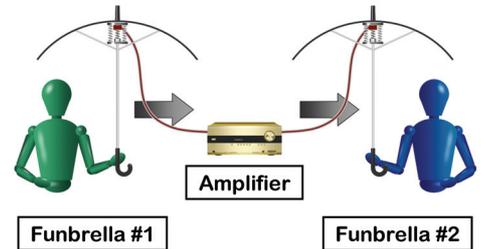
Figure 2: *Vibration-giving mechanism*

Figure 3: *Tele-rain*

1 Introduction

Rain changes its complexion based on the time and the place. Each aspect of rain provides a unique impression, so experiencing it in distant places and different times would be a new way of sharing information. To represent rain, we focused on an umbrella as a user interface to connect humans and rain. Generally, people experience rain with sounds, sights, or sometimes smells; however, in our proposed system, we exploit the vibration perceived through an umbrella's handle to let people feel the rain. We implemented a vibration-giving mechanism based on a speaker and microphone not only to give vibrations but also to record them so that they reconstruct rain. Using this mechanism, we propose a novel umbrella-like user interface named "Funbrella" that can record and replay the rain with FUN (Figure 1). We developed two interesting applications. One is to feel various kinds of rain, and the other transmits rain to different places in real time. With such applications, people can enjoy rain that is usually annoying.

2 Funbrella

In this section, we describe the details of Funbrella's structure.

People perceive the vibration caused by raindrops hitting the cloth of the umbrella through its handle. Since the vibration's strength and timing are irregular and complex, a new method is necessary to record and replay the actual vibration of the raindrops. We focused on a speaker and a microphone to record and generate vibrations. Figure 2 shows the mechanism that records and generates the vibration. Two boards have three springs between them; the upper has a coil, and the bottom has a neodymium magnet. As shown in Figure 1, this mechanism is placed between the cloth and the umbrella's handle. Eventually, the springs sustain the umbrella instead of the handle.

When raindrops hit the Funbrella, its springs are shaken. At this moment, the coil and the magnet generate electromagnetic induction, transferring the up-and-down motions to electric signals that resemble a microphone. The system can store vibration data as well. Funbrella can also generate motion with amplified signals that the Funbrella records. As a result, Funbrella works like a speaker and microphone. In this way, Funbrella can record and generate the actual shaking (vibration) data made by raindrops.

*e-mail:hi-funbrella@hi-mail.ise.eng.osaka-u.ac.jp

3 Application

With Funbrella's features, we implemented two applications to entertain with rain. In this section, we describe these applications in detail.

Crazy Rain: Participants hold Funbrella to experience various kinds of "rain" that were stored in advance. In addition, we provide the recorded sound of the "rain" with a speaker because the simultaneous usage of vibrations and sounds creates a feeling of being immersed in rain. We recorded not only normal rain with three levels of strength but also such "impossible/unlikely" rains as water from a bucket as well as rain that is recorded with snake toys, marbles, BB bullets, and spaghetti. Through this application, participants can feel and experience many unusual types of rain with actual vibrations.

Tele-rain: Two participants hold Funbrellas apart from each other and one's rain is transmitted to the other, as a telephone. Figure 3 shows the entire system. The electric signal recorded by the input side of the Funbrella is sent to its output side and generates the vibration. The Funbrella input can be output and vice versa, so Funbrella is bi-directional. This means that participants can change their position from either sending to receiving the information of raindrops. This enables participants who are in Japan and the United States to share their rain with each other in real time.

4 Conclusion

We proposed a new umbrella-like user interface, "Funbrella," that records and replays different kinds of rain using vibrations generated by the principle of dynamic speakers and microphones. This user interface can store a variety of "rain," and participants experience not only normal but also "crazy" rains that they have never experienced before. In addition, two participants in different places can feel each other's rain in real time. In the future, we are planning to improve the vibration-generating mechanism to store and produce many kinds of vibrations. This system might become a brand new way of sharing information because it can represent the faint presence of humans or physical objects or movements as subtle vibrations.