

Fragra: A Visual-Olfactory VR Game

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Abstract

"Fragra" is a new Visual-Olfactory VR Game that enables players to explore the interactive relationship between olfaction and vision. For this purpose, "Fragra" does not always display fragrances that correspond to images. So observers must distinguish what each visual and olfactory information means and compare them.

1 Introduction

In our everyday life, we tend to disregard olfactory information except during mealtime, and sometimes even treat it as a primitive sense. But does anyone like the flowers without their scents? No, of course not. And although olfaction is generally less well understood than the other senses, it is well known that olfactory information affects memory and emotion deeply. Aromatherapy is a good example of an application of this. Furthermore, some researchers have reported that when a monkey smells a fruit's scent, not only the olfactory area but also the visual area becomes activated.

So we think that the olfactory information is necessary for VR-environment and the interaction between olfaction and vision is a domain that merits further exploration. Thus we developed a new visual-olfactory display device and a novel visual-olfactory game "Fragra" to enable us to experience this interaction as an enlightening form of entertainment. If we can understand the relationship between olfaction and vision, our lives can be enhanced by the olfactory information: cooking programs that enable us to smell the dishes on demand, a new type of restaurant menu which we can see and also smell.

2 System

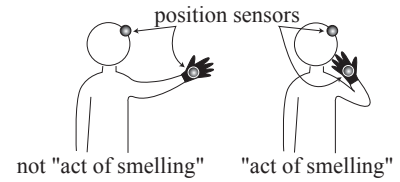
Heilig's sensorama[Heilig 1992] is one implementation of Visual-Olfactory entertainment, but it does not enable players to smell the scent of object on demand. And to investigate the interaction between olfaction and vision, it is necessary to display visual and olfactory information simultaneously. Thus we have developed a new visual-olfactory display device[Fig:a].

The system transfers scented air through tubes[Fig:c]. And it has multiple pathways of scented air so that it can transfer multiple kinds of scents by using a PC-controlled solenoid bulb. However, unlike other olfactory displays that use tubes to transfer scented air[Hirose 2003; Mochizuki 2004], ours is different in that the end of the tube is attached not to the user's nose but to the right hand. To make the device more lightweight and to enable the device to transfer much more scents, we configured as above.

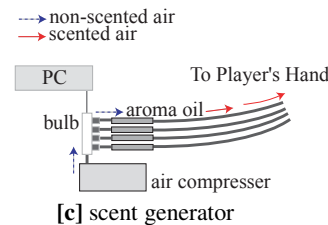
There is "An Unencumbering Localized Olfactory Display"[Yanagida 2003], but for our game, the delay for transferring the scent is not negligible. Thus to transfer the scents at an appropriate time, this system monitors the player's actions continuously and recognizes the "act of smelling" by using electromagnetic position tracking sensors attached to player's head and hand[Fig:b]. Our system thus enables the player to smell the object's scent actively.



[a] player with devices



[b] player's gesture



[c] scent generator



[d] snapshot of player's view

3 Application

By using this system, we have implemented a game "Fragra" that enables players to experience the interaction between olfaction and vision. For this game, we made a 3-dimensional virtual forest[Fig:d], in which there stands a mysterious tree that bears many kinds of food objects. Players can pluck them from the tree by moving their right hand. When they catch one and move it in front of their own nose, they can smell a scent, which may or may not correspond to the appearance. Players must distinguish between "honest" foods, which show exact scents corresponding to their appearance, and "deceiving" foods, which present disparate scents. Through this task, players experience the interaction between olfaction and vision by trying to sense olfactory and visual information independently.

In our preliminary experiment, the percentage of questions answered correctly varied according to the combination of visual information and olfactory information. So there is a possibility that some foods' appearance might have stronger information than their scents, and vice versa.

References

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