

A Nonluminous Display Using Fur to Represent Different Shades of Color

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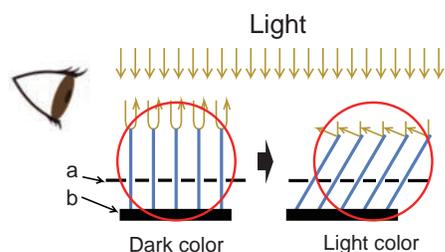


Figure 1: Mechanism

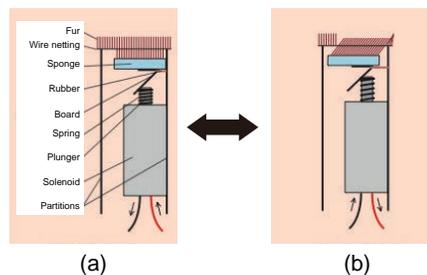


Figure 2: Unit structure

Abstract

This paper proposes a novel display that is in harmony with its surroundings. Our proposed display presents information using the different shades of color that can be generated in fur.

CR Categories: H.5.1 [Information Interfaces and Presentation]: Multimedia Information Systems—Artificial, augmented, and virtual realities;

1 Introduction

The goal of our research is to create a novel display that is in harmony with its surroundings and adapts seamlessly to our living space. To achieve this, our proposed display presents information in a nonluminous manner, because luminous displays (i.e. LEDs) are too assertive for such an environment. Our main idea is to express information using the different shades of color that can be generated in fur. When we stroke fur, its shade becomes different. The proposed system uses this characteristic to present information. Furukawa *et al.* [Furukawa and *et al.*] have used fur to present information. Their “Fur Display” system makes use of the familiarity of fur, as there are many daily necessities made with such materials (e.g. blankets, carpets). By incorporating the proposed display into these items, we are able to present information in a novel situation. For example, when a user strokes a blanket, our display may output the date or the weather, and when included on the surface of a stuffed animal, stroking could produce emotions or messages. In this manner, we aim to form a seamless relation between humans and information. This paper introduces a prototype of the proposed display as a basic study of the presentation of information.

2 Proposed System

The difference in color shades that can be produced by fur is caused by a change in the reflection angle of light according to the angle

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Figure 3: Proposed display

of the fur (Figure 1). The proposed system has a structure that mimics the changing fur angle (Figure 2). The structure consists of an aggregate of fur, wire netting, a sponge, a rubber, a board, a plunger, a solenoid, and partitions. The roots of the fur are fixed by the sponge, and the position of the fur is fixed by the wire netting. We change the fur angle by moving the sponge. The board is attached beneath the sponge to change the direction of motion of the solenoid. When the solenoid lifts the plunger, the sponge moves horizontally. When the solenoid lowers the plunger, the sponge is pulled by the rubber to its former position. This method allows us to control the color of the fur. The proposed display produces information by placing multiple units in a matrix and controlling them individually. Figure 3 shows a prototype system with a 4×4 matrix. In this figure, the fur in the four centre units is laid flat, and the fur of the other units is raised. The material used for the fur in the proposed display has been chosen to ensure that the information produced is clearly visible. As a result, we adopt silk fibers with diameter 0.6 mm and length 3 mm.

3 Future Work

This paper proposed a display that uses the different shades of color produced by raising and lowering patches of fur. We constructed a prototype as a basic study of the presentation of information by this method. In future work, we will incorporate a capacitance sensor as the input device of this system, and make it more interactive.

References

FURUKAWA, M., AND *et al.* Fur interface with bristling effect induced by vibration. *The 1st Augmented Human International Conference*.