

Temperature Design Display device to use Peltier elements and liquid crystal thermograph sheet

“ Thermo-Pict neo ”

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1.Introduction

“Thermo-Pict neo” is a design apparatus produced by applying temperature visualization technology linked to an information display with the use of a thermograph sheet. Thermography is used to visualize the surface temperature of objects through their depiction as colors. This technology has been used primarily in the medical and research fields. Thermography display colors come in a wide range of hues and brightness that enables quick visualization of any object’s surface temperature distribution. Use of this technology will be attempted as a tool in the production of design displays. [Fig.1]

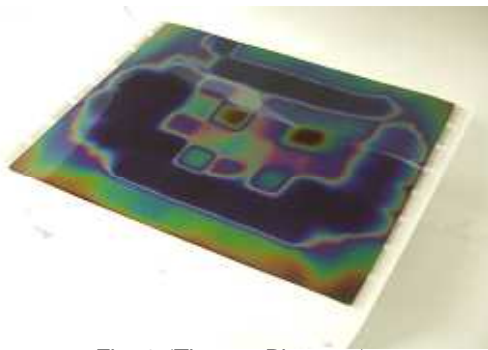


Fig. 1: ‘Thermo-Pict neo ‘

One typical product that uses Peltier elements is a visual tactile display known as “Thermoesthesia”[1] This is an interactive product in which the positions of the tester’s fingers are detected by a touch panel, and simultaneous control of the temperature detected by Peltier elements and the CG image projected on the display can be performed. One limitation of this product is the requirement of a projector, which results in a restriction of the display area size. In the present study, visualization of information was performed using a thermograph sheet, which enables the display even in a well lit area using compact sized instrumentation.

2. System configuration

2.1 Outline

For “Thermo-Pict neo”, which utilizes 80 Peltier elements, the image on the liquid crystal thermograph sheet continuously changes. After being touched by an individual, the image is further modified according to the body temperature detected. Also, an individual using this technology is able to sense the temperature change caused by Peltier elements. Thus the “Thermo-Pict neo” product utilizes displays based on both visual and tactile senses. [Fig.2]

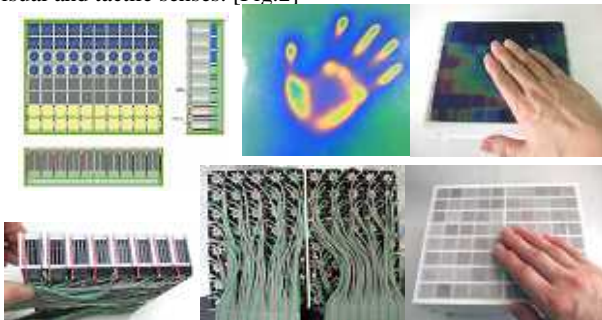


Fig.2 System outline

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2.2 Implementation

For development of our product, a liquid crystal thermograph sheet (C-Task Company) was used. This device responds to a temperature between 20°C ~ 32°C, maintaining a black hue at temperatures below 20°C and a bluish green hue at temperatures above 32°C. In all, 7 temperature-sensitive colors can be displayed: black, reddish brown, yellowish green, blue, purple, green and bluish green.

For this study, the display was made by first placing a total of 80 Peltier elements in a 8x 10 configuration occupying a 15 mm x 15 mm area on an aluminum sheet (to dissipate heat) and then covering the Peltier elements with a 130 mm x 170 mm liquid crystal thermograph sheet. The surface of the thermograph sheet may be touched and the image on the sheet changes according to the person’s body temperature.

From this arrangement, the direction of the current flowing through the Peltier elements can be determined. Images which are temperature-responsive can therefore be shown on the display. Numbers, letters and pictures are programmed as images.

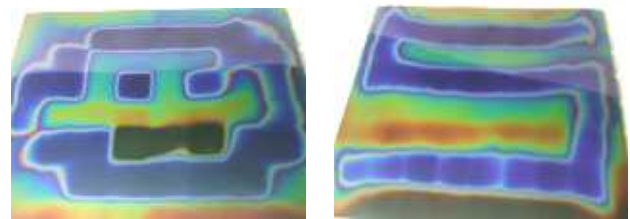
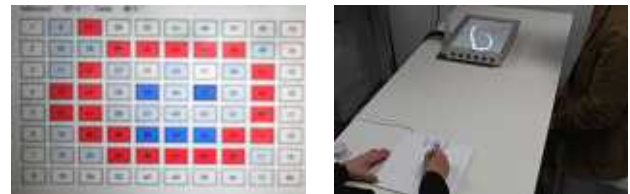


Fig.3 demonstration

3. Future outlook

We are currently developing this product for applications to universal product designs such as wall surfaces, public bulletin boards, and table-top sign systems.

In this production, we developed technology for a tactile display unit which is able to express a novel form of tactile communication for everyday life-use. We envision that the present creation will stimulate development in many other fields and provide a venue for new inventive creation.

References

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