

SMA Motion Display: *plant*

Akira Nakayasu
Graduate School of Design, ADCDU
Kyushu University
info@ander.jp

Kiyoshi Tomimatsu
Faculty of Design
Kyushu University
tomimatsu@design.kyushu-u.ac.jp

1. Introduction

Recently there has been demand for display equipment capable of advanced expressions in spatial design. For example, there is the Adobe Interactive Wall at Union Square (New York City, 2007), and the Zero Energy Media Wall of greenPIX (Beijing, 2008) using LEDs placed on the whole facade. The simple display of information contents is becoming insufficient, and more appealing spatial designs combining information content with interactive art expression are becoming more important. In this paper, we propose a shape memory alloy motion display (SMD), a novel piece of display equipment taking advantage of the existence of an actual object. Then, we introduce an interactive art work *plant* based on SMD technology.

2. What's SMA Motion Display (SMD)?

SMD does not display images with a combination of changes in light as in visual displays, instead the elements corresponding to light dots in visual displays are replaced by objects (actuators). We do not aim to display high density information as is done with images, but realize abstract expressions with physical movements and changes in shape. We are working on devices that give visual expressions and a feeling of creature-like existence from soft, creature-like movements. Applications include interactive walls (e.g. Fig. 1) as Digital Public Art [1], digital signage using visual expressions, Ambient Displays [2], and the moving dolls in theme parks combining 3D structure impossible with images and robotics. We built Himawari [3] as an application to robotics.

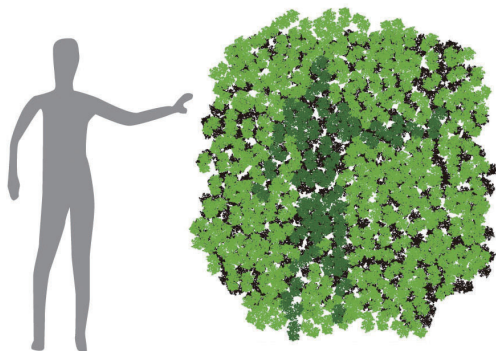


Figure 1: A conceptual image of an application of SMD
“Interactive wall of foliage”

3. *plant*

The *plant* (Fig. 2) is an interactive installation inspired by the vision of grass blowing in the wind. It is also created by using the core technology in SMD. 169 artificial leaves are controlled by using the shape memory alloy actuators we developed. All each leaf is independently controlled and reacts to a hand's movement and moves slowly. The sound also changes when reacting to a hand's movement. The foliage in the darkness creates a fantastic space. The *plant* provides users with the presence of plants and a comfortable interaction by the slow movements of leaves.

The control system is composed of an infrared camera, a control program, an electric circuit, and shape memory alloy actuators. Images from the infrared camera above the *plant* are analyzed using the control program and are converted into control signals for the electric circuit. Control signals are converted into signals for pulse width modulation using the electric circuit, which is developed with a PIC microcontroller. The heat of each shape memory alloy actuator is controlled by controlling the 169ch voltage values, and 169 leaves are driven.



Figure 2. A Snapshot of the *plant*

4. Conclusion and Future Work

This paper has described the possibility of a SMD through making the interactive installation *plant* as a piece of art. However, slowness of response and number of actuators did not fully demonstrate the expressions. We believe a higher degree of interaction allows presentation of expressions that are easier to understand. We will resolve these issues in the future, and will develop devices with more expressional capabilities and reproducibility through fundamental experiments on SMDs.

References

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