Representation of Animal and Plant Motifs in a Substantial Display using a Shape Memory Alloy Motion Display

中安, 翌
九州大学大学院芸術工学府デザインストラテジー専攻

https://doi.org/10.15017/26575

出版情報：九州大学, 2012, 博士（芸術工学）, 課程博士
バージョン：
権利関係：

（様式３）

氏　　名　：Akira Nakayasu

論文題名　：Representation of Animal and Plant Motifs in a Substantial Display using a Shape Memory Alloy Motion Display

区　　分　：甲

論　文　内　容　の　要　旨

In human-computer interaction, devices that use material objects as elements to present information or express ideas are called “substantial displays.” Substantial displays have attracted much interest in the art and computer worlds. This research develops a device representing a substantial display using a set of objects that is impossible to depict with visual displays comprised of a set of light dots.

The shape memory alloy motion display (SMD) proposed in this research is a substantial display that uses shape memory alloy actuators as elements and is reminiscent of a vision of grasses and trees blowing in the wind or tentacles of the sea anemone dancing in the waves. Incorporating expressions in reality and realizing the expressions of “blowing foliage” and “wriggling tentacles” using the substantiality of tangible objects results in a display device that impacts the viewer more powerfully than a two-dimensional lighted image.

Three interactive art pieces utilizing SMD were created in this research. Research and development of SMD were carried out as part of the creative process; evaluations by viewers at exhibits were analyzed.

The first piece, a plant-shaped robot “Himawari,” integrated the expressions of wriggling tentacles and swaying petals in the flower portion. Shape memory alloy actuators were used to move the 68 tentacles and 12 petals. The second piece, “plant,” uses 169 shape memory alloy actuators to express trembling foliage that interactively responds to the viewer. The third piece, “tentacles,” uses 55 shape memory alloy actuators that mimic the tentacles of sea anemone dancing on the waves.

Creation of the three pieces required development of the shape memory alloy actuators, control programs, and voltage control devices that are core technologies of SMD. Viewers positively evaluated the “blowing foliage” and “wriggling tentacles” at exhibits, demonstrating that SMD is an effective technology for substantial displays.