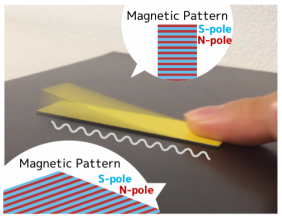
Magnetact: A Magnetic force-based Tactile technology

Moves of magnetic fields, Moves by magnetic fields

Abstract

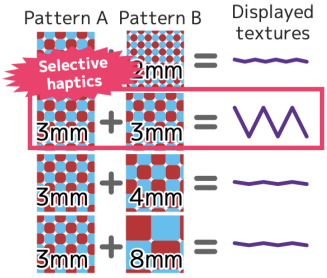
Magnetact is a magnetic tactile technology that does not require any power supply or wiring to present a tactile sensation. The specific patterned magnetic rubber sheets present a unique tactile texture when they are rubbed together. However, it takes time to magnetize the kind of detailed lattice pattern of S/N poles that can provide a selective tactile presentation. Therefore, we invented a new method for generating complex geometric magnetic patterns by layering multiple magnetic rubber sheets with simple magnetic patterns. Moreover, the superposed magnetic lattice patterns can be dynamically changed by rotating the layered magnetic sheets. This method resolves the tradeoff between the complexity of the magnetized pattern and the time required for magnetization.
The Magnetact technology is expected to be applied to a variety of tactile experiences, including in online tactile workshops, portable tactile picture books, and low-cost tactile VR experiences.

Magnetact: A Magnetic Tactile Technology



Magnetact is a magnetic force-based tactile technology. By magnetizing specific magnetic patterns on a magnetic rubber sheet, it presents unique tactile textures when the sheets are rubbed together.

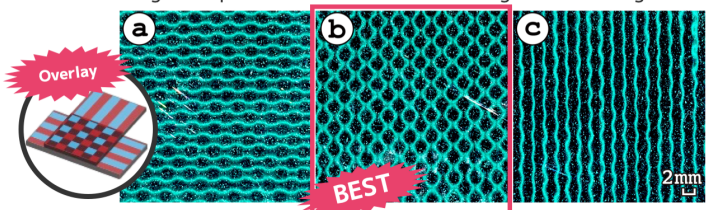
Pattern Superposition by Overlaying Magnets



It is relatively easy to magnetize a simple stripe pattern of S/N poles on the sheet, but it takes time to magnetize the kind of detailed lattice pattern that can provide a selective tactile presentation.

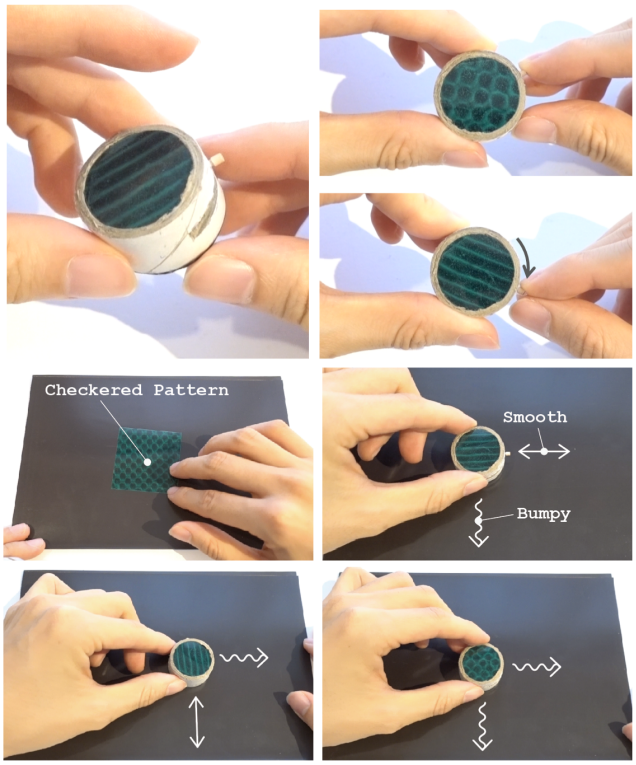
To solve this problem, we have established a method to generate complex geometric magnetic patterns by layering multiple magnetic rubber sheets of appropriate thicknesses. This method shortens the construction time of complex magnetic patterns to about 1/7 that of the machine magnetizing method.

Magnetic patterns visualized with magnetic viewing film



	a	b	c
(upper t_1)	0.31 mm	0.51 mm	0.82 mm
(lower t_2)	1.52 mm	1.52 mm	1.52 mm

Dynamic Change of Magnetic Fields



Moreover, the superposed magnetic patterns can be changed by rotating the layered sheets.

This evolution of Magnetact resolves the tradeoff between the complexity of the magnetized pattern and the time required for magnetization. It is expected to enable online tactile workshops, portable tactile picture books, and low-cost tactile VR experiences.

References

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[3] K. Yasu, M. Ishikawa, "Magnetact Animals: a simple kinetic toy kit for a creative online workshop for children," in *Proc. CHI EA '21*, Article. No. 198, pp. 1–4, 2021.

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