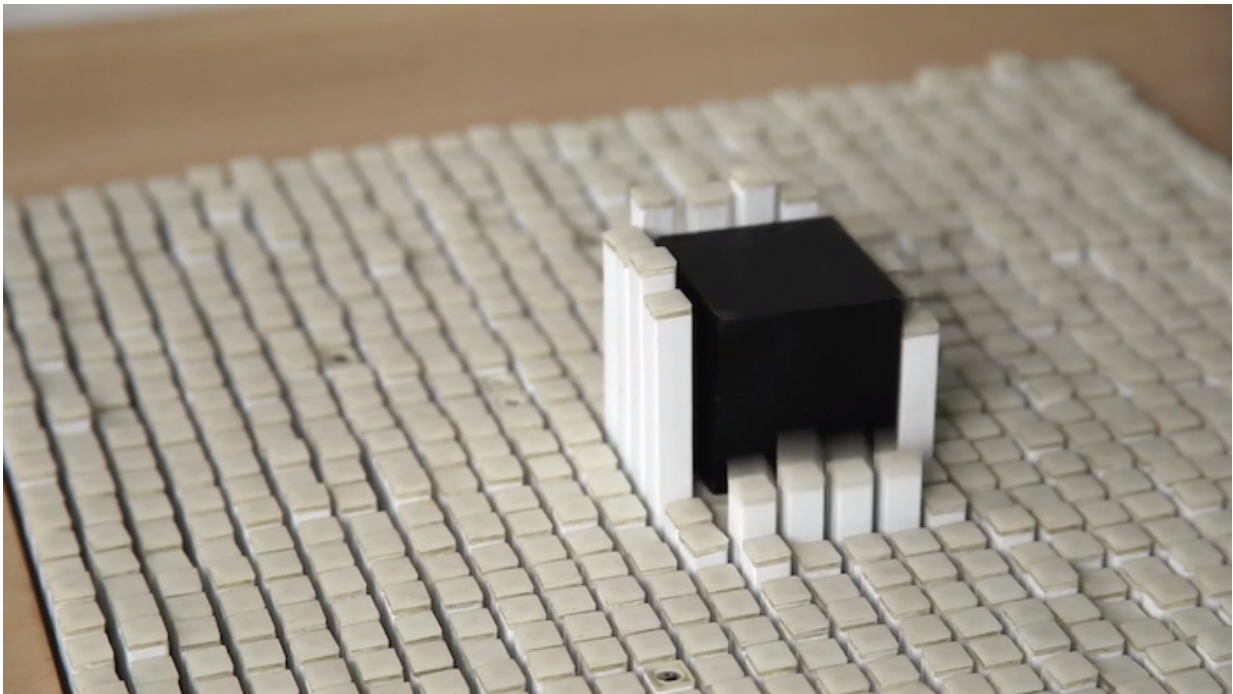


Kinematic blocks are actuated, sensed through pins

October 17 2015, by Nancy Owano



The Tangible Media Group at the MIT Media Lab now brings you Kinetic Blocks in their explorations with pin-based shaped displays.

The team has been taking on the challenge of giving a physical form to digital information; they have been devising ways of moving and manipulating objects that are placed on the pins.

The blocks can be rotated around their x and y axis. What is more, by doing x-y-x rotation they can rotate around the z axis and the blocks can be stacked by lifting and tumbling.

A video shows the recent result of their efforts, special kinematic blocks, which are actuated and sensed through the pins. The blocks can translate vertical pin movements into other degrees of freedom such as rotation or horizontal movement.

The group, Philipp Schoessler, Daniel Windham, Daniel Leithinger, Sean Follmer and Hiroshi Ishii, also presented a paper on the topic, and a video.

"In this paper we focus on such object manipulation: we present ideas and techniques that use the underlying shape change to give kinetic ability to otherwise inanimate [objects](#)."

Shape Display lets them move and manipulate objects. The authors noted its ability to assemble, disassemble, and reassemble structures from simple building blocks. Through coordinated movements of pins, the display can roll blocks around, flip them and stack them.

They explore how they can use the [building blocks](#) for actuated assembly. In the video, adding to the fun of watching the blocks in action, we get to see how the use of magnetic blocks can be used to assemble more complex and permanent structures. The video also shows the kinematic blocks. (The four kinematic blocks were designed in Rhinoceros and printed on the Stratasys Dimension 1200es FDM 3D printer.)

Lee Mathews in *Geek.com* summed up what is going on now with this innovative group: "The Shape Display is a dense grid of plastic pixels that sit atop actuators. Those actuators can fire in response to movements

that are picked up by a Kinect [sensor](#), translating the operator's movements into a sort of topographical animation. It's been two years since the Shape Display first learned how to track and replay movements. Now, it's learning to build things."

The researchers have succeeded in creating an interplay of the Shape Display with objects on its surface. The interplay provides richer input and output, said the comments in the video. This is, fundamentally, as their paper title suggests, "actuated constructive assembly" for interaction and display. In their paper, the authors said their research "shows promising novel approaches for further exploration by robotics and programmable matter researchers."

"MIT's tangible media group just keeps making the Shape Display cooler and cooler," said Mathews, "and we can't wait to see what they come up with [next](#)."

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