Furniture that Learns to Move Itself

Figure 1: Attachable modules with an eccentric rotating mass vibration motor.

Figure 2: Steering an object with multiple modules.

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Abstract

Displacements of large objects induced by vibration are a common occurrence, but the motion is generally unpredictable. Think for instance of an unbalanced front-loading washing machine. For controlled movement, wheels or legs are usually preferred.

In this work, we explore a strategy for moving everyday objects by introducing or harvesting random external vibration rather than using a mechanical system with wheels. We designed vibration modules that can be easily attached to furniture and objects. After learning how several random bursts of vibration affect its pose, an optimization algorithm discovers the optimal sequence of vibration patterns required to (slowly but surely) move the object to a specified position.

This principle may be useful for displacing large or small objects in situations where attaching wheels or complete lifting is impossible – assuming the speed of the process is not a concern. Embedding vibration modules as part of mass-produced objects may provide a low-cost way to make almost anything mobile.