INTRODUCTION
The tranquility of space plays a significant role in our daily life. We are exploring new methods to create “calm spaces”—to enhance a space’s sense of tranquility—via interactive art installations that adapt and react to a space’s environmental conditions and/or the occupants within it. For this project in particular, we were inspired by Zen gardens, also known as Japanese rock gardens or Ryoanji gardens, which consist of rocks placed on raked gravel to create peaceful feelings for meditation. As exploratory work, we wondered: could we create a Zen garden that monitors its surrounding space and automatically responds to the people within that space?

SYSTEM DESIGN
AtmoSPHERE is built with:

- Kinect for Windows
- Arduino Uno with Motor Shield
- K’nex toys
- 2x 12V 200 Stepper Motors
- 2x 3D Printed Gears and Tracks
- 2x Super Magnets
- 2x DC Stepper Motor
- Composite foam, 1/4" Oak Rods
- Sand, glue, tape.

The physical visualization stands above all K’nex and foam structures. The top magnet is driven by two stepper motors, leaving the aesthetic trail on the sand as a form of physical visualization. Then we use a Kinect for Windows to detect the occupancy and tranquility level of the surrounding space.

VISUALIZATION MODES
We provide Tracking Mode and Spiral Mode to visualize occupants’ movement or number of occupants together with surrounding noise level.

(A) Tracking Mode
(B) Spiral Mode

(A) In Tracking Mode, the Kinect tracks a principle occupant’s movement and directly visualizes the path with the magnet marble on the sand, mimicking a random rock “walking” inside the “garden” with the help of the XY table, providing a peaceful aesthetic imprint of the co-habitants movement in the space.

(B) In Spiral Mode, the Kinect detects all occupants within the space as well as the noise level and then sends data to an Arduino in order to drive the motors. The magnetic marble renders a circle with a radius proportional to the number of occupants in the room. The speed of the marble corresponds to the amplitude of sound.

FUTURE WORK
We have posted a step-by-step tutorial on Instructables.com and hope that the project will serve as inspiration to other artists and designers. We also intend to conduct a long-term case study to see how users would like to interact with the visualization and the impact it can have on their daily life.

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