Interactive Form-Making Installation

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PURPOSE

This project is an interactive art installation that explores the possibilities of real-time adaptation in design, materiality, and form. Using contemporary digital technologies, this design blurs the boundaries between designer and user. Employing a flexible mesh and a tessellated fabrication method, ROBOBBLE allows audiences to modify the installation's overall geometry, using basic methods of digital modeling such as push, pull, and soft-transformations. Audience members who interact with ROBOBBLE are able to create customized sculpted forms through the use of a simple Smartphone application, and to see the real-time results in physical space. The sculpture constantly changes based on different audience members' taste and input.

CONTEXT

New technological and social developments are rapidly leading toward the advancement of interactive architectural structures, which promise to open new horizons in our understanding of the built environment (Fox & Kemp, 2009). The design incorporates and expands upon earlier work in which designers and researchers attempted to fabricate smart surfaces to satisfy specific movement-based behavior scenarios. In this case, however, this project is not limited to a two-dimensional surface or to specific design scenarios; it is a three-dimensional object that can be continually transformed through interactive design.

METHOD

The basic material-technical system of the project consists of spandex fabrics covering a dandelion-like core that is made out of linear actuators. The core is a CNC milled plywood icosahedron, where each face contains an actuator that moves perpendicularly to the face. Inside of the core, the Arduino kits and servos that control the actuators are capable of receiving instructions from a design-oriented cell phone application. The end-arms of the actuators (made out of Styrofoam) create soft connections with the surrounding spandex fabric shell. The shell itself has the capacity to expand up to 2.5 times its resting size, which allows the overall geometry of the sculpture to take on a variety of forms and scales.

OUTCOME

The aesthetic and playful side of the project belies its serious purpose in demonstrating new ways of bridging the digital and physical worlds. The use of real-time, linked digital and physical meshes expands the boundaries of the form-making medium, and has the potential to be a transformative tool in the hands of designers and artists. The use of this technology can help to merge formal studies in digital space with hands-on conceptualization in the physical world, thereby heightening the qualities and possibilities of both approaches. The design, fabrication, and installation of the project involved a forward-looking collaboration of researchers from the interior design, architecture, and robotic-engineering fields, incorporating diverse technologies into a seamless product. Bringing these different sets of technologies together in design and fabrication reflects the future of interior space, which will increasingly integrate active human behavior with interactive form designs.

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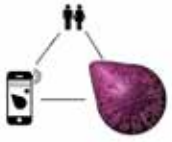
INTERACTIVE FORM-MAKING INSTALLATION

Purpose
ROBOBBLE is an interactive art installation that explores the possibilities of real-time adaptation in design, materiality, and form. Using contemporary digital technologies, ROBOBBLE blurs the boundaries between designer and user. Employing a flexible mesh and a tessellated fabrication method, ROBOBBLE allows audiences to modify the installation's overall geometry, using basic methods of digital modeling such as push, pull, and soft-transformations. Audience members who interact with ROBOBBLE are able to create customized sculpted forms through the use of a simple Smartphone application, and to see the real-time results in physical space. The sculpture constantly changes based on different audience members' taste and input.



Context
New technological and social developments are rapidly leading toward the advancement of interactive architectural structures, which promise to open new horizons in our understanding of the built environment (Fox & Kemp, 2009). The design of ROBOBBLE incorporates and expands upon earlier work in which designers and researchers attempted to fabricate smart surfaces to satisfy specific movement-based behavior scenarios (Probst et al., 2011; Farahi, 2012; Raffle, 2013). In this case, however, ROBOBBLE is not limited to a two-dimensional surface or to specific design scenarios; it is a three-dimensional object that can be continually transformed through interactive design.

Method
The basic material-technical system of ROBOBBLE consists of spandex fabrics covering a dandelion-like core that is made out of linear actuators. The core is a CNC milled plywood icosahedron, where each face contains an actuator that moves perpendicularly to the face. Inside of the core, the Arduino kits and servos that control the actuators are capable of receiving instructions from a design-oriented cell phone application. The end-arms of the actuators (made out of Styrofoam) create soft connections with the surrounding spandex fabric shell. The shell itself has the capacity to expand up to 2.5 times its resting size, which allows the overall geometry of the sculpture to take on a variety of forms and scales.

Outcome
The aesthetic and playful side of ROBOBBLE belies its serious purpose in demonstrating new ways of bridging the digital and physical worlds. The use of real-time, linked digital and physical meshes expands the boundaries of the form-making medium, and has the potential to be a transformative tool in the hands of designers and artists. The use of this technology can help to merge formal studies in digital space with hands-on conceptualization in the physical world, thereby heightening the qualities and possibilities of both approaches. The design, fabrication, and installation of ROBOBBLE involved a forward-looking collaboration of researchers from the interior design, architecture, and robotic-engineering fields, incorporating diverse technologies into a seamless product. Bringing these different sets of technologies together in design and fabrication reflects the future of interior space, which will increasingly integrate active human behavior with interactive form designs.

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