

Semantic approaches to 3D shape editing for nontechnical users

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Associate Professor of Mechanical Engineering Levent Burak Kara and his Ph.D. student Ersin Yumer at Carnegie Mellon University have developed a new method for exploring shape design and product customization.

This method incorporates a set of measurable, descriptive characteristics known as semantic attributes that allow a user to take an existing design and edit its [shape](#) and style without needing to be an expert at [design software](#).

"Conventional shape design and editing technologies such as AutoCAD, Maya, and SketchUp are difficult to master," says Kara. "Our approach allows any user to 'tune up' or 'tune down' certain characteristics with a click and drag of a sliding tool."

For example, a user could alter the design of a shoe to be 'more fashionable,' a car to be 'more sporty,' or a chair to be 'more ergonomic' without the need for detailed geometric manipulations.

"Our approach is particularly useful in scenarios where the user's desires can be expressed using a set of attributes relevant to the target product, but there is no immediate means for transforming such intentions into geometric operations," Kara says.

Kara's collaborative team also includes Carnegie Mellon Professor of Computer Science and Robotics Jessica Hodgins and Sid Chaudhuri of

Cornell University. The team's paper, titled Semantic Shape Editing Using Deformation Handles, will be presented at the SIGGRAPH 2015 conference this August. (SIGGRAPH, a special interest group of the Association for Computing Machinery, fosters innovation in computer graphics and interactive techniques.)

Kara runs the Visual Design and Engineering Lab at Carnegie Mellon University's College of Engineering. His research develops new computational techniques and software to support [product design](#) and user interaction with [design](#) tools. While founded in [mechanical engineering](#), his research draws upon several related disciplines including computer graphics, machine learning and human-computer interaction.

Provided by Carnegie Mellon University Mechanical Engineering

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