

Disney Researchers develop method to capture stylized hair for 3D-printed figurines

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Perhaps no aspect of 3D printing has captured the popular imagination more than personalized figurines with the facial features of real people. Now, researchers at Disney Research Zurich and the University of Zaragoza have developed a method that can incorporate an individual's hairstyle as well.

The researchers will present their new method at ACM SIGGRAPH 2014, the International Conference on Computer Graphics and Interactive Techniques in Vancouver, Aug. 10-14.

Miniature statues with a person's likeness are nowadays produced by scanning the individual's face with a depth camera or other sensor to create a 3D model. These [facial features](#) can then be applied to a figure that is produced on a 3D printer. But hair is beyond the capabilities of most systems, so hairstyles either must be roughly approximated or replaced with a pre-existing template.

The result can leave much to be desired, said Dr. Derek Bradley, associate research scientist at Disney Research Zurich.

"Almost as much as the face, a person's hairstyle is a defining characteristic of an individual," he explained. "The resulting figurine loses a degree of realism when the individual's hairstyle isn't adequately captured."

The goal is not to reproduce a hairstyle fiber by fiber, as this level of

complexity cannot be miniaturized using current 3D printers. Rather, the researchers were inspired by artistic sculptures, such as Michelangelo's David, which reproduce the essence of a hairstyle, but in the solid form of a helmet. In the case of 3D-printed figurines, the researchers sought to retain the appearance of directional wisps and the overall flow of hair, as well as its color.

Beginning with several color images captured of the subject's head, the system first computes a coarse geometry for the surface of the hair. Color information from the images is then added, matching the colors to the rough geometry to the extent possible. In the next step, color stylization, the level of detail is reduced enough to enable the representation to be miniaturized and reproduced, while preserving the hairstyle's defining features. Finally, geometric details are added in a way that is consistent with the color stylization.

The researchers demonstrated the system by capturing the varying hairstyles of several people, including two people who each were scanned with four different hairstyles. In each reproduction, the hairstyles are identifiable and recognizably the same as when the subject's image was captured. The method even enabled facial hair and fur to be reproduced.

More information: More information, including a video, is available on the project web site at www.disneyresearch.com/project...ylized-hair-capture/

Provided by Disney Research

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