

Researchers invent system for 3-D reconstruction of sparse facial hair and skin

Eurekaalert!

ZURICH – Researchers at Disney Research, Zürich, ETH Zürich, and Cornell University have invented a system to digitize facial hair and skin. Capturing facial skin and geometry is a fundamental technology for a variety of computer-based special effects for movies. Conventional face capturing is well established and widely utilized in the entertainment industry to capture a three-dimensional model of an actor's face. However, up to now, no method was capable of reconstructing facial hair or even handling it appropriately. This omission is surprising as facial hair is an important component of our popular culture.

The system developed by the Disney Research Laboratory in Zürich constitutes a significant technical breakthrough in the field of digitizing human faces and was presented at ACM SIGGRAPH, the International Conference on Computer Graphics and Interactive Techniques. "Our method captures individual strands of facial hair and stores them separately from the actual human face. This approach allows us to 'shave' people with facial hair virtually with the computer." said Thabo Beeler, a computer scientist at Disney Research, Zürich, who is the main inventor of the technology.

The system employs several consumer-grade photo cameras to capture a face in a fraction of a second. The method then automatically detects hairs in the captured images. These hairs are being tracked and followed in the input images, much like we follow a path on a map with our fingers. A mathematical method called multi-view stereo (MVS) reconstructs them in three dimensions. The trick the researchers applied is to remove the hair strands from the input images similar to an artist painting over parts of a picture. This process makes the 3D skin surface to look as if it were digitally shaved. The system was applied to a large variety of different facial hair styles, ranging from designer stubbles all the way to wild mustaches, to demonstrate its robustness. The produced results look very compelling.

Prof. Markus Gross, director of Disney Research, Zürich, stated, "The long-term goal of our research is to make facial animation and special effects more realistic and ultimately indistinguishable from reality. This method is going to be a very important step toward this long term goal".

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In addition to Prof. Gross and Thabo Beeler, the participants on the project were Bernd Bickel (Disney Research, Zürich), Gioacchino Noris (Disney Research, Zürich and ETH Zürich), Paul Beardsley (DRZ), Steve Marschner (Cornell University) and Robert W. Sumner (Disney Research, Zürich).

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For more information, please visit the web site at

http://www.disneyresearch.com/research/projects/cv_reconFacialHair_drz.htm.

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