Researchers create digital objects from incomplete 3-D data

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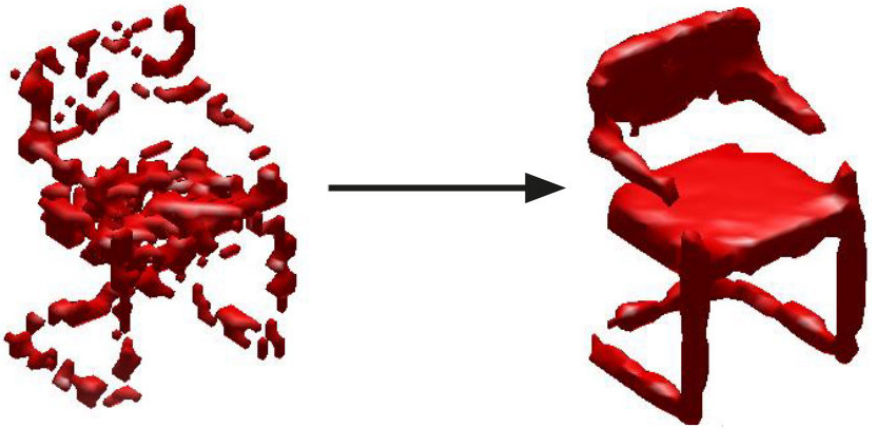

From such faulty data, Saarbrücken computer scientists can reconstruct the original objects. Credit: MPI

Using special cameras, it is now possible to capture real objects digitally. Nonetheless, they run into trouble if for example some parts are hidden by others. Computer scientists from the Max Planck Institute for Informatics, together with colleagues from the US semiconductor

manufacturer Intel and the Intel Visual Computing Institute at Saarland University, have developed a method that can reconstruct a digital object even from incomplete images.

"Although the 3D scanning technology has made significant progress in recent years, it is still a challenge to capture the geometry and shape of a real object digitally and automatically," explains Mario Fritz, who leads the group "Scalable Learning and Perception" at the Max Planck Institute for Informatics. According to Fritz, depth sensors, such as those of the Microsoft Kinect, are very powerful, but unfortunately they do not work equally well on all materials, which leads to noisy data or even missing measurements. "The resulting flawed or even incomplete 3D geometries then pose a real problem for a range of applications, for example in virtual or augmented reality, working together with robots, or 3D printing," explains Mario Fritz.

Together with other researchers from the US semiconductor manufacturer Intel as well as the Intel Visual Computing Institute at Saarland University, he therefore developed a method that also works with incomplete datasets. It uses a special neural network. "Our method requires no supervision during the learning phase, which is novel for this type," explains Fritz. In this way, the researchers could, for example, reconstruct a flat monitor, whose digital representation after a 3D scan looked rather like a paneled wall, so that everyone could once again recognize a monitor in the digital object. The Saarbrücken computer scientists have thereby surpassed previous methods that improve faulty 3D scans and complete digital shapes. The method from Saarbrücken gives very good results for the classification of scanned objects as well. In the future, the scientists intend to further develop their method so that it will also work on deformable objects and larger scenes.

"In the future, it will have to be possible to capture real-world objects simply and quickly, and project them in a realistic way into the digital

world," explains Philipp Slusallek, professor of computer graphics at Saarland University and scientific director of the German Research Center for Artificial Intelligence (DFKI). At the DFKI he is also responsible for the European joint research project "Distributed 3D Object Design," or DISTRO for short, with which the European Union wants to bring its research disciplines of visual computing and 3D computer graphics to the forefront worldwide. For this purpose, a new generation of excellent scientists and technicians is to be trained. Five of the 15 advertised PhD positions were filled by researchers from the Saarland Informatics Campus at Saarland University.

More information: scalable.mpi-inf.mpg.de/vconv- … thout-object-labels/

Provided by Saarland University