NEWS RELEASE

For immediate release

Fuji Xerox and Keio University Jointly Formulate and Release Specs of 3D Printing Data Format, FAV, Which Retains Complex Information—the First in the World[*1]

Containing Object's 3D Data Including Colors, Materials and Connection Strength, FAV Enables Enhanced Representation

TOKYO, July 12, 2016 – Fuji Xerox Co., Ltd. and Hiroya Tanaka, professor of Keio Research Institute at Keio University Shonan-Fujisawa Campus (SFC) jointly announce that they co-researched FAV (FAbricatable Voxel)[*2]–a three-dimensional (3D) printing data format that can retain an object's multiple 3D information including internal structures, colors, materials and connection strength. Without any troublesome data processing, FAV enables fabrication of the object with complicated features. The specifications of FAV format have been released on websites today.[*3]

With the rapid development of 3D printers, some of the recent models enable users to produce objects with complicated internal structures in full colors or with multi materials. However, existing 3D printing data formats have limitations, such as not being able to retain sufficient information on colors and materials, therefore, the expanded capabilities of those 3D printers cannot be fully leveraged.

In order to address this issue, Fuji Xerox and Keio University have developed a data format called FAV, which represents 3D models using voxels[*4] that can seamlessly model complicated internal structures and attributes. Unlike conventional polygon-based data that describes the surface of the object only, voxel is a basic 3D element, and in the case of FAV, color and material information can be assigned to each voxel, resulting in a highly detailed 3D output.

Until now, to fabricate an object with different colors represented by CMYK or RGB, or with complicated structures using different materials (both hard and soft), each part of the object had to be designed separately using computer-aided design (CAD). The 3D-model CAD data or the scanned 3D data was then processed with software dedicated to a specific 3D printer to assign appropriate colors and materials. Further, users sometimes needed to recover data in case it was damaged in a process, resulting in a long and troublesome workflow.

Making full use of the 3D data processing software development expertise possessed by Hiroya Tanaka, representative of Social Fabrication Laboratory and professor of Faculty of Environment and Information Studies, Keio University, who is also a specialist of manufacturing using 3D data, together with image processing technology owned by Fuji Xerox, which can handle high quality and high definition images at high speed, FAV was formulated as the world's first data format that can represent a 3D object with embedded information on complex internal structures, including colors, materials and connection strength. FAV enables 3D print with color and material information in a consistent manner without troublesome data processing.

This research is also a product of Center of Innovation (COI) Program—the Center of Kansei-oriented Digital Fabrication at Keio University and led by the Ministry of Education, Culture, Sports, Science and Technology, Japan, and the program aims at realizing a society where many people benefit by the use of 3D printers. As for Fuji Xerox, it continues to work to make FAV the de-facto standard, and to realize a new manufacturing environment utilizing 3D printers together with its customers.

*1: As a data format which retains not only information on surface of 3D models but also that on all of internal structures, colors, materials and connection strength.

*2: New voxel-based data format jointly promoted by Fuji Xerox and Keio University.

*3: Available on both Keio University's COI–the Center of Kansei-oriented Digital Fabrication website and Fuji Xerox official website:
http://coi.sfc.keio.ac.jp/en
http://www.fujixerox.com/eng/company/technology/communication/3d/fav.html

*4: Voxel is a basic element of 3D data. Voxels are used to express three-dimensional objects in the same way as pixels are used to express two-dimensional images.

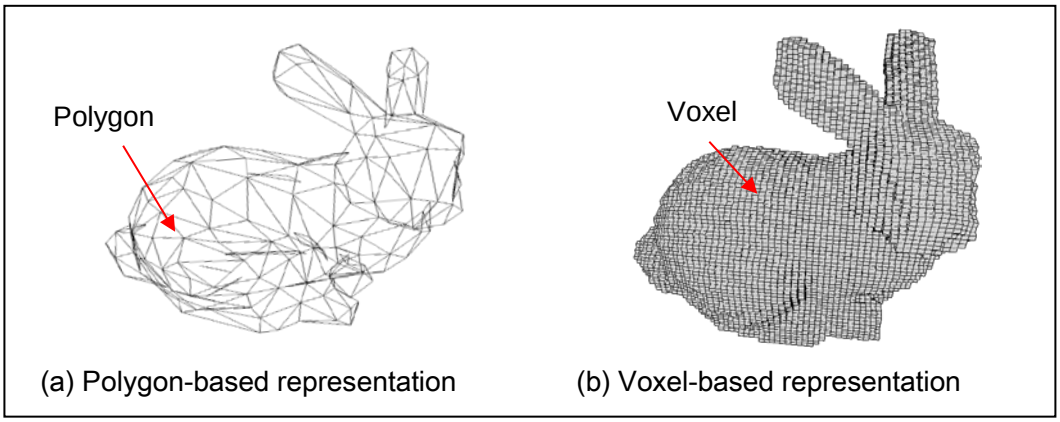


Figure 1: Polygon-based and Voxel-based 3D models

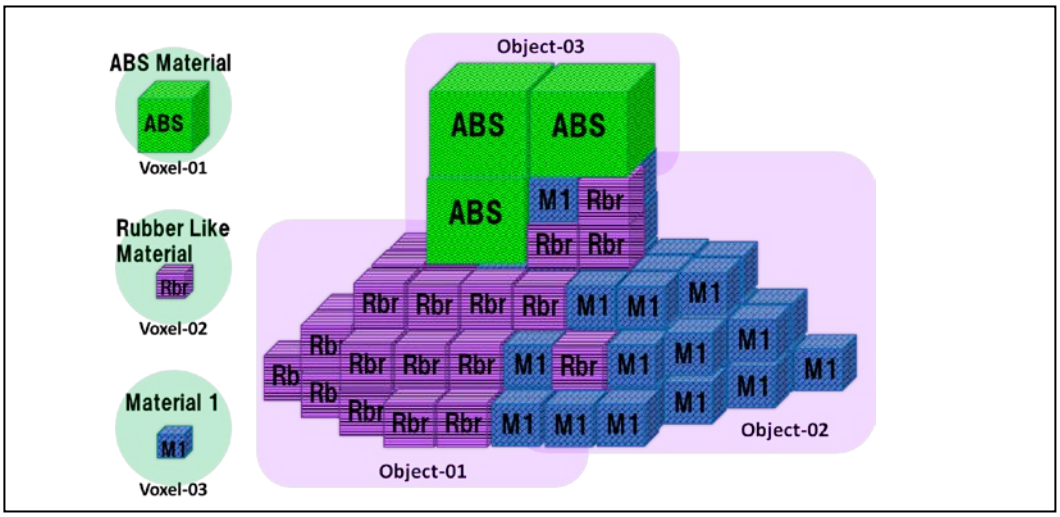
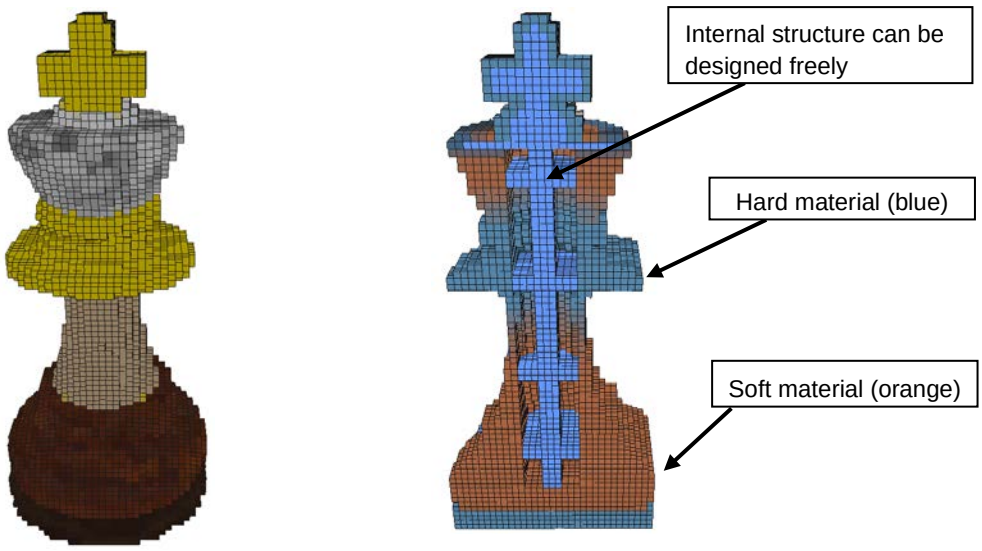


Figure 2: Conceptual Representation of Voxels Laid Out Three-Dimensionally



(a) Color information (b) Material information and internal structures

Figure 3: The FAV format is able to retain information on internal structure, color information, and material information.

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About Fuji Xerox

Fuji Xerox is a joint venture partnership owned by Fujifilm Holdings (75%) and Xerox Limited (25%) to produce and sell office equipment, including multi-function digital devices, publishing systems, document management software, and document-related solutions and services in the Asia-Pacific region, including Japan and China. Multi-function digital devices and printers produced by the company are sold across the world through Xerox Corporation and OEM partners. The company, established in 1962, now has a total staff of approx. 46,000, and works with more than 70 affiliated companies and sales companies globally.
http://www.fujixerox.com

About Keio Research Institute at SFC

The Keio Research Institute at Shonan-Fujisawa Campus (SFC) was established as a base for advanced research with the aim of making contributions to 21st-century society through advanced research, under the Keio University Graduate School of Media and Governance, Graduate School of Health Management, Faculty of Policy Management, Faculty of Environment and Information Studies, and Faculty of Nursing and Medical Care. The Institute promotes coordination of education and research at the SFC of Keio University and related activities conducted by businesses, government, and academia in Japan and throughout the world.
https://www.kri.sfc.keio.ac.jp/en/index.html

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