A System for Visualization of Large Irregular Volume Datasets on a Tiled Display Wall

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Abstract

In this talk, we present an overview of our national project in which we will develop a system to visualize a large scale irregular volume dataset on a tiled display wall(TDW). The accomplishment of this project will be expected to become a visualization foundation for our national peta-scale computing facility which will have developed in 2011.

To visualize a large scale irregular volume dataset, we developed a novel volume rendering technique which employs opaque and emissive particles to render a semi-transparent volume dataset without visibility sorting. Currently, we confirmed that the technique can generate an image which is equivalent to the volume ray-casting's and deal with large irregular volume datasets in which the maximum number of tetrahedral cells exceeded one billion.

TDW is composed of off-the-shelf graphics boards and LCD monitors in order to provide with a large display system for scientific and medical visualization applications and for public displays. TDW is thought to be an effective technique to tackle the conflict between the increasing demands for super-resolution display and the resolution limitations of a single LCD monitor.

Koji Koyamada received a B.S., M.S. and Ph.D degrees in electronic engineering from Kyoto University, Kyoto, Japan in 1983, 1985, and 1994, respectively. He is a professor at Kyoto University. From 1985 to 1998 he was a research member in IBM Japan. From 1998 to 2001 he was an associate professor at Iwate Prefectual University. From 2001 to 2003 he was an associate professor at Kyoto University. His research interest includes scientific visualization and design optimization. He is a member of IEEE Computer Society, Visualization Society Japan, Japan Society of Simulation Technology, and the Information Processing Society of Japan. He received the IEMT/IMC outstanding paper awards in 1998.