

## A proposal of new visualization style: Interactive analysis of multiple movie files with fixed view points

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A challenge in supercomputer simulations is the difficulty of visualization which is usually applied as a post process, after the simulation.

Data size, data complexity, and data transfer time are rocket up as the scale of a simulation grows.

To overcome the difficulties of the post-process visualization, we propose a new visualization style.

This is a kind of real time visualization in which visualizations are applied in the simulation time on the same computer, which means there is no need of the post process for the visualization.

However, a serious problem of the real time visualization method is that you cannot interactively change the viewpoint or visualization parameters of the output images or a movie.

To resolve this, we propose to place thousands (or millions in future) of view points, surrounding the target simulation region.

Each camera has multiple visualization parameters and therefore produces multiple visualization movies from the view point, in accordance with the advancement of the simulation time.

The output of simulations in this visualization style are thousands to millions of movies with the size of order of TB, rather than raw numerical data of the size of order of PB.

To analyze the output data, a special "movie player" is required that can play a movie, extracting proper sequence of images from the thousands of movie files.

The player should be able to interactively analyze the data by smoothly changing the virtual view point, to realize smooth rotation or zooming.

To demonstrate this new visualization style, we have developed prototype programs and applied them to a simulation data of seismic wave propagation by Prof. Furumura (U. Tokyo).

Focusing the simulation region, 130 cameras are placed on a surrounding spherical surface with the Yin-Yang grid point distribution.

We can smoothly, or interactively, see the wave propagation process from any position among 130 viewpoints by smoothly changing the viewpoint by typing a key on the keyboard.

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