

## **Visualization of Nuclear Plant Simulations**

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**Keywords:** *Nuclear plant simulation, hierarchical data visualization, time-varying data visualization*

### **SUMMARY**

We have been focusing on various computer visualization techniques for several years. Computer visualization techniques can be divided into two categories: 1) scientific visualization, which represents natural science and engineering information in physical spaces, and 2) information visualization, which represents general information including non-physical space data. This paper focuses on information visualization. Here, Shneiderman, reported that data structures for information visualization can be categorized into the following seven types: one-dimensional, two-dimensional, three-dimensional, multi-dimensional (= more than three) dimensional, hierarchy, graph, and time-varying data. We have been focusing on visualization of hierarchical and time-varying data for several years. We have applied our techniques to various information including disaster data and simulation results.

This paper introduces an application of our visualization techniques to nuclear plant data. We assume that nuclear plants record various physical measurement values (e.g. temperature, pressure, velocity, density) in each block of the plants per constant time interval. Our application treats the data as time-varying data as well as hierarchical data to effectively visualize them applying our techniques. This paper first introduces that our visualization technique effectively displayed a real accident of a nuclear plant. The plant recorded 512 measurement points, and just one temperature value was extremely high during all other values were normal, just several minutes before the accident. The paper shows that our visualization technique clearly represents such abnormal but elusive phenomena. The paper then introduces that our technique also effectively displayed various simulations of nuclear plants.

The paper additionally introduces other applications on visualization of disaster data and simulation results.

The present study includes the results of "Large-scale information visualization for management of atomic systems" entrusted to "Ochanomizu University" by the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT).