Framework for Seismic Wave Analysis using Visual Data-mining of Ultra Scale Data-set under Distributed Environment
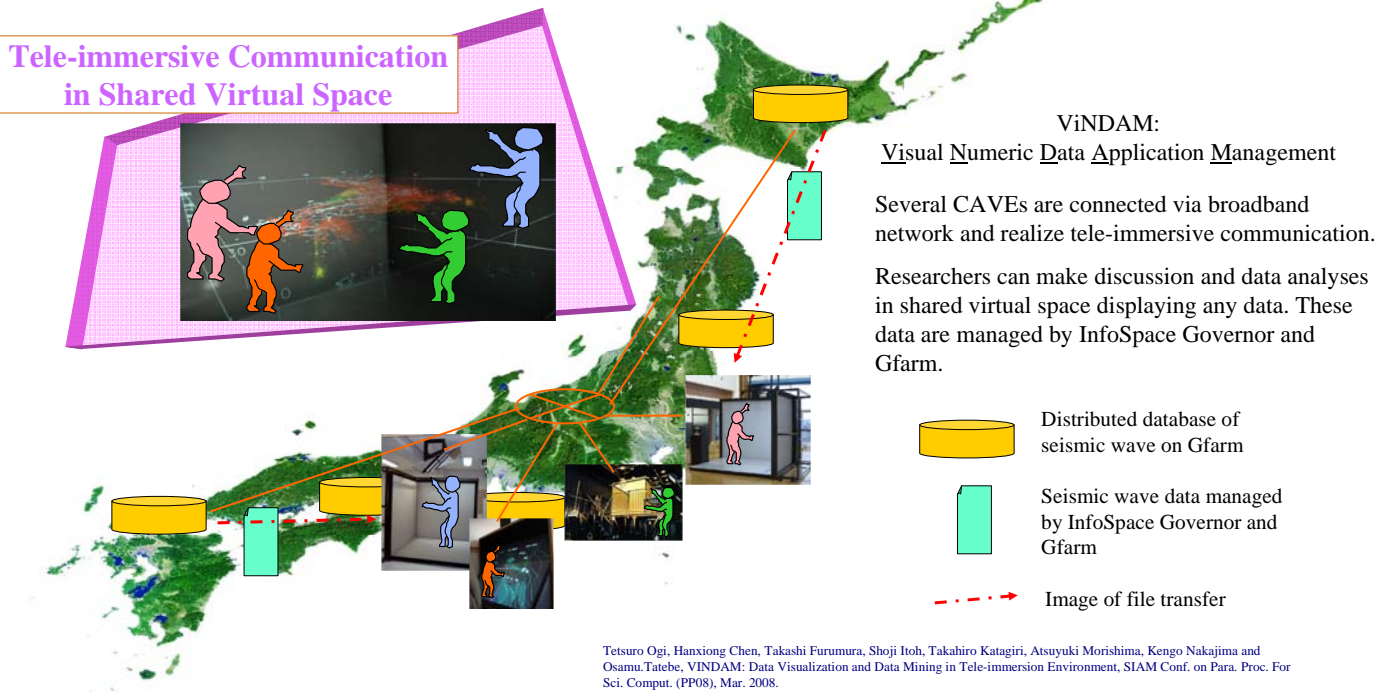
Shoji ITOH[1], Hanxiong CHEN[2], Takashi FURUMURA[3], Takahiro KATAGIRI[3], Atsuyuki MORISHIMA[2], Kengo NAKAJIMA[3], Tetsuro OGI[2] and Osamu TATEBE[2]

[1]RIKEN, JAPAN, [2]University of Tsukuba, JAPAN, [3]The University of Tokyo, JAPAN

Objective

Seismic wave analysis is going to face a new aspect. It does not only reproduce and analyze phenomena from observational data or the data of numerical simulations, but discover new information or knowledge which are latent in data. For this realization, ViNDAM (Visual Numeric Data Application Management) is indispensable new information infrastructure.

Visual data-mining is an emerging research topic in large-scale scientific computing. Size of data sets through simulations and observations is huge, and they may be stored in distributed manner. We focus on development of visual data mining system under distributed environments, and discuss on future directions of individual technology and interdisciplinary collaborations.

What can we realize with ViNDAM?   (Assumed Diagram)

Tele-immersive Communication in Shared Virtual Space

ViNDAM:
<u>Vi</u>sual <u>N</u>umeric <u>D</u>ata <u>A</u>pplication <u>M</u>anagement

Several CAVEs are connected via broadband network and realize tele-immersive communication.

Researchers can make discussion and data analyses in shared virtual space displaying any data. These data are managed by InfoSpace Governor and Gfarm.

Distributed database of seismic wave on Gfarm

Seismic wave data managed by InfoSpace Governor and Gfarm

Image of file transfer

Tetsuro Ogi, Hanxiong Chen, Takashi Furumura, Shoji Itoh, Takahiro Katagiri, Atsuyuki Morishima, Kengo Nakajima and Osamu.Tatebe, VINDAM: Data Visualization and Data Mining in Tele-immersion Environment, SIAM Conf. on Para. Proc. For Sci. Comput. (PP08), Mar. 2008.
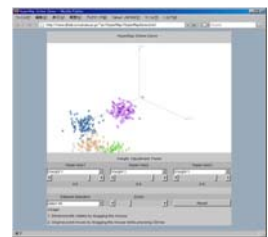
Current Topic

Researcher can be immersed in seismic wave data on one CAVE.

Hyper Map is a web application for 3D data-mining originally.

Hyper Map has been ported on CAVE !!

Automatic Tuning for Analysis of Seismic Wave

At present, core application planning to use ViNDAM is "Analysis of Seismic Wave and Its Knowledge Discovery by Large Scale Data-sets by Furumura".

Furumura, T. Hayakawa, M. Nakamura, K. Koketsu, and T. Baba, Development of long-period ground motions from the Nankai Trough, Japan, earthquakes: Observations and computer simulation of the 1944 Tonankai (Mw8.1) and the 2004 SE Off-Kii Peninsula (Mw7) Earthquakes, Pure Appl. Geophys., accepted, 2007.

ViNDAM

Input

Relations among mutual research areas

Output

Under the present status of affairs, these graphs (right) are obtained by hand-tuning !