A Polymorphic Data Visualization for Spatiotemporal Database

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Outline of Presentation

- An Introduction to Reki-Show Authoring Tools
- Conceptual design of polymorphic data visualization
- Examples of Reki-Show Authoring

What is Reki-Show?

Spatiotemporal Descriptive Information

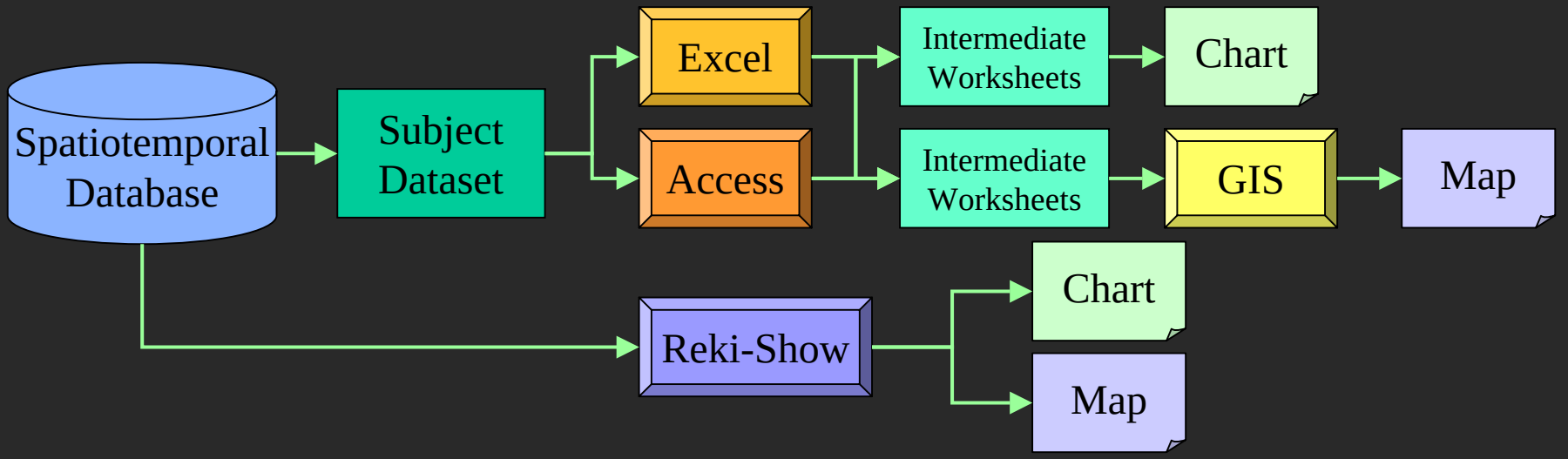
Temporal Attribute	"When"
Spatial Attribute	"Where"
Observation of event	"Who did what" "What became how"

Purpose of Our Project

To construct the basic information tool for recording various events, researching and analyzing social phenomena based on the conceptual model of Reki-Show.

Requirements for Reki-Show Authoring Tools

- Operability to handle spatiotemporal dataset
  - Spatiotemporal database is not easy to use for almost every researchers and students in the field of social science.
  - They don't have efficient way to handle spatiotemporal dataset by using popular software.(i.e. Microsoft Excel, Access, etc.) It **is not impossible**, but **is annoying**.
  - Improving operability to handle spatiotemporal dataset is required.

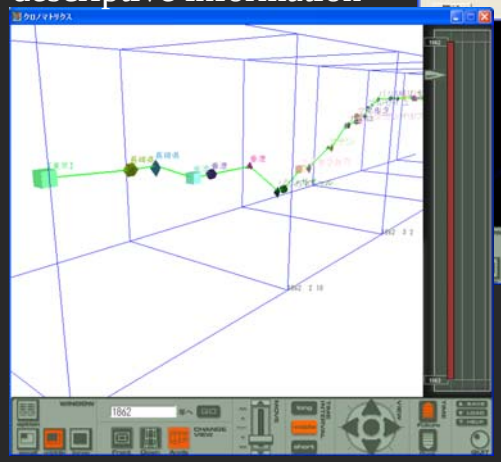


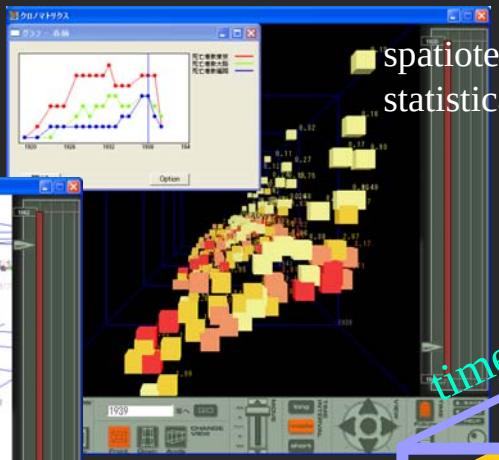
Requirements for Reki-Show Authoring Tools

- Capability to visualize spatiotemporal multidimensional information
  - Usually, social science data is represented as spatiotemporal multidimensional information. The number of dimension vary by the field of concern.
  - To visualize spatiotemporal information by using legacy software, we have to reduce spatial information or temporal information. Because, legacy software are not fitted for multidimensional data visualization.
  - A tools designed for visualization of spatiotemporal multidimensional information is required.

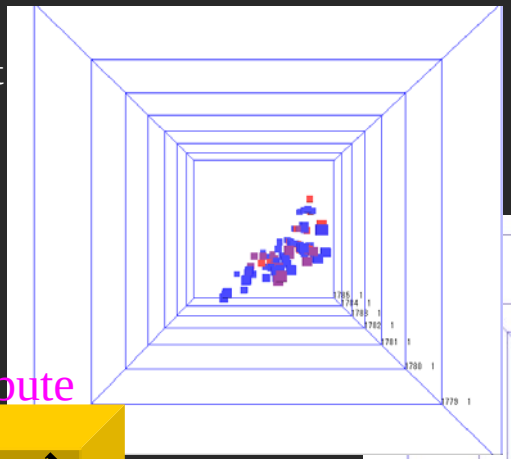
A Solution: Polymorphic Data Visualization

spatiotemporal
descriptive information

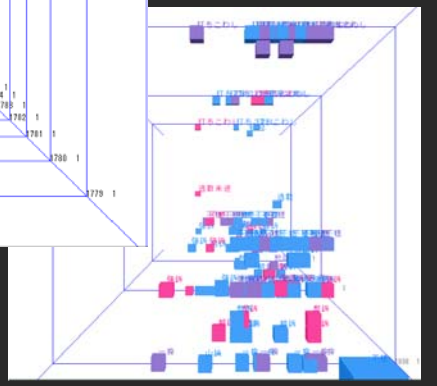




spatiotemporal
statistical dataset



spatiotemporal
categorized
multi-attribute
dataset



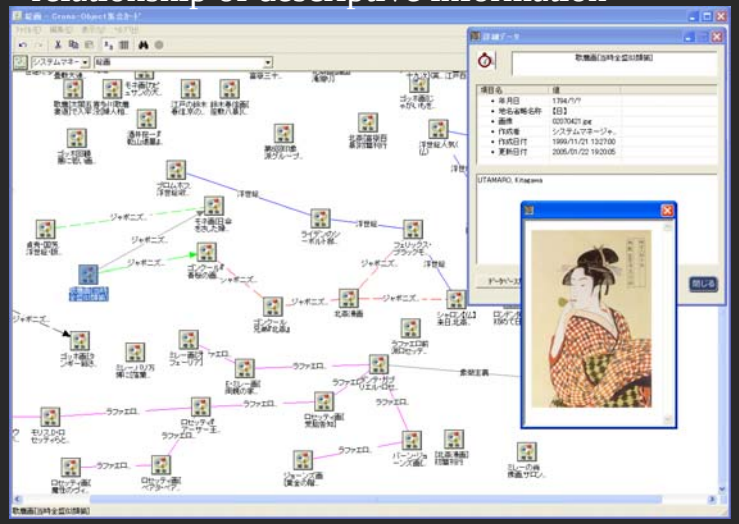
time

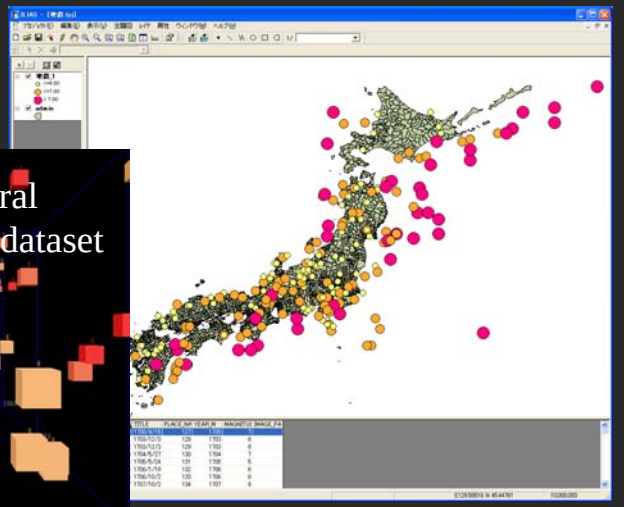
attribute

location

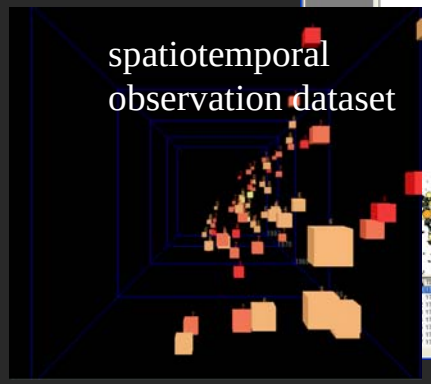
Multidimensional
Dataset

relationship of descriptive information



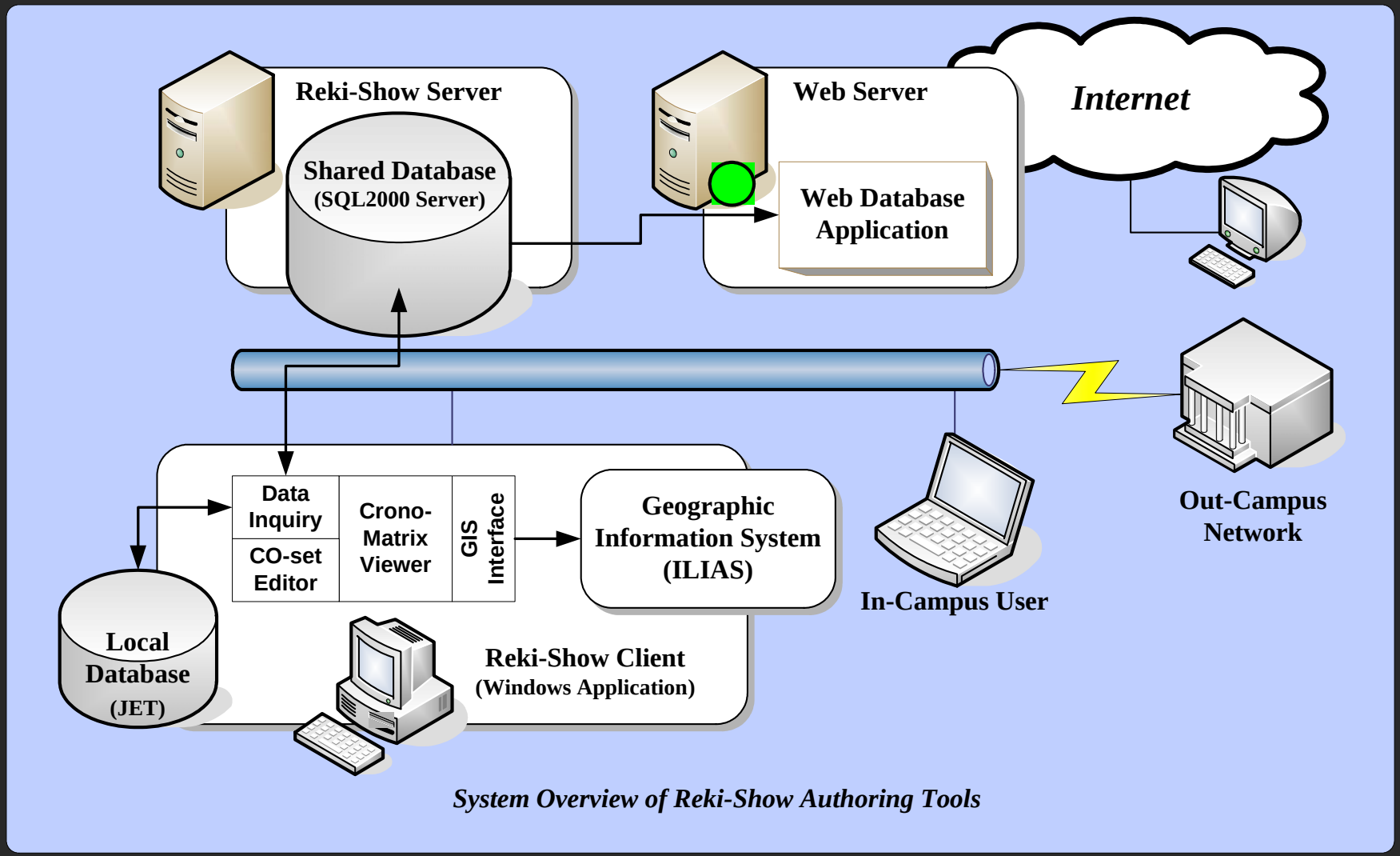


spatiotemporal
observation dataset



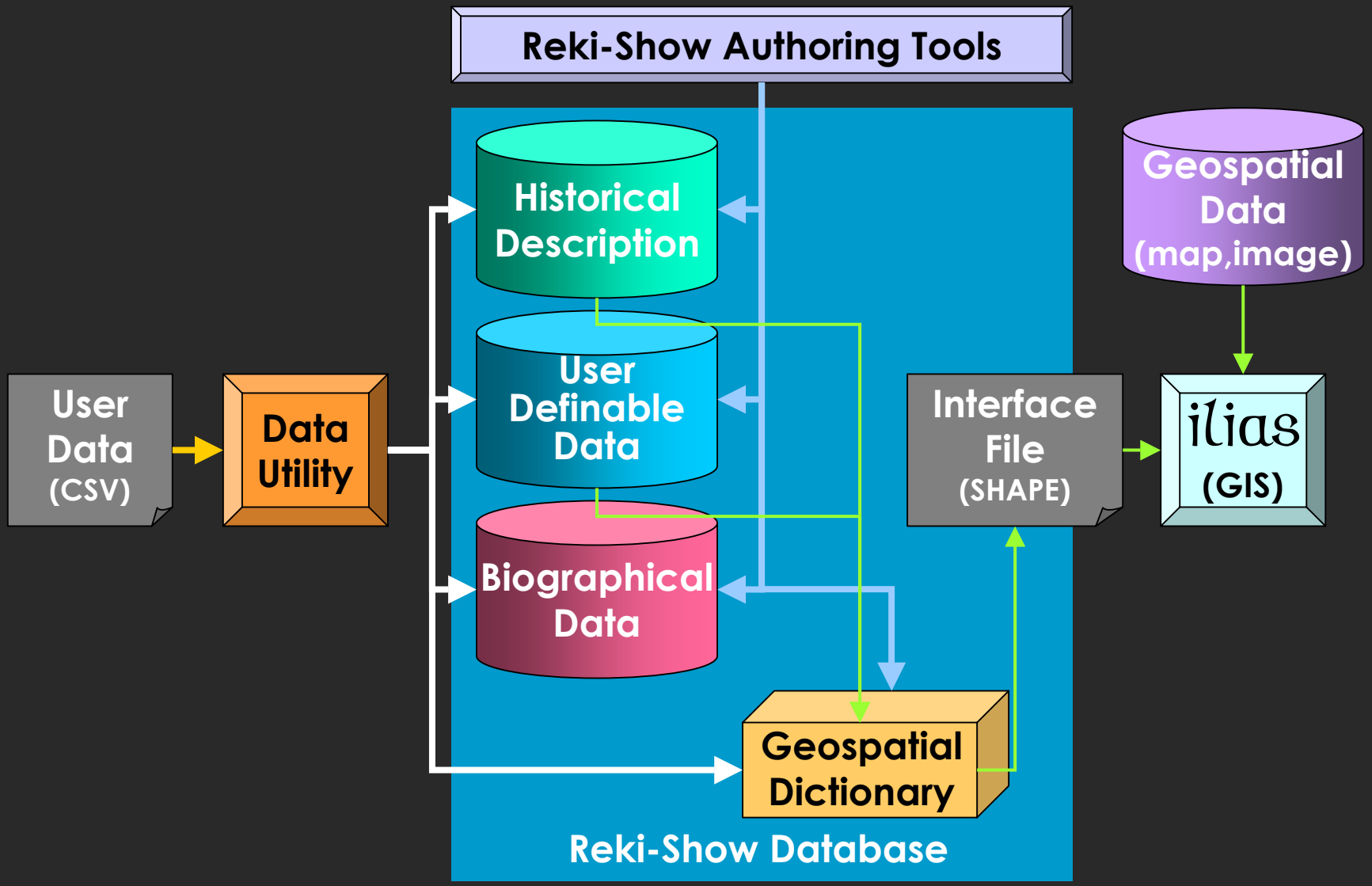
Reki-Show

System Overview



System Overview of Reki-Show Authoring Tools

Block Diagram of Reki-Show Database

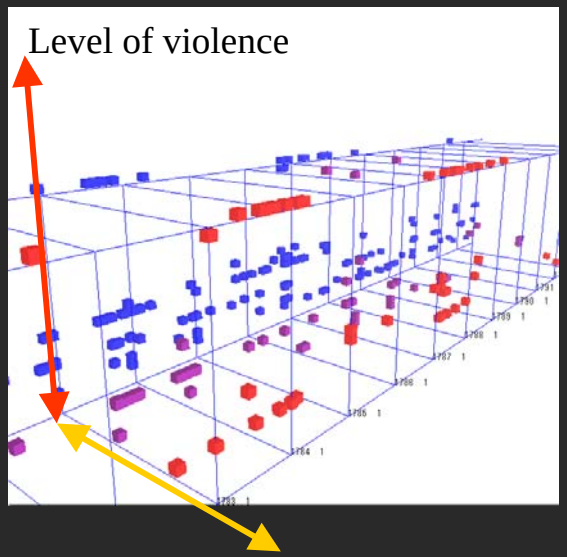


Applied Example -1

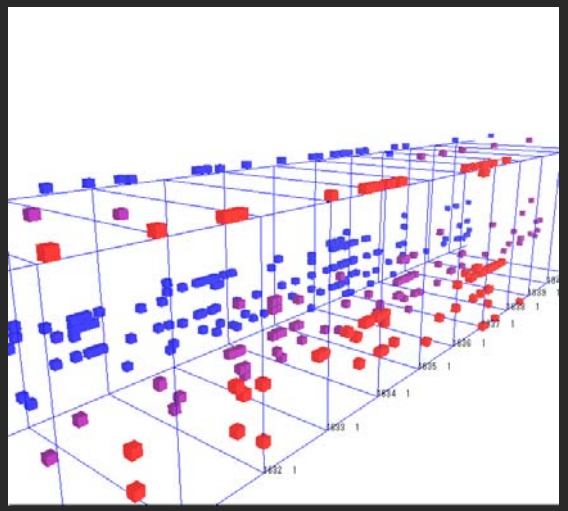
- Visualization of Peasant Riots in 18th~19th century of Japan
  - In the late of Edo-era(1840~1868), peasant riots occurred frequently in every part of Japan.
  - We categorized the cause of riot as follows:
    - Market originated(unfair pricing, corner, etc.)
    - Heavy tax
    - Other reason
  - Also classified the level of violence as follows:
    - Direct Appeal (non violent)
    - Direct Appeal (violent)
    - Escape
    - Riot
    - Uprising
  - Data source:
    - Koji Aoki (1971):*"The General Chronicle of Peasant Riot"*, San-ichi Press, Japan

Data Visualization by Crono-Matrix Viewer

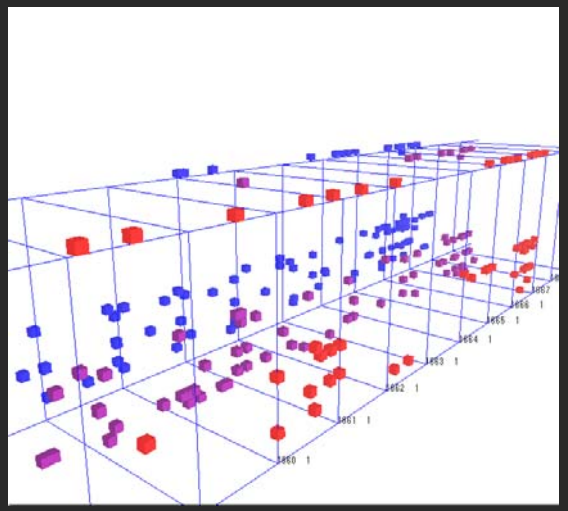
TEN-MEI Famine, 1782-84



TEN-PO Famine, 1832-38

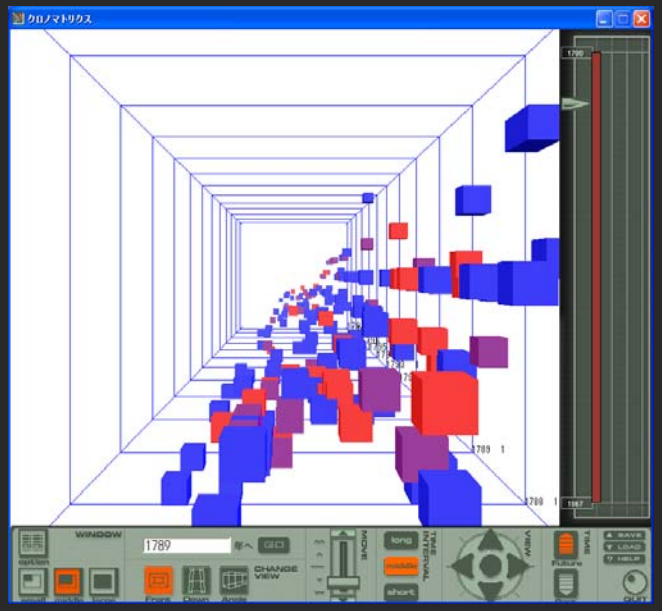


The end of EDO era, 1864-68



- Market originated
- Heavy tax
- Other reason

Spatial Distribution of Riots

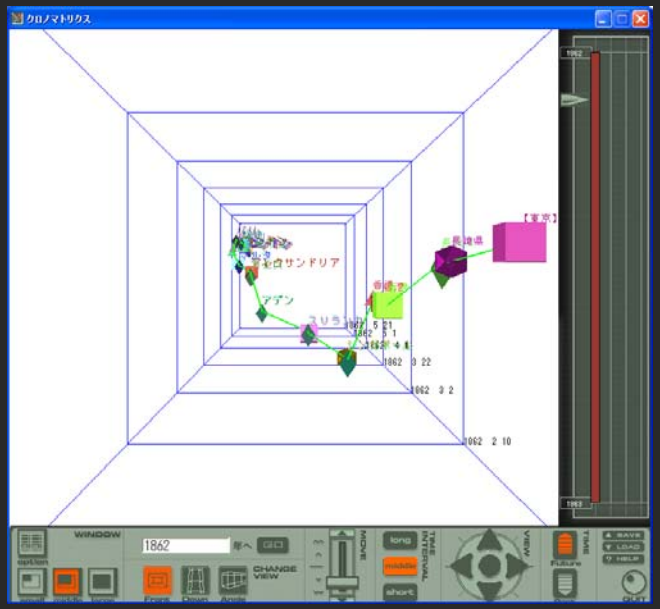


Reki-Show

Applied Example -2

- Visualization of Yukichi Fukuzawa's Logbook
  - Yukichi Fukuzawa(1935-1901) is one of famous enlightenment person in 19th century of Japan. He wrote a lot of books for young people and translated various western books. He also founded KEIO University.
  - Fukuzawa went a round trip to Europe in 1862 as a translator of embassy. He wrote a detailed logbook of the travel, "Seiko Nisshi".
  - This logbook is a good example of Reki-Show Dataset; spatiotemporal descriptive information.

Fukuzawa's Logbook in Crono-Matrix



Major Milestones of Project

- Beta release of Reki-Show Authoring Tools by April, 2006.
  - Software will be downloaded from our Web site.
- Web Database Inquiry System will be released by April, 2006.
- Multilingual user interface should be supported by the end of 2006.

Thank you

reference

- Tomobe, K (2002): *"Peasant Riots and Disasters in TOKUGAWA era"*, Research on Risk Communication and Management based on Reki-Show Authoring Tools, Working Paper Series No. 02-001
- Hirayama, Hanashima, Tomobe (2004): *"Reki-Show Authoring Tools - Risk, Space, History"*, PISTA2004, Proceedings Vol. 1, p.215-221

URL

http://www.fcronos.gsec.keio.ac.jp/home.html