Proposal of BBS with Visual Representation for Online Data Analysis

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Group Discussion for Data Analysis

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Customer info. → Data → Technical issue → Environment → Management
Online Discussion for Data Analysis

Group Discussion Enables;
- Data analysis from various viewpoints
- Collecting various opinions

Merit of Online Discussion
- From meeting room to virtual space
- Asynchronous meeting
- No limitation on number of participants

Online Discussion for Data Analysis is Promising
Various Tools for Online Meeting

- Video Teleconference
- Online Chat
- Instant Messages
- BBS (Bulletin Board System)
- etc…

- Asynchronous discussion
- Many participants familiar with BBS
- Simple for inexperienced participants
- Suitable for collecting comments
Improvements of BBS for Online Data Analysis

- BBS NOT designed for Data analysis
  - Text information
  - No capability of sharing data

Proposal: Introduction of visual representation for sharing target data
Visual Representation for Online Data Analysis with BBS

Information Visualization

Database (large-scale, complicated)

Find correspondence automatically

Easy-to-understand

Comment

reference

correspondence
System Architecture of BBS with Visual Representation

Find relationship between comment & visual objects & data record
KeyGraph-based BBS

- KeyGraph as Visual Representation
- Chance discovery
- Implementation
- CGI (Ruby)
- Client (Flash)
KeyGraph

Visualize Frequency & Relationship of items

**Visual Objects**

- **Black nodes**: Frequent items
- **Red nodes**: Items not occurred so frequently
- **Double-circled nodes**: Items co-occurred with black nodes frequently
- Links: Frequent co-occurrence of item pair
  - **Solid line** form an *island*.
  - **Dotted line** connect *islands*.

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**Island**
Items occurred and co-occurred frequently

⇒ Widely known context

**Bridge**
Weak connection of islands

⇒ Unknown relationship
User Interface
Display Correspondence between Comment & KeyGraph

Defined island & bridges
Show correspondence with same color

【このシナリオをクエリーとしてシナリオ検索】

【2】Bさん 2005/10/20 18:00
島：ライブドアやフジテレビの島
事件の表面的な部分を表す島である
島：株価の動きの島 [[1]から経営}
島：外資・規制の島 [[1]から経営}
島：経営者の保有の島 [[1]から経営}
ライブドアやフジテレビの島はこの事件の表面的な部分を表している。
一方、株価の動きの島や、そこから経営者の保有の島を介して外資・規制の島へのつながりはこの事件の隠された本质が表れているのではないか？

【このシナリオをクエリーとしてシナリオ検索】

【3】Nさん 2005/10/20 20:00
島：表面的な動きの島
User Interface
Support for Defining Reference Island/Bridge

Island/bridge inheritance is possible

Click nodes
Define & refer
Write scenario here
Post
Comment Retrieval based on Comment-Data Correspondence

- **Correspondence**
  - Data-set A & Comment A
  - Data-set B & Comment B

- **Similarity**
  - Comment A & B

KeyGraph

Database

(1) reference

Comment A

(3) Similarity

Comment B
Summary of Experiments

- **Used Data:** 214 headlines of Nikkei News
  M&A issue between livedoor Co., Ltd. & Fuji Television Network, Inc.
  (From 12 Jan. 2005 to 26 Jun. 2005)

- **Evaluation based on BBS Log and Questionnaires from 13 test subjects**
  - Number of using functions
    - Island/bridge definition: 2.8 times / user
    - Island/bridge inheritance: 0.8 times / user
  - **Comment Retrieval**
    - Data records corresponding to comments can be used for retrieving Comments
Island of the main topic contains keywords appearing in newspaper headline. The keywords play a roll to attract readers’ attention.

There are connections from Island of main topic representing center of topic to Island of livedoor president and to Island of Fuji TV president.
Example of Scenario Expansion with retrieved comments (2)

Revised comment

Bridge connecting Island of livedoor president & Island of Fuji TV president through Island of main topic might represent the confliction between 2 presidents behind main topics.

There are connections from Island of main topic representing center of topic to Island of livedoor president and to Island of Fuji TV president.

Retrieved Comment give new interpretation
Conclusion

Proposal of

- Concept of BBS with Visual Representation for Online Data Analysis
- Prototype BBS with KeyGraph for Online Chance Discovery

Future Work

- Evaluation by Business People
- Development of BBS with Visual Representation other than KeyGraph