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Knowledge Experience Model for Designing Data Exploration Tools in Museums

General Background

In data analysis, user behavior can involve purposeful validation, exploratory data investigation to understand the characteristics of the data, or these behaviors may switch randomly, making them difficult to predict. So, there is no established design methodology for data analysis tools that can accommodate all of these scenarios.

➞ Proposed an interaction and format to record any findings of user that occur on the data analysis tool and contribute to the continuous improvement of the data analysis system.

Method

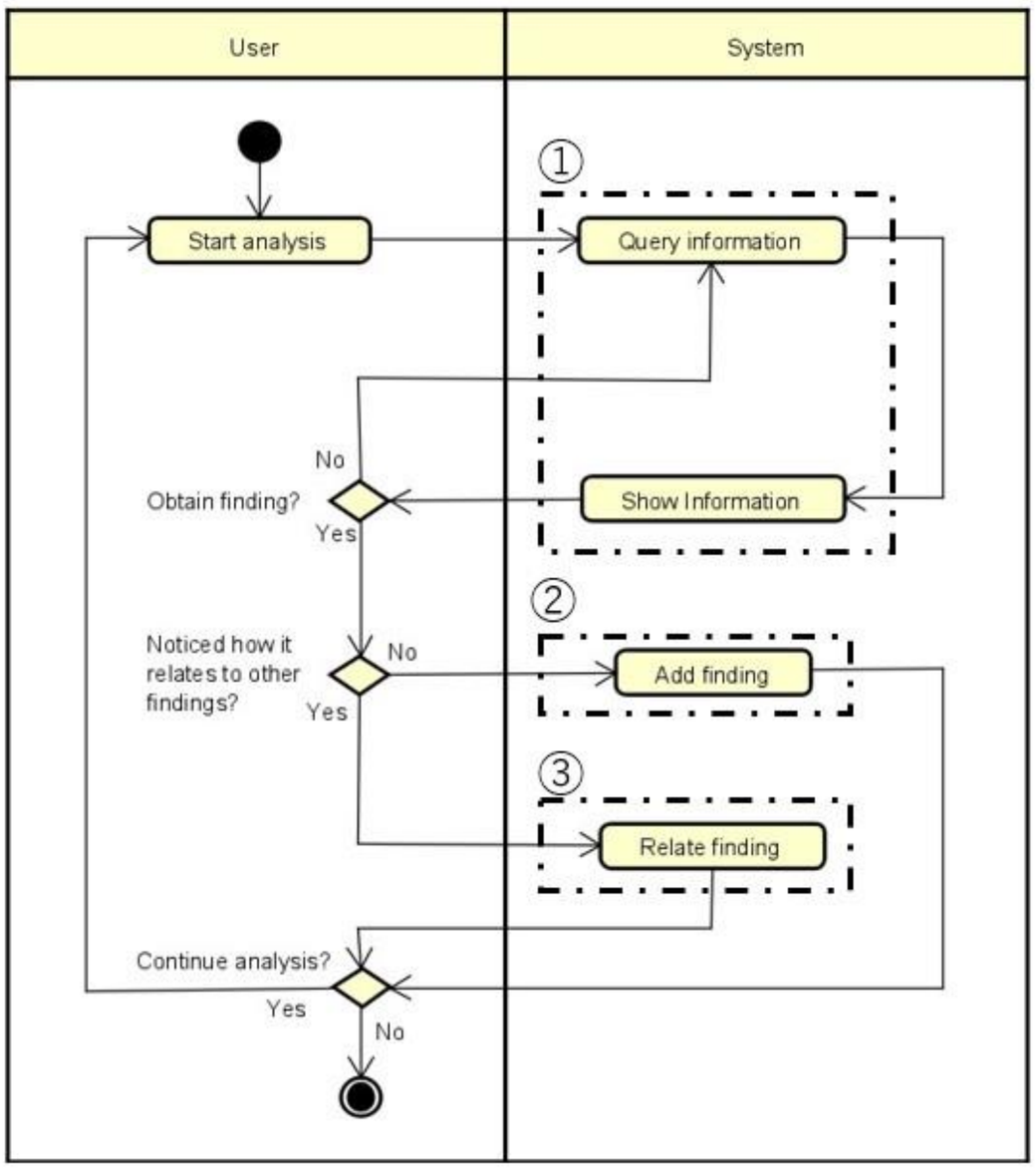

Figure1. Knowledge Experience Interaction

① User’s finding occurs when attempting to view information or when viewing information.

② Through interaction, the system represents both "resolved issues" and "unresolved issues.”

③ When organizing the relationships between findings, the expectation is to generate ideas for decision-making and improvements in analytical tools.

Finding	
ID	Finding identification number
Information	Information (e.g., graphs or findings) that led to a finding
What worked / What didn’t work	Describe what was understood or not understood by the information
Author	User name
Time	When the finding was discovered

Figure2. Format of Finding

The symbol representing the relationship between findings.

——————— Relationship of equality

———————→ Correlation relationship

Case-Study

Validate the case study using the Fukushima Prefectural Museum as the subject matter.
(To the right are the results of the curatorial analysis.
Also, these are only examples, not actual verification results.)

The following is assumed
User: Museum curators

Data: Data obtained from sensors installed in the museum's permanent exhibit.
(ex. Number of visitors, temperature, humidity, pressure, volume, and movement of visitors)

Information: Graphs processed from the data and findings created by other curators.
(ex. Number of visitors by day of the week and Visitor Interest Heat Map, Visitor flow map…)
(ex. The user's findings regarding the data and the user's limitations on manipulating the data...)

Finding
1
Heat map showing visitor interest
During the summer vacation, the area around the dinosaur exhibits was especially crowded.
Suzuki
2023-09-01 13;00

Finding
2
Finding 1
It is thought that this is because there are many visitors with children, but the system cannot determine the age range of visitors.
Suzuki
2023-09-01 13;07

Finding
3
Heat map showing visitor interest
Regardless of the season, visitors spend a lot of time where the captions are placed.
Sato
2023-09-01 14:15

Finding
4
Finding 3
We wanted to see the correlation between the age of visitors and a certain location. However, the age of visitors cannot be viewed in the system.
Sato
2023-09-01 14:21

Discussion and Conclusion

・We expect that the proposed interaction and format will reveal two things: effective visualization methods for users and analysis tool requirements.

・In the future, we would like to verify this in actual curatorial activities and evaluate the effectiveness of the interactions and formats qualitatively and quantitatively.