

A Study of Efficient Data Processing Method for Full Scale Equipment Log Data Usage in Various Analysis Activities

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1. Introduction

Recently, the amount of the data that was able to be collected from equipment increased rapidly. Moreover, the equipment data use work has been expanded and the data necessity has been diversified. So the efficiency of the work decreases, the cost and time has become more necessary. In this thesis, the efficiency improvement technique of the equipment data use work was examined.

2. Problems of Equipment Data Use

Conventionally, the data logger has been used for the equipment engineer to collect the equipment data and to understand the state of the equipment. In that case, after the equipment data is processed to suitable for own requirement of the equipment engineer, the equipment data is used (Figure 1).

Recent years, advanced work that uses the equipment data comes to be noted, for instance, Virtual Metrology (VM) and equipment Fault Prediction (FP). As more detailed and much amount of equipment data has become to collect, the cost and the time have increased to process the equipment data to the dataset suitable for each engineering work. As a result, processed dataset suitable for individual requirement has not been provided timely. This is the obstruction factor of effective enhancing of equipment data use work.

We studied about the method to improve the efficiency of the equipment data use. It increase the efficiency of the work flow (Figure2) from data in equipment to processing the dataset that the engineer demanded.

3. The Efficient Equipment Data Processing Method

Data processing step to the data set which is required by the end users (ex. process engineers) is analyzed, according to the following procedure. Then the equipment data processing method has been improved to the efficient method.

- 1) The work flow of the data processing is analyzed from the aspect of the demand of the end user.
- 2) A necessary function is dug up in generalizing the flow of the data processing.
- 3) Whether the diversity of the demand can be absorbed by grouping the function is verified.

4. Result of Data Processing Analysis

The equipment engineering works are various, and end user of equipment data exist in a lot of sections. The equipment view and the product view, etc. are typical classifications. Therefore, the requirement of data set is different depending on each work and analysis object.

In the modeling of data analysis work, the trial and error of the analysis is frequently repeated for the acquisition data. Because work of developing the interpretive procedure of data is contained these work. In this trial and error, there are work to cut out a necessary part and work to aggregate the data cut out in an average value and the maximum value, etc. from among a large amount of equipment data.

As a result, the data processing can be classified into the three following function.

- a) A necessary part of data is cut out (cutting out function).
- b) The set of the data cut out is consolidated in the value necessary for the analysis (aggregation function).
- c) To input the processed value to the use tool, the order of data is permuted (tabulation function).

These functions can be developed independently and can be used by combining. Therefore, it has been understood the diversification of the demand is to be able to absorb many by combining individual functions.

5. Conclusion

The work to offer the equipment data to user is constructed with the combination of "Cutting out function", "Aggregation function", and "Tabulation function". Moreover, it is possible to correspond to the diversification of the demand quickly by preparing the pattern of each function as parts.

6. Future Tasks

Information (WaferID and StepID, etc.) to identify the data cut out is necessary to enjoy the advantage in which data is processed by the above-mentioned flow. Moreover, it is necessary to share the definition of these information between equipment.

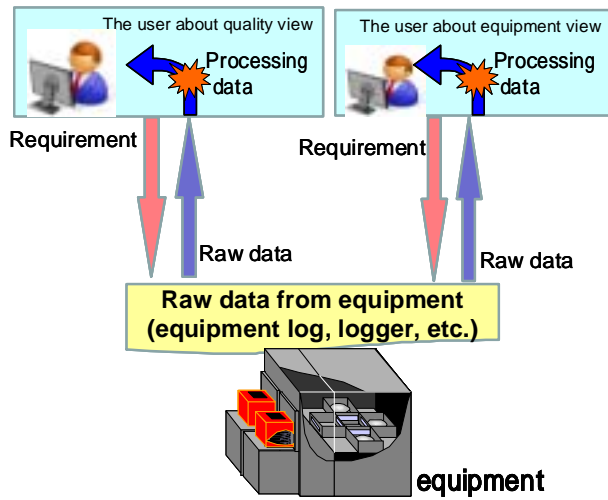


Figure1 Flow of equipment data processing of the past

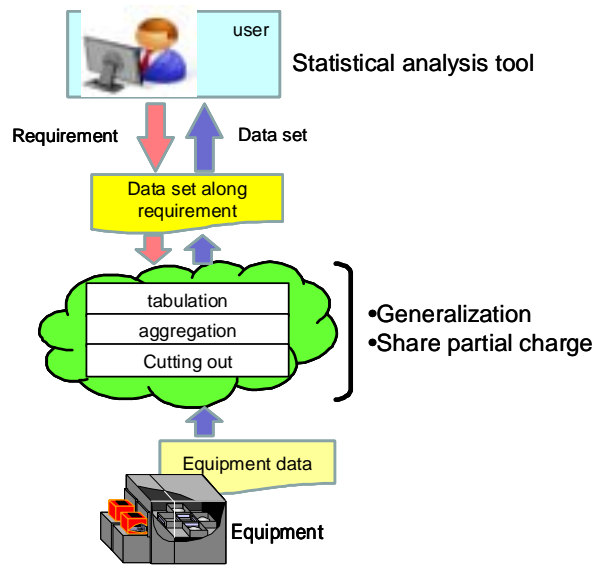


Figure2 Efficiency improvement of data processing procedure

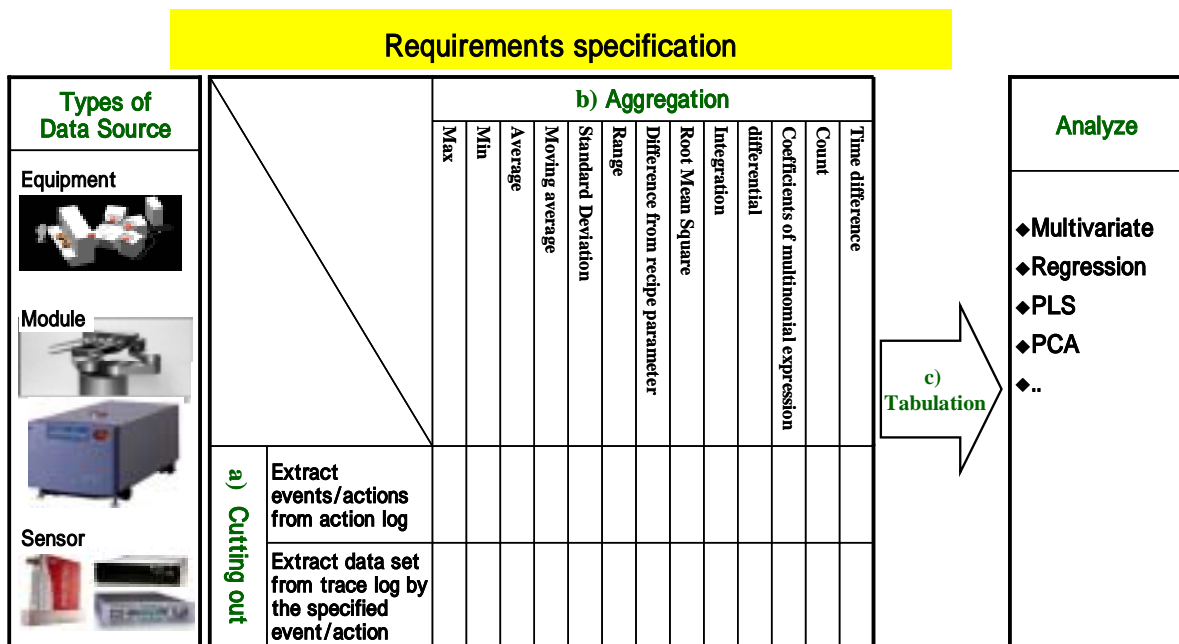


Figure3 Efficiency improvement of correspondence to data demand by combination of function