Using Data Mining Technique to Improve Billing System Performance in Semiconductor Industry

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Abstract

▸ The new billing approaches are manly to apply the integrated concept of data warehouse with relevant billing data;

▸ in addition, use the methods of mining association rule to sort out the Billing Quantities Pattern and then figure out the billing quantities.

▸ Moreover, employ the Decision Tree algorithm of data mining to find out the unit billing price. As a result, the new billing approach is made of the methods of data warehouse and date mining.

▸ This study is mainly focused on improving the operation of current billing system to establish the new functionality of the Billing quantities and Billing price.

▸ As for the benefit of these two new functions, it is not only able to lead into clients' billing systems, but it is also capable of upgrading the efficiency in rapid setup; especially for the enterprises that already possessed billing system internally but not yet implemented.

▸ In addition, it can also reduce the difference in revenue, shorten the process of issuing invoice, speed up the export operation, increase the export efficiency and provide the revenue data for integrating into the Executive Data System (EIS), Decision Support System (DSS) and Business Intelligent System (BIS) to allow enterprises making the right decisions promptly.

Existing

- Billing is not only a complicate but also detailed and unavoidable task in the IC Testing Industry.

- Between each client's billing rules, some of them are similar, some of them are total different from each other, or some of them that need a specific calculation process;

- as a result, it needs to be combined with production and quotation data to figure out the client's billing data.

- So far, there are many IC Testing manufacturers still apply the manual or semi-manual operation to handle their billing data.

- In addition, it may not only establish a complicate billing rule, but it also lacks of flexible variation in the end. The main problem is consisted in the calculation rules that are complicated with needing the flexible and variable billing factors.

- However, operations of many systems become even more complicated due to their lack of flexibility, even if continuously adopt the variable billing rules and factors, still, during the process of making financial report and export,

- it will not only be short of the quickness and correctness for operation, but it also needs to invest even more manpower in checking the billing data.

disadvantage

▸ So far, there are many IC Testing manufacturers still apply the manual or semi-manual operation to handle their billing data.

▸ In addition, it may not only establish a complicate billing rule, but it also lacks of flexible variation in the end.

▸ The main problem is consisted in the calculation rules that are complicated with needing the flexible and variable billing factors.

▸ However, operations of many systems become even more complicated due to their lack of flexibility, even if continuously adopt the variable billing rules and factors, still, during the process of making financial report and export,

▸ it will not only be short of the quickness and correctness for operation, but it also needs to invest even more manpower in checking the billing data.

Proposed

- This study proposed applying the data warehouse and data mining technologies to the billing system;

- in addition, expected to establish the warehouse system for the billing, utilize the data mining technology and analyze the billing approach to obtain a high flexible billing function in order to promptly provide the revenue data for enterprises, speed up the lead time of client's billing patterns and improve the efficiency in billing process;

- especially for the clients that already possessed the billing system but still not implemented yet. Thus, to achieve the expected contribution and response to the demand for complicate and flexible billing system,

- this study is seeking for completing the following purposes:

- 1. Establish the billing data warehouse: To collect and categorize the relevant billing data and historic data into a same platform by using the concept and technology of the data warehouse in order to make the billing analysis and calculation.

- 2. Establish the rules of the billing price and billing quantity to setup the billing pattern:

- 3.Improve the billing efficiency in reducing the adjustable time that needed to response to different billing variation:

Advantage

- figure out the correct billing qty pattern and the billing quantities that made the correctness rate of entire billing qty pattern to upgrade up to 99% averagely the billing pattern is applied the data mining's Decision Tree to find out the most optimal unit price, and actually use its Decision Tree generating rule to figure out the unit price, and the correctness rates are all over 90% that improved by 23% than the current billing system
- used the real-time online analysis technology of OLAP to build up a multi-dimensional, multi-quantities combination intelligent business system to provide for making decision analysis.

HARDWARE REQUIREMENTS

- Processor   –   Pentium –III
- Speed   –   1.1 Ghz
- RAM   –   256 MB(min)
- Hard Disk   –   20 GB
- Floppy Drive   –   1.44 MB
- Key Board   –   Standard Windows
                                        Keyboard
- Mouse   –   Two or Three Button
                                        Mouse
- Monitor   –   SVGA

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SOFTWARE REQUIREMENTS

- Operating System   :   Windows 8
- Front End   :   Java /DOTNET
- Database   :   Mysql/HEIDISQL

Conclusion

▸ This study is mainly applied the data warehouse technology to integrate the related billing information and the billing qty pattern mining methods to figure out the correct billing qty pattern and the billing quantities that made the correctness rate of entire billing qty pattern to upgrade up to 99% averagely.

▸ In addition, the billing pattern is applied the data mining's Decision Tree to find out the most optimal unit price, and actually use its Decision Tree generating rule to figure out the unit price, and the correctness rates are all over 90% that improved by 23% than the current billing system. The changing time of the billing quantities is changed from billing system's one week to 32 days and the improvement rate is 71%.

▸ The lead time is reduced from one month to one week, and the improvement rate is 76%.

▸ At last, used the real-time online analysis technology of OLAP to build up a multi-dimensional, multi-quantities combination intelligent business system to provide for making decision analysis.

Reference

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