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IMPROVING USE RESTRICTION WITH MODIFIED ATTRIBUTES BASED ALGORITHMS

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Abstract
This in the article commerce banks information in the system use restriction in the process information quality and system resources between integration effective to manage SMART-Q (Systematic Multi-layered Algorithm for Real-Time Quality) algorithm offer Algorithm bank information in systems there is was different information sources only quality criteria based on real time in mode analysis to do , to check and integration opportunity The SMART-Q algorithm gives of information completeness , accuracy and compatibility automatic evaluation , various in format information only structure based on combine and information quality decrease prevent to take service does . Proposal done approach commerce banks information in systems security increase, errors reduce and use restriction in the process decision acceptance to do efficiency provision opportunity gives.

Keywords: Commerce banks , information system , usage restriction , data quality, integration , SMART-Q algorithm , real -time mode , information safety.

Introduction

Latest in years commerce banks in the activity digital from technologies use sharp increase, bank information systems complicated and many layered to infrastructure has become. To customers remote service display, electronic payments, mobile banking services and real time in mode transactions bank information systems continuous, reliable and safe performance demand will. With this together, bank information in systems being kept information size increase and different from sources coming of information diversity in the system information quality provision the issue current to the problem is rotating [1].

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Commercial banks information in the system use restriction process directly users information, financial resources and important information assets with related is, this in process wrong or complete not been from data use security risks to increase take arrival possible. In practice a lot of bank information in systems information different in different formats level accuracy and completeness with This is stored. intersystem integration in the process conflicts, errors and information to disappear reason will be [2].

Traditional in approaches information integration mainly technician at the level done increased and of information quality indicators enough at the level into account As a result, the use of restriction in the process decision acceptance to do wrong or outdated to the information justification possible. Therefore, commercial banks information in the system information quality permanent control to do and integration process quality criteria related without management necessity to the surface comes [3].

This in the article offer The SMART-Q algorithm is being developed exactly this problem solution to reach aimed at is , it is the data acceptance to do , automatic quality analysis , integration and real time in mode update stages own inside takes . Algorithm of information completeness , accuracy and compatibility mathematician models based on assessment opportunity This gives commerce banks information in the system use restriction process further reliable , flexible and effective organization to reach service does [4].

SMART-Q algorithm current to grow via bank information in systems information quality increased , intersystem compatibility provided and security risks noticeable at the level As a result , bank information systems stability and reliability increase , users displayed services quality will improve .

In the process of restricting access to the information system of commercial banks, it is necessary to organize the integration of information between the data of users in the system and information on resources in the system (all databases in the system) depending on the level of data quality (a sign of not losing the value of the information), that is, to manage the integration process. In this case, using the model presented in the previous paragraph, it is possible to propose the following new algorithm, the SMART-Q (Systematic Multi-layered Algorithm for Real-

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Time Quality) algorithm [5] . When implementing this algorithm, it is necessary to take into account the following main factors, which are:

- increase system efficiency;
- reduce errors;
- ensuring the accuracy and completeness of information;
- creating interoperability between different systems.

The SMART-Q algorithm is implemented using the following five main steps:

First stage. The stage of data acquisition in the information system of commercial banks . At this stage, the identification of data sources in the information system of commercial banks is carried out, that is, the analysis of all data sources and their formats available in the system is carried out. In this case, it is possible to identify and enter all new and updated data into the system through API (Application Programming Interface - a specification used for two or more computer programs to connect and communicate with each other) or ETL (Extract, Transform and Load - a method of integrating data used in business data). After that, the completeness of the data in the system is determined. A completeness check is performed for each new or changed data entered into the system (for example, user name, address, credit card number, etc.) [6].

The mathematical representation of this stage is as follows.

M_i– the main source of information in the information system of commercial banks i –.

$D_i = \{d_{i1}, d_{i2}, \dots, d_{in}\}$ a set of data entered from an internal source in the information system of commercial banks .i –

T_i– function to check the completeness of the entered data.

$$T_i(D_i) = \begin{cases} 1, & if\ D_i\ is\ complete \\ 0, & if\ D_i\ is\ not\ complete \end{cases} \quad (1)$$

Here, 1 and 0 represent complete or incomplete data in the information system of commercial banks.

Second stage. Automatic analysis of data quality in the information system of commercial banks . First of all, the accuracy and completeness of the data in the information system of commercial banks is analyzed. During the analysis, each

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data element in the system is checked against several recorded keywords and data sources for accuracy. For example, checking the format of city names, telephone numbers, or bank card numbers are among them. After that, attention is paid to the correctness and consistency of the data between several systems and sources. For example, if a customer's address is updated in one system, it must also be updated in other systems. For this, fuzzy matching or similarity checking algorithms can be used. After the similarity check is performed, it is necessary to determine whether the data in the system is outdated and create mechanisms to update it. For example, checking the customer's contact information or financial status. The mathematical expression of this stage is as follows [7] .

In the process of restricting access to the information system of commercial banks, the following parameters are used to analyze the quality of data in the system:

$A = \{a_1, a_2, \dots, a_n\}$– a set of indicators of the accuracy, completeness and other quality of information in the information system of commercial banks .

Q_j– j –an indicator of quality (e.g., accuracy, precision).

in the process of restricting access in the information system of commercial banks can be calculated using the following expression:

$$Q_{general} = \frac{1}{m}\sum_{j=1}^{m} Q_j \qquad 2$$

Here $Q_{general}$ is a general quality indicator, each quality indicator Q_j Calculates the average value of .

in the process of restricting access to the information system of commercial banks can be calculated using the following expression:

$$A_{accuracy}(d_{ij}) = \begin{cases} 1, & if\ d_{ij}\ is\ true \\ 0, & if\ d_{ij}\ \text{is wrong} \end{cases} \qquad 3$$

$$A_{completeness}(d_{ij}, d_{ik}) = \begin{cases} 1, & if\ d_{ij} = d_{ik} \\ 0, & if\ d_{ij} \neq d_{ik} \end{cases} \qquad 4$$

After these calculations are performed, the proposed algorithm proceeds to the third stage. In the third stage, the data in the system is integrated [8] .

The third stage. The data integration stage in the process of restricting access to the information system of commercial banks. At this stage, before combining the

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data in the system, it is necessary to ensure that it is in a single format. At this stage, flexible normalization algorithms are used between systems, for example, converting data to JSON, XML, or CSV formats. After that, semantic mapping (data adaptation) and data fusion techniques are used to automatically integrate data between different systems. In this process, the data stored in each system is brought to a single, unique format and adapted to each other. After the data in the system is adapted, it allows working in real time. Therefore, the proposed SMART-Q algorithm combines both real-time and ad-hoc integration methods. For real-time systems, data is integrated synchronously via API, while for other systems, data is updated regularly (i.e. at intervals specified by the system administrator). The mathematical representation of this stage is as follows [9,10] .

I — a set of data that commercial banks can integrate into their information systems during the process of restricting access.

F_i— in the process of restricting access to the information system of commercial banks i −Data format for integration from the third system.

$M_{integration}$— integrated information in the process of restricting access to the information system of commercial banks.

The data integration process in the process of restricting access to the information system of commercial banks is expressed as follows:

$$M_{integration} = \bigcup_{i=1}^{n} (D_i \cap F_i) \quad 5$$

Here $M_{integration}$, it represents a common set of integrated data from all systems and the retrieval of data in formats appropriate for each system.

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