CLOSED-LOOP COMMUNICATION ENTERPRISE RESOURCE PLANNING SYSTEM BASED ON A FULL-PROCESS ORAL SERVICE

TECHNICAL FIELD

[0001] The present invention relates to the field of medical management, and in particular, to a closed-loop communication enterprise resource planning (ERP) system based on a full-process oral service.

BACKGROUND

[0002] In a current stage, a problem generally exists in private oral service management, that is, requirements for real-time performance of data and a data volume of transmission are inconsistent at oral service ports. During full-process oral service management, if preference is given to a pursuit for transmission and calling of batch data at each of the oral service ports, data response time may be excessively long, and operation and management efficiency of an oral service management system may be affected. However, if preference is given to a response rate of the system, data transmission between ports of the oral service ports may be inconvenient. Therefore, a proper communication interface and communication mode must be selected, and real-time judgment switching must be performed in a process of data interchange and calling, to further maintain normal operation of oral service management and implement closed-loop communication management of a full-process oral service. In addition, in an existing oral service ERP system, not only a large quantity of human and material resources are required for salary statistics, but also a problem of incorrect calculation of the salary statistics may occur due to a relatively complex compensation calculation method for a medical worker and a relatively large quantity of types of calculation.

[0003] The Chinese patent with Publication No. CN111831662B provides a method and system for processing medical data information. In the patent, medical databases of different medical collection terminals are stored in a hash manner, and different medical data is cryptographically configured again on the basis of hash storage. This improves encryption adaptability in a cryptographic configuration process. A main difference between the patent and the present invention is that a communication configuration of each terminal is not involved in a reference document after a medical database is established, and instead, an emphasis is placed on cryptographic configuration in each data list. The Chinese patent with

Publication No. CN108563697B provides a data processing method, apparatus, and storage medium. In the patent, packet index information of data is established to process all target data in a same data packet in parallel. However, a data index mode according to the patent has a high requirement for a return value of the data, and a data feedback mode is not explicitly described in the patent.

[0004] Therefore, the present invention proposes a closed-loop communication ERP system based on a full-process oral service for a problem present in an existing medical data communication process.

SUMMARY

[0005] For the above problems, the present invention provides a closed-loop communication ERP system based on a full-process oral service, specifically including: establishing an outpatient hospital information system (HIS), where the outpatient HIS combines an oral diagnosis and treatment service with an hospital information management system and establishes an automatic determining manner for a communication mode to manage and maintain a data volume and real-time performance of data transmission at oral service ports; and the oral service ports include a personnel management port, a salary port, and a financial port.

[0006] Specifically, the closed-loop communication ERP system combines a conventional HIS with an actual oral service management system to form the closed-loop communication ERP system. In the actual oral service management system, the conventional HIS cannot better manage specific data interchange and data calling due to a relatively large quantity of oral diagnosis and treatment service ports involved and complex and diverse actual data volumes. This causes an imbalance between real-time performance of data transmission and a data volume of the data transmission among the oral service ports, and reduces management efficiency of a full-process oral service management system.

[0007] Preferably, a salary system is involved in the outpatient HIS, and a salary calculation formula is established in the salary system; and salary calculation is performed by using the salary calculation formula for outpatient income data aggregation, performance data aggregation, and performance data validation, and then a salary calculation result is synchronized to the salary port.

[0008] Specifically, the performance data aggregation includes commission data, performance data, consumable data, and patient quantity data. Complex salary calculation

formulas are quickly aggregated and integrated. Inbound and outbound inventory data is combined and financial income data is synchronized to the financial port, for the financial port to automatically complete work such as account reconciliation and credential generation.

[0009] Preferably, the salary calculation specifically includes a peripheral product bonus, a consulting reservation, a consulting bonus, a tooth cleaning bonus for a nurse, a whitening bonus, a store achievement reward, a store performance commission, and a doctor bonus.

[0010] Preferably, the automatic determining manner for the communication mode includes the following specific process:

[0011] B1. establishing a data volume monitoring statistical model for a specified period, and setting a threshold range of transmission for a data volume and data traffic;

[0012] B2. determining the data traffic at a specified time for an oral service process with a real-time performance requirement, and automatically switching to a RestFul API communication mode when the data traffic is not within the threshold range; and

[0013] B3. determining the data volume for an oral service process without a real-time performance requirement, and automatically switching to an Oracle intermediate table communication mode when the data volume is not within the threshold range.

[0014] Preferably, for an Oracle intermediate table, a data incremental synchronization method is established to update data sheets at each of the oral service ports in a batch.

[0015] Preferably, for the Oracle intermediate table, when data at any of the oral service ports changes, data in the data intermediate table is updated, and the outpatient HIS performs the updated stored data and transmits the stored data to a database of the outpatient HIS.

[0016] Preferably, incremental database optimization processing is established in the data incremental synchronization method; and database update optimization and multi-database interactive optimization are established for the oral service ports in the incremental database optimization processing.

[0017] Preferably, in the database update optimization, correlation analysis is performed on a feature value corresponding to related data in a data sheet on the basis of the update of the data sheets in the data incremental synchronization method, and automatic update of the related data in the data sheet is performed.

[0018] Preferably, in the automatic update, calculation of a deviation value between raw data and updated data in a data sheet is established to make an adaptive adjustment of accuracy of the automatic update of the data sheet in the data incremental synchronization method.

[0019] Preferably, a user-defined index list is established in the multi-database interactive optimization to reduce the number of times of accesses and interactions between databases.

[0020] Specifically, the closed-loop communication ERP system based on a full-process oral service involves extraction of a data sheet in a plurality of databases. Frequent database accesses cause a relatively slow overall response of the system. Associated readiness of a plurality of data sheets may be implemented in a multi-database interaction process by establishing the user-defined index list, so as to reduce and optimize the number of times of interactions in the plurality of databases.

[0021] Compared with the prior art, the present invention has the following beneficial effects:

[0022] (1) The closed-loop communication ERP system based on a full-process oral service according to the present invention combines an HIS with a related function in an oral service management system, improves a communication mode in a conventional oral service process, establishes an automatic determining manner for the communication mode, and determines and switches the communication mode in real time in a process of data interchange and data calling at each of the oral service ports. A proper communication interface and communication mode are selected, and real-time judgment switching is performed in the process of data interchange and calling, to further maintain normal operation of oral service management and avoid problems of poor real-time performance of data communication among the oral service ports and inconvenient output transmission.

[0023] (2) On the basis of (1), in the present invention, a salary system is involved in the outpatient HIS, and a salary calculation formula is established in the salary system. With respect to the salary calculation formula, a set of different calculation is designed for different posts in view of a difference in salary performance calculation for service personnel at various posts at the oral service ports and a relatively complex calculation method. In addition, salaries of service personnel at various posts are automatically checked and calculated according to the calculation formula. This simplifies a conventional manual financial statistics process, and improves both efficiency of financial accounting and accuracy of salary calculation. Finally, wage data is synchronized to a financial system, and a financial report is generated. On this basis, in the present invention, a full-process oral service is managed in an automated manner, ranging from approval to execution, performance data generation to check, abnormal data monitoring to notification, and data aggregation to generation of various result data and reports. This reduces the conventional time for generating a management report from 15 days to three days. The system automatically submits a payment plan to a bank on a payroll day to complete payroll.

[0024] (3) On the basis of (2), in the present invention, a data sheet is updated with the incremental synchronization method in the Oracle intermediate table communication mode.

Compared with a full synchronization method, the incremental synchronization method only stores updated data, so as to simplify data transmission. In addition, for the automatic determining manner for the communication mode according to the present invention, the incremental synchronization method for data update is used to better perform monitoring and statistics of values of the data volume and data traffic in the specified period, thereby improving accuracy of switching of the communication mode and data monitoring in the present invention.

[0025] (4) On the basis of (3), in the present invention, the incremental synchronization method is optimized and improved, and an automatic update method for a data sheet based on correlation matching is added. This improves capabilities of data transmission and automatic management of the closed-loop communication ERP system based on a full-process oral service, and improves operation and management efficiency of the system.

[0026] (5) On the basis of (4), in the present invention, optimization processing is performed on a database interaction mode and a number of times of accesses in the plurality of databases involved in the closed-loop communication ERP system. The user-defined index list is established to improve a conventional interaction process of one interaction and one access into a form of one interaction and a plurality of times of accesses. This avoids a problem of a relatively slow database response caused by frequent interactions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] FIG. 1 is a flowchart of a closed-loop communication ERP system based on a full-process oral service.

DETAILED DESCRIPTION OF EMBODIMENTS

[0028] Embodiment 1:

[0029] A closed-loop communication ERP system based on a full-process oral service according to this embodiment, as shown in FIG. 1, specifically includes: establishing an outpatient HIS, where the outpatient HIS combines an oral diagnosis and treatment service with an hospital information management system and establishes an automatic determining manner for a communication mode to manage and maintain a data volume and real-time performance of data transmission at oral service ports; and the oral service ports include a personnel management port, a salary port, and a financial port.

[0030] In an implementation manner, a salary calculation specifically includes a peripheral

product bonus, a consulting reservation, a consulting bonus, a tooth cleaning bonus for a nurse, a whitening bonus, a store achievement reward, a store performance commission, and a doctor bonus, where a specific calculation formula for performance data related to a salary is as follows.

[0031] Peripheral product bonus: total performance in a payment column * x% for a "care product" as a secondary category;

[0032] Consulting reservation: consulting bonus * (x%); the consulting reservation for July to December of a previous year is paid in July, and the consulting reservation for January to June of the previous year is paid in January;

[0033] Consulting bonus: for an amount less than or equal to RMB 300,000, a commission percentage is x%; for an amount between RMB 300,000 and RMB 600,000 (including RMB 600,000), the commission percentage is x%; for an amount above RMB 600,000, the commission percentage is x%; and for an extra part, the commission percentage is increased;

[0034] Tooth cleaning bonus for a nurse: non-site diagnosis times * x for HID (level I) tooth cleaning and periodontal whitening, and site diagnosis * x for (level II) tooth cleaning;

[0035] Only when a post is a nurse and a head nurse and both a receiving doctor and a receiving nurse are available can an order be assigned to the receiving nurse. This part is excluded when performance of a doctor is calculated. Whitening bonus: total performance in HIS payment * x%;

[0036] Information of a nurse and a doctor must be available. Performance is not calculated when the information of a doctor is not available and when there is information of a plurality of nurses;

[0037] Store achievement reward: a reward of X is given when (imported) outpatient performance calculated with actual performance (HIS)/target performance of a store reaches a standard; and a reward of RMB 1,000 to RMB 3,000 (upper limit) is added for performance exceeding 110%;

[0038] Store performance commission: x% of total performance of a store;

[0039] Doctor bonus: outpatient performance of another doctor or a part-time doctor: (performance – performance technology – cost) * commission percentage; the commission percentage and the performance technology vary by a star level;

[0040] Inherent performance of a part-time doctor: (performance – eas cost – adjustment cost) * commission percentage (one percentage for one person).

[0041] In an implementation manner, in data interchange, switching between two

communication modes, a RestFul API and an Oracle intermediate table, may be called based on real-time performance of data transmission and a data transmission volume. On the basis of the Oracle intermediate table, the RestFul API mode is established to perform real-time data processing at each of the ports, and data communication is performed in any of the communication modes. Establishing the Oracle intermediate table includes the following specific steps:

[0042] S1. establishing, in the HIS, a data intermediate table that is based on each of the ports;

[0043] S2. performing synchronous data collection on each of the ports in an oral service, and transferring the collected data to the data intermediate table;

[0044] S3. establishing a trigger and a storage process that are based on the data intermediate table, establishing a corresponding operation mark, and triggering a dynamic resource track table and a resource status table in the trigger based on the operation mark;

[0045] S4. triggering, in the storage process, a status of a resource at each of the ports based on the operation mark;

[0046] S5. when data at any of the ports changes, data in the data intermediate table is updated, and the HIS performs the updated stored data and inserts the stored data to a database of the HIS;

[0047] S6. establishing a database view that is based on each of the ports, to call data in a specific case; and

[0048] S7. the data update is performed by means of incremental update, and a result table and an incremental record table are established to perform the data update.

[0049] In an implementation manner, for the RestFul API, establishing its communication mode includes the following specific steps:

[0050] A1. creating a storage process, where there are two cursor output parameters and one string output parameter in the storage process;

[0051] A2. registering a general RestFul API object in the storage process;

[0052] A3. requesting a URL and setting a request packet, and returning a request packet response; and

[0053] A4. obtaining a packet format for calling a general RestFul API service request.

[0054] In conclusion, in the closed-loop communication ERP system according to the present invention, a standardized data structure is established and an electronic sheet of a unified structure is generated, to improve efficiency of data transmission between the service ports. This optimizes a conventional data synchronization method of manual table import and manual transcription. This not only improves overall system efficiency, but also reduces an error

generated by manual table import.