

DIAGNOSIS AND TREATMENT RECORD COMPLIANCE MANAGEMENT METHOD FOR AN ORAL MANAGEMENT SYSTEM

TECHNICAL FIELD

[0001] The present invention relates to the field of medical management, and in particular, to a diagnosis and treatment record compliance management method for an oral management system.

BACKGROUND

[0002] Compliance management is a key requirement in the operation and management of medical organizations and also an important part of medical work. Compliance and systematization of the medical work are related to the diagnosis and treatment quality of patients and the efficiency of hospital operation. A compliance management process is strengthened in oral treatment and diagnosis to further improve the level and quality of oral medical management. However, in an existing medical structure compliance management method, as doctors present the large space of subjective diagnosis and treatment, the management of drugs and consumables during the doctor diagnosis and treatment has been in a blank stage, and it is impossible to judge whether the doctors prescribe non-therapeutic drugs or medical consumables in medical advices, so that there is the problem of extra kickback income. Intelligent diagnosis and treatment data recording means are established, so that electronic medical records have the advantages of simple diagnosis and treatment operation and strong statistical analysis ability. The electronic medical records being combined with compliance management during the doctor diagnosis and treatment can further improve the ability of the medical structure compliance management, thereby making up for the deficiency of compliance management during the doctor diagnosis and treatment. In addition, this also will solve unnecessary medical disputes and administrative penalties caused by serious consequences such as financial violations and medical violations in outpatient clinics with large-scale mismatching among doctor charging content, medical record content and use of medical consumables in the private dental industry.

[0003] The Chinese Patent, with Publication No. CN111986765A, provides an electronic medical record entity marking method and device, computer equipment and storage medium.

In the patent, anchor points are added to historical electronic medical records to position the locations of electronic medical record data to be updated later, thus improving the accuracy of updating the electronic medical record data. However, the patent focuses on the updating of electronic medical records, without covering their data extraction and utilization. The Chinese Patent, with Publication No. CN111047309B, provides a safety compliance detection method and device, computer equipment and storage medium. The compliance monitoring described herein focuses on data safety compliance detection in the payment industry. In the patent, data is automatically detected according to compliance detection rules to improve the efficiency of compliance detection. However, the patent mainly focuses on a compliance detection process, without covering specific detection methods of detection data.

[0004] Therefore, for the problems in the existing compliance detection methods, the present invention provides a diagnosis and treatment record compliance management method for an oral management system, which is mainly designed for the field of oral medical treatment.

SUMMARY

[0005] For the above problems, the present invention provides a diagnosis and treatment record compliance management method for an oral management system, and the method specifically includes the following steps:

[0006] S1. Extracting data from an electronic medical record of a patient, and extracting a feature tag from each module in the electronic medical record based on data extraction.

[0007] Specifically, the electronic medical record includes, but is not limited to, a patient information module, a diagnosis and treatment record module, a medical advice data module, and an image test data module; each module in the electronic medical record is subjected to the data extraction; and the feature tag includes, but is not limited to, a pathological diagnosis tag, a medication tag, a therapeutic consumable tag, and the like.

[0008] S2. Obtaining data contents associated with the feature tag based on feature tag extraction, performing semantic diagnosis and treatment keyword recognition on feature tag contents, and transmitting diagnosis and treatment data obtained through the semantic diagnosis and treatment keyword recognition to a compliance check module.

[0009] S3. Comparing the diagnosis and treatment data with consumable data deducted by a hospital and doctor income data respectively, and judging the diagnosis and treatment compliance of the doctor according to comparative calculation results.

[0010] Specifically, the compliance judging method includes: judging whether the data

contents associated with the feature tag in the diagnosis and treatment data correspond to the consumable data deducted by a hospital and the doctor income data respectively; if there is a data correspondence deviation, judging that the doctor diagnosis and treatment is non-compliant, and investigating reasons for non-compliance.

[0011] Preferably, in S1, during the feature tag extraction, a feature tag list is established, the data in the electronic medical record is traversed and indexed according to the feature tag list to designate feature tag positioning.

[0012] Specifically, the range of the feature tag list is smaller than that of the feature tag; the feature tag list can be customized according to the contents to be extracted; and the feature tag can be extracted from the feature tag list by traversing and querying electronic medical record data.

[0013] Preferably, during the feature tag positioning, whether the data contents associated with the feature tag are null or not is judged; if the data contents are null, a return value is zero and the feature tag is removed; or, if the data contents are not null, a return value is one and the feature tag is kept.

[0014] Specifically, during the judgment of the feature tag positioning, a non-null feature tag is screened to return a feature tag list with a specific return value, thereby reducing the data volume of the return value and improving the operation efficiency of the oral management system.

[0015] Preferably, in S2, during the semantic diagnosis and treatment keyword recognition, syntactic diagnosis and treatment data keywords are respectively split for the data contents obtained from each module; and diagnosis and treatment data keyword entity alignment and topological structure diagram calculation are used for extracting the diagnosis and treatment data.

[0016] Preferably, during splitting of the syntactic diagnosis and treatment data keywords, the data contents extracted from each module are subjected to word segmentation according to a syntactic structure, so as to judge whether diagnosis and treatment data keywords subjected to word segmentation are various proper nouns; if the diagnosis and treatment data keywords are not the proper nouns, the diagnosis and treatment data keywords are subjected to secondary word segmentation.

[0017] Preferably, during the word segmentation, a positioning tag is established according to characteristics of the diagnosis and treatment data keywords subjected to word segmentation, and the positioning tag is used as a flag bit to position and extract the diagnosis and treatment

data keywords.

[0018] Preferably, in the topological structure diagram calculation, an associated topological structure diagram of the diagnosis and treatment data keywords, the consumable data deducted by a hospital, and the doctor income data is established, that is, after a single diagnosis and treatment data keyword is locked, a traceability query of the consumable data deducted by a hospital and the doctor income data are capable of being performed in a multi-way manner.

[0019] Specifically, the diagnosis and treatment data keywords and the diagnosis and treatment data keywords can be divided into time dimension, charging content and medical record content dimension, and medical record content and medical consumable use dimension.

[0020] Preferably, an association factor is established among the diagnosis and treatment data keywords, the consumable data deducted by a hospital, and the doctor income data, to measure the association degree thereof.

[0021] Preferably, when the association degree is high, a distance between medical attributes and the diagnosis and treatment data keywords is close; and when the association degree is low, a distance between medical attributes and the diagnosis and treatment data keywords is far, whereby forming a topological structure diagram for the diagnosis and treatment data keywords.

[0022] Specifically, when the association degree between a plurality of diagnosis and treatment data keywords and a plurality of medical attributes is within a specified range, it is determined that the plurality of diagnosis and treatment data keywords are a same diagnosis and treatment data keyword, and the same diagnosis and treatment data keyword is determined to avoid the confusion and repetition of data extraction caused by a fact that medical terms recorded by different doctors for a same patient are different but the contents of the medical data involved are the same.

[0023] Preferably, a function of automatically collecting and monitoring uploading signals of the electronic medical record is set in a compliance management module; and after the doctor issues an electronic medical record for a patient, the compliance management module receives and updates response data of the electronic medical record, and performs automatic matching of the diagnosis and treatment data, the consumable data deducted by a hospital, and the doctor income data in the electronic medical record, to judge doctor diagnosis and treatment compliance.

[0024] Compared with the prior art, the present invention has the beneficial effects:

[0025] (1) In the diagnosis and treatment record compliance management method for an oral

management system according to the present invention, the diagnosis and treatment data in the electronic medical record is extracted for matching analysis with the consumable data deducted by a hospital and the doctor income data, so as to further develop the management and supervision of the medical compliance, further improve the transparency of the operation and management of an oral system in the oral management system, avoid the related problems such as receiving kickbacks from consumables by doctors during the diagnosis and treatment, and safeguard the medical interests of patients during their diagnosis and treatment.

[0026] (2) On the basis of (1), in the present invention, a feature tag positioning judgment method is established during the extraction of the electronic medical record; the feature tag positioning judgment method is used to eliminate the feature tag of unassociated data during the traversing of the feature tag list, thereby further reducing the transmission volume of data during data return during the compliance judgment and improving the operation rate of the oral diagnosis and treatment system.

[0027] (3) On the basis of (2), in the present invention, the splitting of the syntactic diagnosis and treatment data, the secondary word segmentation, and the part-of-speech-based positioning tag are established to improve the accuracy of the splitting of the syntactic diagnosis and treatment data keywords, which avoids failure in the subsequent diagnosis and treatment data keyword entity alignment and the topological structure diagram calculation due to the splitting recognition errors of the keywords and improves the accuracy of data matching in the diagnosis and treatment record compliance management of the oral management system.

[0028] (4) On the basis of (3), in the present invention, the topological structure diagram calculation is performed to calculate the extracted diagnosis and treatment data, the consumable data deducted by a hospital and the doctor income data based on the association degree, and the calculation of the association degree is used to improve the semantic matching accuracy among data during the compliance matching by calculating a data relationship with a shortest distance and a highest association degree, and the importance degree of the matching data is reasonably divided, thus facilitating the subsequent calculation and analysis of the doctor diagnosis and treatment compliance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] FIG. 1 shows a flow diagram of a diagnosis and treatment record compliance management method for an oral management system; and

[0030] FIG. 2 shows a schematic flow diagram of doctor diagnosis and treatment compliance

judgment.

DETAILED DESCRIPTION OF EMBODIMENTS

[0031] Embodiment 1:

[0032] A diagnosis and treatment record compliance management method for an oral management system described in the embodiment, as shown in FIG. 1, includes the following steps:

[0033] S1. extracting data from an electronic medical record of a patient, and extracting a feature tag from each module in the electronic medical record based on data extraction.

[0034] S2. obtaining data contents associated with the feature tag based on feature tag extraction, performing semantic diagnosis and treatment keyword recognition on feature tag contents, and transmitting diagnosis and treatment data obtained through the semantic diagnosis and treatment keyword recognition to a compliance check module; and

[0035] S3. comparing the diagnosis and treatment data with consumable data deducted by a hospital and doctor income data respectively, and judging the diagnosis and treatment compliance of the doctor according to comparative calculation results.

[0036] In one embodiment, as shown in FIG. 2, the doctor diagnosis and treatment compliance judgment specifically includes:

[0037] from the time dimension, a doctor treatment fee was charged on the 25th of last month, but this treatment actually happened on the 5th of this month, resulting in a discrepancy between the financial income time and the actual treatment time, which does not conform to the financial principle of accrual basis;

[0038] from the charging content and medical record content dimension, the charging content of the doctor is of category A treatment, but recorded as category A treatment in the medical record, so that the financial income content is inconsistent with the charging voucher and the fact, resulting in financial violations and medical violations;

[0039] from the medical consumable use dimension, if the medical record content is recorded as category A treatment, but the ex-warehousing consumable data has nothing to do with the category A treatment, there are also discrepancies in facts, which also leads to financial violations and medical violations; and from the charging content and therapeutic consumable use dimension, if the charging content is category A treatment, but the ex-warehousing consumable data has nothing to do with the category A treatment, this will also lead to the above problems, and there are huge management loopholes for the corresponding violations,

such as the problem that doctors communicate with patients to collect money through their private accounts so as to give patients discounts and make them consume high-value medical consumables in an outpatient clinic. The auxiliary examination labels include, but are not limited to, blood routine, bite force test, electromyography, X-ray, etc. The data content is the patient diagnosis and treatment data corresponding to the characteristic tag.

[0040] In one embodiment, in a process of extracting data from an electronic medical record of a patient, the feature tag includes, but is not limited to, a pathological diagnosis tag, a disease course tag, an auxiliary examination tag, a medication tag, and a therapeutic consumable tag where the pathological diagnosis tag includes, but is not limited to, decayed teeth, periodontitis, gingival bleeding, orthodontics, and the like; the disease course tag includes, but is not limited to, present medical history, past medical history, disease course record, step-by-step diagnosis, auxiliary examination, and the like; the auxiliary examination tag includes, but is not limited to, blood routine examination, occlusal force test, electromyography, X-ray, and the like; and the data content is the patient diagnosis and treatment data corresponding to the feature tag.

[0041] In S3, during the semantic diagnosis and treatment keyword recognition, syntactic diagnosis and treatment data keywords are respectively split for the data contents obtained from each module; and diagnosis and treatment data keyword entity alignment and topological structure diagram calculation are used for extracting the diagnosis and treatment data.

[0042] In one embodiment, during the diagnosis and treatment data keyword entity alignment, a one-dimensional vector data structure of the diagnosis and treatment data keywords under each module in the electronic medical record is established, where

[0043] $P = \{P_1, P_2, P_3, P_4\}$, and P_1, P_2, P_3, P_4 respectively represent a patient information module, a diagnosis and treatment record module, a medical advice data module, and an image test data module;

[0044] $P_i = \{\omega_1, \omega_2, \dots, \omega_n\}$, and $\omega_1, \omega_2, \dots, \omega_n$ respectively are feature tags in each module, representing a pathological diagnosis tag, an auxiliary examination tag, a medication tag and a therapeutic consumable tag respectively;

[0045] $C = \{c_1, c_2, \dots, c_n\}$ and $c_1, c_2, \dots, c_n$ represent correspond to $\omega_1, \omega_2, \dots, \omega_n$, and are data contents corresponding to the feature tags;

[0046] A relationship between the modules $\langle \omega_{11}, \omega_{21}, \omega_{31}, \omega_{41} \rangle$ in the feature tags is established, so that the repeated diagnosis and treatment data keywords in a plurality of

modules can be screened and integrated with a single diagnosis and treatment data keyboard.

[0047] In one embodiment, the topological structure diagram calculation includes the specific processes:

[0048] A1. defining a single diagnosis and treatment data keyword $a_i \in \{a_1, a_2, \dots, a_n\}$;

[0049] A2. calculating an association degree $d_{[i][j]}$ between the data keyword and the specified data in the consumable data deducted by a hospital and the doctor income data, where j is the index number of a data node in the consumable data deducted by a hospital and the doctor income data;

[0050] A3. during the calculation of the association degree $d_{[i][j]}$, specifying a mode of custom setup of association weight; and for the custom setup of association weight, establishing a weight list based on an individual diagnosis and treatment data keyword to classify the consumable data deducted by a hospital and the doctor income data under a specified weight based on the weight list; and

[0051] A4. finding an association data set $\min_{[i][j]}$ with a highest association degree between the single diagnosis and treatment data keyword, the consumable data deducted by a hospital and the doctor income data by means of proximity searching, and performing compliance calculation on the association data set $\min_{[i][j]}$ with a highest association degree.

[0052] To sum up, by means of the diagnosis and treatment record compliance management method for an oral management system according to the present invention, quantities of drugs and medical consumables consumed in an inventory are compared according to the medication data and the therapeutic consumable data extracted from the electronic medical record, so as to judge whether there is a problem that prescribed drugs and diagnostic consumables are not used; according to the pathological diagnosis data extracted from the electronic medical record, the types and quantity ranges of drugs and medical consumables to be used are calculated, and whether there are excessive or non-therapeutic drugs and medical consumables in during the diagnosis and treatment is judged, so as to judge the compliance of doctor diagnosis and treatment.

CLAIMS

WHAT IS CLAIMED IS:

1. A diagnosis and treatment record compliance management method for an oral management system, comprising the following steps:

S1: extracting data from an electronic medical record of a patient, and extracting a feature tag from each module in the electronic medical record based on data extraction;

S2: obtaining data contents associated with the feature tag based on feature tag extraction, performing semantic diagnosis and treatment keyword recognition on feature tag contents, and transmitting diagnosis and treatment data obtained through the semantic diagnosis and treatment keyword recognition to a compliance check module; and

S3: comparing the diagnosis and treatment data with consumable data deducted by a hospital and doctor income data respectively, and judging the diagnosis and treatment compliance of the doctor according to comparative calculation results.

2. The diagnosis and treatment record compliance management method for an oral management system according to claim 1, wherein in S1, during the feature tag extraction, a feature tag list is established, the data in the electronic medical record is traversed and indexed according to the feature tag list to designate feature tag positioning.

3. The diagnosis and treatment record compliance management method for an oral management system according to claim 2, wherein during the feature tag positioning, whether the data contents associated with the feature tag are null or not is judged; if the data contents are null, a return value is zero and the feature tag is removed; or, if the data contents are not null, a return value is one and the feature tag is kept.

4. The diagnosis and treatment record compliance management method for an oral management system according to claim 1, wherein in S2, during the semantic diagnosis and treatment keyword recognition, syntactic diagnosis and treatment data keywords are respectively split for the data contents obtained from each module; and diagnosis and treatment data keyword entity alignment and topological structure diagram calculation are used for extracting the diagnosis and treatment data.

5. The diagnosis and treatment record compliance management method for an oral management system according to claim 4, wherein during splitting of the syntactic diagnosis and treatment data keywords, the data contents extracted from each module are subjected to word segmentation according to a syntactic structure, so as to judge whether diagnosis and treatment data keywords subjected to word segmentation are various proper nouns; if the

diagnosis and treatment data keywords are not the proper nouns, the diagnosis and treatment data keywords are subjected to secondary word segmentation.

6. The diagnosis and treatment record compliance management method for an oral management system according to claim 5, wherein during the word segmentation, a positioning tag is established according to the part of speech of the diagnosis and treatment data keywords subjected to word segmentation, and the positioning tag is used as a flag bit to position and extract the diagnosis and treatment data keywords.

7. The diagnosis and treatment record compliance management method for an oral management system according to claim 4, wherein in the topological structure diagram calculation, an associated topological structure diagram of the diagnosis and treatment data keywords, the consumable data deducted by a hospital, and the doctor income data is established, that is, after a single diagnosis and treatment data keyword is locked, a traceability query of the consumable data deducted by a hospital and the doctor income data are capable of being performed in a multi-way manner.

8. The diagnosis and treatment record compliance management method for an oral management system according to claim 7, wherein an association factor is established among the diagnosis and treatment data keywords, the consumable data deducted by a hospital, and the doctor income data, to measure the association degree thereof.

9. The diagnosis and treatment record compliance management method for an oral management system according to claim 8, wherein when the association degree is high, a distance between medical attributes and the diagnosis and treatment data keywords is close; and when the association degree is low, a distance between medical attributes and the diagnosis and treatment data keywords is far, whereby forming a topological structure diagram for the diagnosis and treatment data keywords.

10. The diagnosis and treatment record compliance management method for an oral management system according to claim 1, wherein a function of automatically collecting and monitoring uploading signals of the electronic medical record is set in a compliance management module; and after the doctor issues an electronic medical record for a patient, the compliance management module receives and updates response data of the electronic medical record, and performs automatic matching of the diagnosis and treatment data, the consumption data of medical consumables, and the doctor income data in the electronic medical record, to judge doctor diagnosis and treatment compliance.