

INTELLIGENT HEALTHCARE SYSTEM

BACKGROUND

1. Technical Field

[0001] The present disclosure relates to an intelligent healthcare system, in particular, to a smart learning type intelligent healthcare system capable of combining family physicians and healthcare information systems installed in clinics.

2. Description of Related Art

[0002] Under existing technologies, family physicians adopt the conventional way of attending to patients and manually prescribe for a complaint to the patients in zone of responsibility; however, in addition to their own medical professionals, there are no systems provided to enable family physicians to systemize health data related to other medical specialties and assist family physicians to make supplementary medical diagnoses and auxiliary medical learning, thus leaving room for improvement.

SUMMARY

[0003] The primary purpose of the present disclosure is to provide an intelligent healthcare system to enable family physicians in their own medical professionals to provide initial medical diagnostic advices and treatment to the patients in zone of responsibility. In addition to effectively providing family physicians with supplementary health data other than their own medical professionals, the health data modules of the intelligent healthcare system of the present disclosure can further update the health data based on personal

health information given by each clinic after implementation of the learning reinforcement.

[0004] According to one exemplary embodiment of the present disclosure, an intelligent healthcare system is provide, including an intelligent health platform which is simultaneously connected with a remote server and at least one clinic; in which the remote server is a plurality of big data required for providing to the intelligent health platform, and in which the intelligent health platform includes: a graphic processing unit, a pediatric health data module, a plurality of health data modules, a family physician pediatric clinic interface and at least one patient end. The graphic processing unit includes a health parameter identifying module configured to receive parameters of health data and identify what kind of medical specialty the parameters of health data belong to; a digital data accumulating unit coupled to the health parameter identifying module and configured to accumulate and store the parameters of health data; a classification counting and analyzing unit coupled to the digital data accumulating unit and configured to count and analyze the parameters of health data; and a health status assessing module coupled to the classification counting and analyzing unit and configured to assess the health status of the health data according to the health status of the analyzed health data. The pediatric health data module is coupled to the graphic processing unit and configured to store and record the health status or the health data transmitted from the graphic processing unit and to transmit pediatric health data to the graphic processing unit for serving as reference data on intelligent learning for pediatrics. The plurality of health data modules are respectively coupled to the

graphic processing unit and configured to store and record the health status or the health data transmitted from the graphic processing unit and to transmit health data about different medical specialties to the graphic processing unit for serving as reference data on intelligent learning for different medical specialties. The family physician pediatric clinic interface is coupled to an output of the graphic processing unit and configured to couple the intelligent health platform with a family physician pediatric clinic. The at least one patient end is coupled to the family physician pediatric clinic interface which is an end of a family physician treating the least one patient.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a schematic diagram illustrating connection manner of the intelligent healthcare system according to an embodiment of the present disclosure.

[0006] FIG. 2 is a block diagram illustrating circuit connection of the intelligent health platform according to an embodiment of the present disclosure.

[0007] FIG. 3 is a flow chart of a module A according to an embodiment of the present disclosure.

[0008] FIG. 4 is a flow chart of a module B according to an embodiment of the present disclosure.

DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0009] Reference will now be made in detail to the exemplary embodiments of the present disclosure, examples of which are illustrated in the

accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

[0010] The advantages, features and aspects of the present invention will become apparent from the following description of the embodiments with reference to the accompanying drawings, which is set forth hereinafter. The present invention may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the present invention to those skilled in the art. The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of example embodiments. As used herein, the singular forms “a,” “an” and “the” and exemplary steps “S10”, “S20”, and so on are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising”, and “at least one” when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0011] Referring to FIG. 1, a schematic diagram illustrating connection manner of the intelligent healthcare system according to an embodiment of the present disclosure is shown. The intelligent healthcare system of the present disclosure includes an intelligent health platform 1 which is simultaneously connected with a remote server 3 and at least one clinic 5, and the clinic 5

interacts with at least one patient 7. That is, the intelligent healthcare system of the present disclosure includes the intelligent health platform 1, the remote server 3 and the at least one clinic 5, in which the clinic 5 has interaction with the patient 7. The remote server 3 is a plurality of big data, in particular the big data related to different medical specialties, required for providing to the intelligent health platform 1.

[0012] Specifically, each clinic 5 is provided with a healthcare information system (HIS) installed in the intelligent health platform 1. In practice, the HIS is HIS criterion regulated by the department concerned. However, the provided HIS criterion is not applicable to intelligent applications and cannot be employed practically by family physicians. Thus, the intelligent health platform 1 of the present disclosure is provided to overcome the current drawbacks, enabling family physicians to obtain supplementary information about other medical specialties in addition to their professional fields. Besides, by virtue of the feedback derived from anamnesis data given by each clinic, the intelligent health platform 1 of the present disclosure can update data through the learning enforcement and establish the data corresponding to each medical specialty in the health data modules.

[0013] Reference is made to FIG. 2. The intelligent health platform 1 includes a graphic processing unit (GPU) 10, a pediatric health data module 20, a plurality of health data modules 22, 24, 26, a family physician pediatric clinic interface 50, a family physician dental clinic interface 52 and at least one patient end 70, 72, 74, 76. In practice, the GPU is not limited to any operation processors associated with graphic processing. In embodiments of the present

disclosure, the graphic processing unit 10 is mainly used as a high-speed operation processor or an ultrahigh-speed operation processor necessary for artificial intelligence learning module for processing a large amount of health statistics, health data and health status associated with various medical specialties. That is, any central processing unit (CPU) capable of executing high-speed operation can be used as the graphic processing unit 10 of the present disclosure.

[0014] The graphic processing unit 10 includes a health parameter identifying module 12, a digital data accumulating unit 14, a classification counting and analyzing unit 16 and a health status assessing module 18. The health parameter identifying module 12 is configured to receive parameters of health data inputted to the graphic processing unit 10 and identify what kind of medical specialty the parameters of health data belong to; for example, identifying the parameters of health data belonging to pediatrics professionals, dermatological professionals, or other medical specialties. The digital data accumulating unit 14 is coupled to the health parameter identifying module 12 and configured to accumulate and store the parameters of health data. The classification counting and analyzing unit 16 is coupled to the digital data accumulating unit 14 and configured to count and analyze the parameters of health data. For example, the classification counting and analyzing unit 16 analyzes the parameters of health data to correspond to the health data pre-stored in the pediatric health data module 20 or the health data derived from different health levels, and then analyzes and compares the obtained health data.

[0015] The health status assessing module 18 is coupled to the classification counting and analyzing unit 16 and configured to assess level and medical specialty to which the health status of the health data belongs on the basis of the health status of the analyzed health data. Here, the operation of assessing the health status or providing advices which is completed by the health parameter identifying module 12, the digital data accumulating unit 14, the classification counting and analyzing unit 16 and the health status assessing module 18 can be done by central processing units (CPU), high-speed microcontrollers, or high-speed microprocessors, and the present disclosure is not limited thereto.

[0016] The pediatric health data module 20 is coupled to the graphic processing unit 10 and configured to store and record the health status or the health data transmitted from the graphic processing unit 10 and provide and transmit the pediatric health data to the graphic processing unit 10 for serving as reference data on intelligent learning for pediatrics. The plurality of health data modules such as a dermatological health data module 22, an orthopedic health data module 24 and a dental health data module 26 are respectively coupled to the graphic processing unit 10 and configured to store and record the health status or the health data transmitted from the graphic processing unit 10 and to transmit health data about different medical specialties to the graphic processing unit 10 for serving as reference data on intelligent learning for different medical specialties.

[0017] An output of the dermatological health data module 22 is coupled to an input of the graphic processing unit 10 and an input of the dermatological

health data module 22 is coupled to an output of the graphic processing unit 10, for processing and then storing and recording the health status or the health data transmitted from the graphic processing unit 10 and providing dermatological health data to the graphic processing unit 10 for serving as reference data on intelligent learning for family physicians in dermatological specialty. For example, if a family physician is professional in pediatrics, but the patient the family physician diagnoses is suffering from dermatological diseases, the intelligent health platform of the present disclosure is capable of providing the pediatrician with medical diagnostic advices related to dermatological diseases, so that the patient does not have to make an appointment with a dermatologist. The present disclosure is advantageous to family physicians in remote regions and rural areas where medical resource is inadequate.

[0018] Similarly, an output of the orthopedic health data module 24 is coupled to an input of the graphic processing unit 10 and an input of the orthopedic health data module 24 is coupled to an output of the graphic processing unit 10, for processing and then storing and recording the health status or the health data transmitted from the graphic processing unit 10 and providing orthopedic health data to the graphic processing unit 10 for serving as reference data on intelligent learning for family physicians in orthopedic specialty. Consequently, by virtue of the present disclosure, a family physician who is professional in pediatrics can obtain medical diagnostic advices related to orthopedic diseases; in addition, the provided technical solution can assist the family physicians in remote regions and rural areas where medical resource

is inadequate in obtaining supplementary data about other medical specialties and providing patients with professional medical diagnostic advices and health information, thereby using medical resource effectively and efficiently. Likewise, an output of the dental health data module 26 is coupled to an input of the graphic processing unit 10 and an input of the dental health data module 26 is coupled to an output of the graphic processing unit 10, for processing and then storing and recording the health status or the health data transmitted from the graphic processing unit 10 and providing dental health data to the graphic processing unit 10 for serving as reference data on intelligent learning for family physicians in dental specialty.

[0019] The family physician pediatric clinic interface 50 is coupled to an output of the graphic processing unit 10 and configured to couple the intelligent health platform 1 with a family physician pediatric clinic 5. In addition, the family physician dental clinic interface 52 is coupled to an output of the graphic processing unit 10 and configured to couple the intelligent health platform 1 with a family physician dental clinic. That is to say, the family physician pediatric clinic interface 50 and the family physician dental clinic interface 52 enable the intelligent health platform 1 of the present disclosure to couple with the family physician in the clinic 5 in which HIS has been installed and provide the function of updating data, training and learning, so that the family physician can obtain the necessary medical advices and information.

[0020] The at least one patient end is coupled to the family physician pediatric clinic interface 50 and the family physician dental clinic interface 52, which is to describe an end of a family physician treating the least one patient.

Referring to FIG. 2, the at least one patient end includes a patient suffering from influenza treatment end 70, a patient suffering from dermatological disease diagnosis end (providing medical diagnostic advices) 72, a patient suffering from dental disease diagnosis end (providing medical diagnostic advices) 74, and a patient suffering from dental disease treatment end 76, in which the patient suffering from influenza treatment end 70, the patient suffering from dermatological disease diagnosis end (providing medical diagnostic advices) 72 and the patient suffering from dental disease diagnosis end (providing medical diagnostic advices) 74 are coupled to the family physician pediatric clinic interface 50. In this case, the family physician in the pediatric clinic can obtain medical diagnostic advices or supplementary information about dermatological, orthopedic and dental diseases effectively and efficiently through the intelligent health platform 1 of the present disclosure, thereby broadening the scope of the family physician in the pediatric clinic diagnosing and treating patients suffering from different diseases. The patient suffering from dental disease treatment end 76 is independently coupled to the family physician dental clinic interface 52; that is, the family physician professional in dentistry is capable of directly treating the patient suffering from dental diseases. The treatment ends or the diagnosis end are provided to exemplarily describe the end between patients and family physicians or the process of providing treatment and/or medical diagnostic advices.

[0021] In one exemplary embodiment of the present disclosure, the intelligent health platform 1 can be installed with pediatric health data module

20, the dermatological health data module 22 and the orthopedic health data module 24 without installing the dental health data module 26 and the family physician dental clinic interface 52. Besides, the intelligent health platform 1 can also be installed with the patient suffering from influenza treatment end 70, the patient suffering from dermatological disease diagnosis end (providing medical diagnostic advices) 72 and the patient suffering from dental disease diagnosis end (providing medical diagnostic advices) 74 without installing the patient suffering from dental disease treatment end 76. By arranging the modules and interface in this manner, the exemplary embodiment of the present disclosure is applicable to family physicians in general pediatric clinics, facilitating the obtainment of professional medical diagnostic advices and supplementary health information in addition to their own medical specialty.

[0022] FIG. 3 is a flow chart of a module A according to an embodiment of the present disclosure. When the patient 7 visits at least one clinic 5, the intelligent health platform 1 is connected to the clinic 5, and the intelligent healthcare system executes the following steps of: S10: the patient seeking medical advice in the clinic; S11: the clinic inputting the patient's symptom to the intelligent health platform; S12: the intelligent health platform corresponding to a module A, such as a pediatric health data module, or one of the plurality of health data modules, and conducting data query.

[0023] After that, as shown in FIG. 3, S13: the intelligent health platform producing medical diagnostic advices; S14: the intelligent health platform transmitting the medical diagnostic advices to the clinic; S15: the clinic providing the medical diagnostic advices and prescription drug to the

patient; S16: the intelligent health platform implementing learning reinforcement to the corresponding pediatric health data module or other medical specialties health data module according to the medical diagnostic advices; and S17: the corresponding health data module updating the health data after implementation of the learning reinforcement, in which S14 and S16 are conducted simultaneously. The above steps are provided to complete the method of the intelligent health platform of the intelligent healthcare system of the present disclosure according to an exemplary embodiment.

[0024] Reference is made to FIG. 4. When the patient 7 visits at least one clinic 5 of which the family physician is professional dental specialty, the intelligent health platform 1 is connected to the clinic 5, and the intelligent healthcare system executes the following steps of: S20: the patient seeking medical advice in the clinic; S21: the clinic inputting the patient's symptom to the intelligent health platform; S22: the intelligent health platform corresponding to a module B, such as a dental health data module, or one of the plurality of health data modules, and conducting data query; and S23: the intelligent health platform producing medical diagnostic advices.

[0025] As shown in FIG. 4, after S23, S24 and S26 are simultaneously executed. The steps further include: S24: the intelligent health platform providing medical diagnostic advices to the clinic, in which the family physician in the clinic is professional in dental specialty; S25: the clinic providing the medical diagnostic advices and prescription drug to the patient; S26: the intelligent health platform implementing learning reinforcement to the corresponding dental health data module or other medical specialties health

data module according to the medical diagnostic advices; and S27: the corresponding health data module updating the health data after implementation of the learning reinforcement. The above steps are provided to complete the method of the intelligent health platform of the intelligent healthcare system of the present disclosure according to another exemplary embodiment.

[0026] In summary, by means of the intelligent healthcare system provided by the present disclosure, a family physician can obtain medical diagnostic advices related to other diseases in addition to his/her own medical specialty; in addition, the provided technical solution can assist the family physicians in remote regions and rural areas where medical resource is inadequate in obtaining supplementary data about other medical specialties and providing patients with professional medical diagnostic advices and health information, thereby using medical resource effectively and efficiently. As a result, the present disclosure is capable of overcoming the deficiencies of conventional HISs effectively, and family physicians can further benefit greatly from the intelligent healthcare system of the present disclosure.

[0027] The above-mentioned descriptions represent merely the exemplary embodiment of the present disclosure, without any intention to limit the scope of the present disclosure thereto. Various equivalent changes, alterations or modifications based on the claims of the present disclosure are all consequently viewed as being embraced by the scope of the present disclosure.

WHAT IS CLAIMED IS:

1. An intelligent healthcare system, comprising an intelligent health platform which is simultaneously connected with a remote server and at least one clinic; wherein the remote server is a plurality of big data required for providing to the intelligent health platform, and wherein the intelligent health platform comprises:

a graphic processing unit, comprising:

a health parameter identifying module configured to receive parameters of health data and identify what kind of medical specialty the parameters of health data belong to;

a digital data accumulating unit coupled to the health parameter identifying module and configured to accumulate and store the parameters of health data;

a classification counting and analyzing unit coupled to the digital data accumulating unit and configured to count and analyze the parameters of health data; and

a health status assessing module coupled to the classification counting and analyzing unit and configured to assess the health status of the health data according to the health status of the analyzed health data;

a pediatric health data module coupled to the graphic processing unit and configured to store and record the health status or the health data transmitted from the graphic processing unit and to transmit pediatric health data to the graphic processing unit for serving as reference data on intelligent learning for pediatrics;

a plurality of health data modules respectively coupled to the graphic processing unit and configured to store and record the health status or the health data transmitted from the graphic processing unit and to transmit health data about different medical specialties to the graphic processing unit for serving as reference data on intelligent learning for different medical specialties;

a family physician pediatric clinic interface coupled to an output of the graphic processing unit and configured to couple the intelligent health platform with a family physician pediatric clinic, and

at least one patient end coupled to the family physician pediatric clinic interface which is an end of a family physician treating the least one patient.

2. The intelligent healthcare system according to claim 1, wherein the plurality of health data modules comprise a dermatological health data module, wherein an output of the dermatological health data module is coupled to an input of the graphic processing unit and an input of the dermatological health data module is coupled to an output of the graphic processing unit, for processing and then storing and recording the health status or the health data transmitted from the graphic processing unit and providing dermatological health data to the graphic processing unit for serving as reference data on intelligent learning for family physicians in dermatological specialty.

3. The intelligent healthcare system according to claim 1, wherein the plurality of health data modules comprise an orthopedic health data module, wherein an output of the orthopedic health data module is coupled to an input of the graphic processing unit and an input of the orthopedic health data

module is coupled to an output of the graphic processing unit, for processing and then storing and recording the health status or the health data transmitted from the graphic processing unit and providing orthopedic health data to the graphic processing unit for serving as reference data on intelligent learning for family physicians in orthopedic specialty.

4. The intelligent healthcare system according to claim 1, wherein the plurality of health data modules comprise a dental health data module, wherein an output of the dental health data module is coupled to an input of the graphic processing unit and an input of the dental health data module is coupled to an output of the graphic processing unit, for processing and then storing and recording the health status or the health data transmitted from the graphic processing unit and providing dental health data to the graphic processing unit for serving as reference data on intelligent learning for family physicians in dental specialty.

5. The intelligent healthcare system according to claim 1, comprising a family physician dental clinic interface coupled to an output of the graphic processing unit and configured to couple the intelligent health platform with a family physician dental clinic.

6. The intelligent healthcare system according to claim 1, wherein the at least one patient end coupled to the family physician pediatric clinic interface comprises a patient suffering from influenza treatment end.

7. The intelligent healthcare system according to claim 1, wherein the at least one patient end coupled to the family physician pediatric clinic interface comprises a patient suffering from dermatological disease treatment end.

8. The intelligent healthcare system according to claim 1, wherein the at least one patient end coupled to the family physician pediatric clinic interface comprises a patient suffering from dental disease treatment end.

9. The intelligent healthcare system according to claim 1, when the at least one clinic is coupled to the intelligent health platform and when a patient visits the at least one clinic, comprising steps of:

the clinic inputting the patient's symptom to the intelligent health platform;

the intelligent health platform corresponding to the pediatric health data module or one of the plurality of health data modules and conducting data query;

the intelligent health platform producing medical diagnostic advices;

the intelligent health platform transmitting the medical diagnostic advices to the clinic; and

the clinic providing the medical diagnostic advices and prescription drug to the patient.

10. The intelligent healthcare system according to claim 9, after the intelligent health platform completing the steps of producing the medical diagnostic advices, comprising:

the intelligent health platform implementing learning reinforcement to the corresponding health data module according to the medical diagnostic advices; and

the corresponding health data module updating the health data after implementation of the learning reinforcement.