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COMPLETE SPECIFICATION
(See section 10 and rule 13)

1. TITLE OF THE INVENTION

PROCESS FOR PROVIDING EFFECTIVE DATA REGARDING ISSUES RAISED BY BACK PAIN AND NECK PAIN DUE TO PHYSICAL ACTIVITIES

2. APPLICANT

(i) NAME : Manisha Pravin Mali
(ii) NATIONALITY : IN
(iii) ADDRESS : Assistant Professor Department of Computer Engineering, Vishwakarma Institute of Information Technology, Pune

(i) NAME : Shashank Madhav Kapile
(ii) NATIONALITY : IN
(iii) ADDRESS : Alumni, Vishwakarma Institute of Information Technology, Pune

(i) NAME : Saurabh Gajanan Koshatwar
(ii) NATIONALITY : IN
(iii) ADDRESS : Alumni, Vishwakarma Institute of Information Technology, Pune

(i) NAME : Hrushikesh Sanjay Baravkar
(ii) NATIONALITY : IN
(iii) ADDRESS : Alumni, Vishwakarma Institute of Information Technology, Pune

(i) NAME : Sarthak Tushar Gophane

(ii) NATIONALITY : IN

(iii) ADDRESS : Alumni, Vishwakarma Institute of Information Technology, Pune

2. PREAMBLE TO THE DESCRIPTION

COMPLETE

The following specification particularly describes the invention and the manner in which it is to be performed.

FIELD OF THE INVENTION

The present invention generally relates to neuro – spine medical data analytics and in particularly relates to a process for providing effective data regarding issues raised by back pain and neck pain due to physical activities.

BACKGROUND OF THE INVENTION

With day to day enhancement in technology, performing even the hardest of the tasks have become much simpler. Also, the lifestyle of the people has changed a lot due to this simplicity of work. Very less movement of body is done in day to day activities and mostly the lifestyle has changed to sedentary lifestyle where work gets completed at a click of a button. Such lifestyle has adverse effects on the body and may lead to many spine related problems.

Spinal cord is the biggest nerve of the human body and has access to all the nerves throughout the body. Problems occurring at various regions of the body may or may not be related to spinal cord. Hence there is a need of a system that can effectively detect, analyze and remedy these issues related to spinal cord.

There are many techniques developed to monitor and gather data related to spinal movement. But these techniques are restricted to only monitoring and alerting the user about incorrect posture through some bio-feedback. Such techniques may also need some wearables to keep a track of the movements of the spine. They are not capable of defining the analyzing the data gathered and providing intensity of the pain which would help doctors get more insights and treat patients in a better way.

In one solution, an apparatus and a method are provided for improving the medical care of patients. The apparatus includes an input device, a medical risk database, a data processor, and a communication device. Data entered in the input device, usually by a health care professional, defines a patient data record. The medical risk database associates certain patient data entered into the data record, which increases the risk of a missed medical care opportunity, with

additional medical care to address the risk. The communication device responds to the identification of patient data presenting a medical risk by communicating to a health care professional additional medical care selected to identify and take advantage of a medical care opportunity.

In one solution, systems and methods are disclosed of analyzing healthcare data. In one embodiment, a Medical National Operations Center application (MNOC) displays clear, concise and actionable information, with visual indicators, to help Line of Service (LOS) teams to manage their operations by providing a dashboard of information. For example, the application may present selected summaries of data, baseline targets, customized metrics and interactive alerts that will be used to monitor, analyze and measure LOS performance. In one embodiment, the systems and methods of the present invention may be implemented in a health insurance provider system. As such, the present invention may provide access to additional, real-time data to evaluate initiatives allowing the LOS to react quickly to variances and expected results. Further, the present invention may provide tools to evaluate the effectiveness and performance of initiatives and programs, such as, for example, member steerage tools.

In one solution, a hospital computerized system includes terminals in all departments for entering information pertinent to a patient's stay. The initial information entered includes the patient's history, admitting physician's physical examination results, and physician's orders for tests or hospital services to be performed. The system prints a history and physical report for the patient's chart and highlights abnormal findings and complaints. The system schedules and reschedules all hospital services for the patient on a priority basis, thereby eliminating this responsibility from the nurses and other hospital personnel, and avoids situations where the patient is scheduled to be in two places simultaneously. The system receives and stores all test results and technician's, nurses, and doctor's notes and prints a summarized discharge planning document and a narrative discharge report for the chart, as well as a patient instruction document.

In another solution, a method is disclosed for processing medical records, the method comprising: converting, by a computer, a set of medical records into a computer-readable form; searching, by the computer, the converted set of medical records to locate data of interest (DOI);

extracting, by the computer, the DOI from the converted set of medical records; and generating, by the computer, a summary report comprising the extracted 10 DOI.

The existing systems do not create doctor's and patient's profile. In addition of, the existing systems don't recognize multiple patterns and trends to tackle various symptoms for issues faced and their correlation, which are required to be improved. Further, the existing systems don't recommend remedies for issues recognized through patterns for doctor's reference and recommending appropriate neuro – spine doctors for patients. Therefore, there exists a need to have a better process for providing effective data regarding issues raised by back pain and neck pain due to physical activities.

SUMMARY OF THE INVENTION

The present invention generally relates to neuro – spine medical data analytics and in particularly relates to a process for providing effective data regarding issues raised by back pain and neck pain due to physical activities.

In an embodiment, a process of process for providing effective data regarding issues raised by back pain and neck pain due to physical activities is provided. The process includes the steps of: entering data related to back and neck regions into a mobile application interface by an user; transferring entered data to a server for data pre processing; constructing model using a multiple classifier in the server for data processing of entered data; comparing entered data with pre stored data in the server by using machine learning and data analysis techniques, wherein pre stored data is related to back pain and neck pain medical reports; providing predictions and remedy recommendations to the mobile application interface by the server; and displaying report on a screen of the mobile application interface to the user.

An object of the present invention is to gather detailed data of patients related to back and neck from sources like personalized multiple-choice questions, etc

Another object of the present invention is to create doctor's and patient's profile.

Another object of the present invention is to analyze personalized patient profiles and visualize reports.

Another object of the present invention is to recognize multiple patterns and trends to tackle various symptoms for issues faced and their correlation.

Another object of the present invention is to recommend remedies for issues recognized through patterns for doctor's reference and recommending appropriate neuro – spine doctors for patients.

To further clarify advantages and features of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof, which is illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail with the accompanying drawings.

BRIEF DESCRIPTION OF FIGURES

These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

Figure 1 shows a flowchart for a process of providing effective data regarding issues raised by back pain and neck pain due to physical activities;

Figure 2 shows system architecture for providing effective data regarding issues raised by back pain and neck pain due to physical activities in accordance with an embodiment of the present invention;

Figure 3 shows exemplary data flow diagram in accordance with an embodiment of the present invention;

Figure 4 shows case diagram for admin, patient and doctor in accordance with an embodiment of the present invention;

Figure 5 shows activity diagram of a process of providing effective data regarding issues raised by back pain and neck pain due to physical activities; and

Figure 6 shows sequence diagram of a process of providing effective data regarding issues raised by back pain and neck pain due to physical activities.

Further, skilled artisans will appreciate that elements in the drawings are illustrated for simplicity and may not have been necessarily been drawn to scale. For example, the flow charts illustrate the method in terms of the most prominent steps involved to help to improve understanding of aspects of the present invention. Furthermore, in terms of the construction of the device, one or more components of the device may have been represented in the drawings by conventional symbols, and the drawings may show only those specific details that are pertinent to understanding the embodiments of the present invention so as not to obscure the drawings with details that will be readily apparent to those of ordinary skill in the art having benefit of the description herein.

DETAILED DESCRIPTION:

For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated system, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

It will be understood by those skilled in the art that the foregoing general description and the following detailed description are exemplary and explanatory of the invention and are not intended to be restrictive thereof.

Reference throughout this specification to “an aspect”, “another aspect” or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrase “in an embodiment”, “in another embodiment” and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

The terms "comprises", "comprising", or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a process or method that comprises a list of steps does not include only those steps but may include other steps not expressly listed or inherent to such process or method. Similarly, one or more devices or sub-systems or elements or structures or components proceeded by "comprises...a" does not, without more constraints, preclude the existence of other devices or other sub-systems or other elements or other structures or other components or additional devices or additional sub-systems or additional elements or additional structures or additional components.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The system, methods, and examples provided herein are illustrative only and not intended to be limiting.

Embodiments of the present invention will be described below in detail with reference to the accompanying drawings.

The present invention generally relates to neuro – spine medical data analytics and in particularly relates to a process for providing effective data regarding issues raised by back pain and neck pain due to physical activities.

Figure 1 illustrates a flowchart for a process for providing effective data regarding issues raised by back pain and neck pain due to physical activities. The process 100 includes the steps of: Step 102 of entering data related to back and neck regions into a mobile application interface by an user; Step 104 of transferring entered data to a server for data pre processing; Step 106 of constructing model using a multiple classifier in the server for data processing of entered data; Step 108 of comparing entered data with pre stored data in the server by using machine learning and data analysis techniques, wherein pre stored data is related to back pain and neck pain medical reports; Step 110 of providing predictions and remedy recommendations to the mobile application interface by the server; and Step 112 of displaying report on a screen of the mobile application interface to the user.

In an embodiment, the process 100 further includes the steps of entering personal information of patient in the mobile application interface.

In an embodiment, the process 100 further includes filling questionnaire activity in the mobile application interface, wherein the patient having many questionnaire category related to back pain and neck pain.

In an embodiment, the machine application interface having a profile activity that shows patient details includes predictions, remedy recommendations and all present and previous medical reports.

In an embodiment, the data having information related to patient medical reports, answers of pre stored questions, graphical representation and previous patient data in mobile application interface.

In an embodiment, the mobile application interfaces creates an individual patient profile so that doctors able to monitor and analyze each patient individually.

In an embodiment, remedy recommendations include various exercise suggestion and generic medical remedies.

In an embodiment, the data gets stored in the server and the mobile application interface.

In an embodiment, the mobile application interface provides visualizations which would also help doctors to make effective and informed decisions.

Figure 2 shows system architecture for providing effective data regarding issues raised by back pain and neck pain due to physical activities in accordance with an embodiment of the present invention. The overall architecture provides these parts:- the input from patients to mobile application. The mobile application would include patient profiling, questionnaire input and report generation. The system aims at assisting doctors and patients get effective analysis and deeper insights about the issues raised due to poor body posture, bad lifestyle, sedentary job at workplace, etc. and other such related issues raised due to physical activities.

The NSMDAS server includes all the data storage along with data analytics procedures like data pre-processing, model construction and prediction. It would also include Remedy and Doctor Recommendation along with Data Analysis and Report Generation.

It involves gathering the data for the patient through and Android application. This gathered data is then sent over for performing analysis and predicting the severity of the problem faced by the patient. It recommends remedies depending upon the severity.

Figure 3 shows exemplary data flow diagram in accordance with an embodiment of the present invention. The mobile application would create an individual patient profile so that doctors can monitor and analyze each patient individually. The mobile application would be used to gather current information about the patient through MCQ's and graphical representations to send it to the server. The server would then analyze the information based on all the training done till date and would provide predictions to the problem analyzed. It would also suggest remedies that need to be taken by the patient.

Figure 4 shows case diagram for admin, patient and doctor in accordance with an embodiment of the present invention. The Neuro – Spine Medical Data Analytics System (NSMDAS) is a system which assists doctors and patients get effective analysis and deeper insights about the issues raised for back and neck pain due to physical activities. NSMDAS also provides detailed analysis related to various problems occurring at back and neck regions and can suggest effective remedies to temporarily overcome the pain in the affected regions. The NSMDAS would also train itself from the data collected from upcoming patients and would also predict the problem the patient is likely to face in the near future. The system also provides various visualizations which would also help doctors to make effective and informed decisions.

Figure 5 shows activity diagram of a process of providing effective data regarding issues raised by back pain and neck pain due to physical activities. The system provides simplicity and portability as it is based on our everyday use smart phones. It doesn't not required any kind of wearables and analysis is purely done on the basis of data gathered by the questionnaires. It provides better availability and compatibility with enhanced visualizations for efficient decision making. The system analyzes the data gathered unlike other techniques which are mainly used for monitoring and alerting purposes. The NSMDAS consists of a portable mobile-application which would be suitable for both patients and doctors to use. The system consists of centralized client-server architecture where all the processing and analysis will be performed.

Figure 6 shows sequence diagram of a process of providing effective data regarding issues raised by back pain and neck pain due to physical activities. The training of the model would be done through data gathered by multiple sources like MCQ, graphical representation and previous patient data. The system would also perform textual information extraction on patients text reports generated through various medical tests taken. The model would provide solutions to general and specialized problems as well. The model would map the pattern and the traits using current input given and would offer solutions. The data would be stored completely on the database server for easy access. The doctors would be able to get insights through various visualization graphs for multiple categories of patients. The remedy recommendation would include various exercise suggestion and generic medical remedies that are easily available. The

system would allow doctors to effectively map various types of patients to different categories and take more informed decisions

In an implementation, the system is enhanced using various techniques: a real-time posture detection and data gathering technique is provided as input for further processing and analysis. Specialized question set generation based on patient treatment progress. Information extraction module is configured to extract details from doctor and review and comments which can also be used for processing accordingly. A specialized analysis targeted to specific patient or group of patients for medical research purposes.

The drawings and the forgoing description give examples of embodiments. Those skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, orders of processes described herein may be changed and are not limited to the manner described herein. Moreover, the actions of any flow diagram need not be implemented in the order shown; nor do all of the acts necessarily need to be performed. Also, those acts that are not dependent on other acts may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific examples. Numerous variations, whether explicitly given in the specification or not, such as differences in structure, dimension, and use of material, are possible. The scope of embodiments is at least as broad as given by the following claims.

Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any component(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature or component of any or all the claims.

We claim:

1) A process for providing effective data regarding issues raised by back pain and neck pain due to physical activities, said process comprising:

entering data related to back and neck regions into a mobile application interface by an user;

transferring entered data to a server for data pre processing;

constructing model using a multiple classifier in the server for data processing of entered data;

comparing entered data with pre stored data in the server by using machine learning and data analysis techniques, wherein pre stored data is related to back pain and neck pain medical reports;

providing predictions and remedy recommendations to the mobile application interface by the server; and

displaying report on a screen of the mobile application interface to the user.

2) The process as claimed in claim 1 further comprising of entering personal information of patient in the mobile application interface.

3) The process as claimed in claim 1 further comprising of filling questionnaire activity in the mobile application interface, wherein the patient having many questionnaire category related to back pain and neck pain.

4) The process as claimed in claim 1, wherein the machine application interface having a profile activity that shows patient details includes predictions, remedy recommendations and all present and previous medical reports.

5) The process as claimed in claim 1, wherein data having information related to patient medical reports, answers of pre stored questions, graphical representation and previous patient data in mobile application interface.

6) The process as claimed in claim 1, wherein the mobile application interfaces creates an individual patient profile so that doctors able to monitor and analyze each patient individually.

7) The process as claimed in claim 4, wherein remedy recommendations include various exercise suggestion and generic medical remedies.

8) The process as claimed in claim 1, wherein the data gets stored in the server and the mobile application interface.

9) The process as claimed in claim 1, wherein the mobile application interface provides visualizations which would also help doctors to make effective and informed decisions.

Dated this 23rd day of March, 2020

Rajat

RAJAT MALHOTRA

Agent for the Applicant [IN/PA-1775]

ABSTRACT

PROCESS FOR PROVIDING EFFECTIVE DATA REGARDING ISSUES RAISED BY BACK PAIN AND NECK PAIN DUE TO PHYSICAL ACTIVITIES

The present invention generally relates to neuro – spine medical data analytics and in particularly relates to a process for providing effective data regarding issues raised by back pain and neck pain due to physical activities. The process includes the steps of: entering data related to back and neck regions into a mobile application interface by an user; transferring entered data to a server for data pre processing; constructing model using a multiple classifier in the server for data processing of entered data; comparing entered data with pre stored data in the server by using machine learning and data analysis techniques, wherein pre stored data is related to back pain and neck pain medical reports; providing predictions and remedy recommendations to the mobile application interface by the server; and displaying report on a screen of the mobile application interface to the user.