THE FURTHER VISIT OF THE PATIENT USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT

The article shows that AI usage can ease the doctors' everyday work. It can cope with the tasks which are too hard for a person. The most difficult ones are data analysis and different kinds of predictions. It is even possible to predict the further visit of the patient using AI. Apart from the problems of PHRs representation formats is the problem of current PHR system's passivity, i.e., they just provide a means for managing individuals PHR but they neither analyze nor provide potential improvements to individual's healthcare. This is regrettable, as active PHR systems could provide a wide variety of cost-effective opportunities for improving the quality of healthcare. An important goal of PHR is the ability to predict the future of the patient (Patient's health situation and the diagnosis of diseases and medicines that must be taken by the patient). To predict the further visit of a patient, the following data need to be analyzed: patient's register number, previous date of visit and disease. For analyzing these features such program as KERAS NEURALNETWORK can be used.

KEYWORDS: Artificial neural networks, keras, technological development, personal health record, tools.

INTRODUCTION

It is well known that technological development has led to an improvement in medical services. Among the modern applications of these digital systems are the PHRs, which are used in many fields of medical applications. This document is the most used of the PHR in predicting and predicting diseases, identifying the most appropriate drugs for the treatment of diseases and controlling the patient's health in the future. In addition, PHR plays a leading role in creating a knowledge to make more accurate decisions.

The intelligence presented by machines or software is known as artificial intelligence (AI). While the human brain perceives its environment and then makes such a decision, artificial intelligence research also aims to make the intelligent agent able to understand the environment and then be able to make decisions, through an artificial neural network. Artificial intelligence research is deeply divided into subdomains that sometimes do not communicate with each other. Some divisions are due to social and cultural factors, are also divided into technical issues, such as some subdomains related to the resolution of specific problems and others that focus on approaches or the use of particular tools or towards the achievement. particular applications. Reasoning, knowledge, planning, learning, natural language processing (communication), perception, ability to move and manipulate objects are the elements of artificial intelligence. Tools through which the search for artificial intelligence is implemented and mathematical optimization, logic, methods based on probability and economics and many others. The field of artificial intelligence is interdisciplinary involves many sciences and professions converge such as computer science, mathematics, psychology, linguistics, philosophy and neuroscience, artificial psychology.[1]

The objective of artificial intelligence to make software and computers asthe human brain for this, a thorough analysis of the natural brain is necessary because this great contribution of all the written fields becomes very important.

Nowadays, it has become an essential part of the technology industry, providing heavy work for most of the most difficult problems in computer science. Basically, Big Data is a large collection of digital information that is continuously developing through many channels such as emails, social networks, user-generated content such as photos and videos, customer and B2B transactions, phones portable equipped with GPS, social networks (WhatsApp, hiking, etc.), system records of all kinds. These sources provide a continuous flow of digital information with no limit defined called Big Data. Massive data can act as a driving force that can affect the profits of the organization. With Big Data, you can better understand your customers, employees, partners and operations.[2]

Population and source of data

The origin of this compound by patients was a study of primary care MIMIC-III, the basis of a large data public health data environmental Anonymous thousand patients hospitalized in Intensive Care Units. of Beth Deaconess Medical. Centered between 2001 and 2012. The Demographic Data Database Includes Measurements vital signs in the head, Results of

Laboratory Tests, Procedures, Medications, Notes of Medical Nurses there, Hospital Mortality. MIMIC is compatible with a wide range of analytical studies covering epidemiology, improvement of clinical standards and development of electronic tools. They are remarkable because they are very real, it covers a diverse and very large population of intensive care patients and It contains high-resolution temporal data, which includes laboratory results, electronic documentation and trends, and waveforms of the bedside monitor.[3]

Patient's data processing

Personal Health Record (PHR) contains data on patients that visit the hospital. It includes patient's register numb, visit number,date and time of visit, disease, treatment, admission time and date, release date and time, discharge time and date and so on.[4]

Another important goal of PHR is the ability to predict the future of the patient (the health situation of the patient and the diagnosis of diseases and medicines that must be taken by the patient).

Each medical photo, examination protocol and medical history contains information that allows medical workers to accurately diagnose and prescribe treatment. Unfortunately, even experienced doctors do not always see the full picture of the disease, because the data in the medical record is not structured, and the medical history can be too voluminous. The effectiveness of their work is also affected by fatigue and in some cases by lack of knowledge in narrow areas.[6]

Some diseases, such as cancer, can be defeated if non-obvious symptoms are recognized and the treatment begins. According to Google, every tenth patient suffers from a misinterpretation of medical information.

Artificial intelligence can solve this problem. "Smart" developments for assessing the patient's condition and preliminary diagnosis are offered by Google (Deepmind Health) and IBM (Watson Health).[7]

Improved scheduling and routine automation

Patients often cancel a visit to a doctor. That is why the patient's recovery may slow down. This leads to losses: it was calculated that in the USA the additional costs for each patient who canceled the visit amounted to an average of $200.

To reduce this figure, a new approach to management is required. It is important to take into account the seriousness of the patient's complaints, the weather conditions in the region, the congestion of roads, even the character of a person.

Of course, this is beyond the strength of the hospital staff, but it's possible to do with AI. It will take into account a lot of "trifles" and reduce the burden on the medical institution during rush hours.

To predict the further visit of a patient, the following data need to be analyzed: patient's register number, previous date of visit and disease. For analyzing these features such program as KERAS NEURALNETWORK can be used.

Keras is a powerful easy-to-use Python library for developing and evaluating deep learning models. It wraps the efficient numerical computation libraries Theano and TensorFlow and allows you to define and train neural network models in a few short lines of code.[4]

The typical Keras workflow looks just like that example
- ➢ Define training data: input tensors and target tensors.
- ➢ Define a network of model that maps inputs to targets.
- ➢ Configure the learning process by choosing a loss function, an optimizer, and some metrics to monitor.
- ➢ Iterate on your training data by calling the fit () method of your model.

There are two ways to define a model: using the Sequential class or the functional API.

A two-layer model defined using the Sequential class

From keras import models

From keras import layers

Model = models. Sequential

Model. add (layers. Dense (32, activation='relu', input_shape=(784,)

Model. Add (layers. Dense (10, activation='softmax')

The model defined using the functional API

Input_tensor = layers. Input (shape= (784,)

x = layers. Dense (32, activation='relu')(input_tensor)

Output_tensor = layers. Dense (10, activation='softmax') (x)

Model = models. Model (inputs=input_tensor, outputs=output_tensor)

With the functional API, we can manipulating the data tensors that the model processes and applying layers to this tensor.

RESULTS AND DISCUSSION

The proposed system is consists of several phases.

These steps consist of

1) Input the user query

2) Apply the Artificial Intelligence-based algorithm

3) Analyzer

4) Return the results.

Personal health record contains data of patients that visit the hospital. Features include patient's reg. numb, visit numb, data and time of visit, admissions numb, wad numb, disease, treatment, admit time and date, release date and time, discharge time and date. Now we can do a number of analysis on this dataset like to predict patient's next visit date (day, month, and year), disease prediction and treatment prediction.

After feature analysis and data cleaning main features that can be used in patient's next visit are patient's Patient ROW_ID, previous date (e.g. discharge date) and disease.

When the required data is entered thenKeras algorithm will apply on these data (Patient ROW_ID, previous date (e.g. discharge date) and disease).

Visit date split (as given in dataset) into the day, month and year like vise split discharge date into the day, month and year. Then Data is divided into two categories as numerical and categorical. Numerical contains training features (pat reg., discharge day, month, year, disease) and categorical include prediction features as visit day, visit month and year.

CONCLUSIONS

Artificial neural networks are a powerful tool to help doctors perform diagnostics and other operations. In this sense, artificial neural networks have several advantages, including, the ability to process a large amount of data and reduced diagnostic time. Artificial neural networks have proved adequate for the satisfactory diagnosis of various diseases. In addition, its use makes the diagnosis more reliable.

REFERENCES

1. F. Amato, A. López, E. M. Peña-Méndez, P. Vaňhara, A. Hampl, and J. Havel, "Artificial neural networks in medical diagnosis," J. Appl. Biomed., 2013; 11(2): 47–58.

2. L. Sharma and V. Srivastava, "Performance Enhancement of Information Retrieval via Artificial Intelligence," Print, 2017; 1(1): 187–192.

3. E. Choi et al., "D Octor AI : P Redicting C Linicale Vents VIA R Ecurrentn Euraln Etworks,", 2016; 1–5.

4. Teije, A., Popow, C., Holmes, J. H. & Sacchi, L. Artificial Intelligence in Medicine: 16th Conference on Artificial Intelligence in Medicine, AIME 2017, Vienna, Austria, Proceedings. – Springer, 2017; 369.

5. A. N. H Zaied, M. Elmogy, and S. A. Elkader, "Electronic Health Records: Applications, Techniques and Challenges," Int. J. Comput. Appl., 2015; 119(14): 38–49.

6. K. Danjuma and A. O. Osofisan, "Evaluation of Predictive Data Mining Algorithms in Erythemato-Squamous Disease Diagnosis," no. Cvd, 2015; 10.

7. Q. Al-Shayea, "Artificial Neural Networks in Medical Diagnosis.," J. Comput. Sci. Issues, 2011; 8(2): 150–154.