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On Management of Artificial Intelligence and 3D Programs in Chronic Diseases

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Abstract

Artificial intelligence is a technology created to produce devices and programs that can learn and behave like humans by transferring human abilities to machines and computers. Artificial intelligence began to be used in the field of health in the 1970 s and this technology continues to be used and developed in many areas of health. The main reason for its use in the field of health is that it provides convenience and practicality in the diagnosis and treatment of diseases. In addition, it provides the right guidance by revealing the correct and reliable results in a short time. In practice, medical decision making, early diagnosis and treatment, drug development, and medical imaging are generally focused on. There are discussions in the field of ethics in the use of artificial intelligence in health. The reason for this is that it is not clear who is to blame and who will be punished when artificial intelligence takes over the duties of doctors and health workers and makes mistakes. In this study, 8 studies dealing with the relationship between artificial intelligence and chronic diseases were examined. Studies include diabetes, hypertension and heart diseases. In the results of the study, it has been determined that artificial intelligence and 3D programs add positivity to the diagnosis and treatment of chronic diseases.

Keywords: Artificial intelligence; Management of chronic diseases; 3D programs

Introduction

Artificial intelligence, which is one of the popular concepts of recent times, is used in health, engineering, business, architecture, art, etc. It is used in many fields and professions. Although it was thought that artificial intelligence would destroy humanity and the world by endangering the human race in the first years, this belief has been replaced by studies made to make our lives easier with artificial intelligence in recent years. Artificial intelligence, which is very useful in the early diagnosis and correct diagnosis of diseases, especially in the field of health, is among the most popular topics in the medical world. The closest example we can give from our daily life can be considered as wearable smart technologies. With smart watches and phones, blood pressure, heart rate, sleep pattern, respiration etc. many more parameters monitor and analyze us during our sleep and wakefulness periods, and when it detects an anomaly, it has the ability to warn us. In a way, it can be said that we carry mini health workers with us at all times.

The aim of this study is to inform the international community and the public about the use of artificial intelligence and 3D programs in the management of chronic diseases, to show the work done in these fields with artificial intelligence and to support the field for more studies. It is also said that occupational groups, which we can describe as the professions of the future, will emerge in the field of artificial intelligence as a result of these developments in the future. Some of these professions will be a plastic and reconstructive and aesthetic surgery 3D printer specialist, virtual hospital manager, deep learning specialist, synthetic organ designer, epigenetic counseling and voice assistant designer providing health care content.

Literature Review

Artificial intelligence

Artificial intelligence encompasses intelligent automated systems that can generate algorithms. It was first created by John McCarthy in 1956 as a concept, dating back to ancient times. Artificial intelligence can also be called a human. The reason for this is that artificial intelligence tries to use it by gaining the features of thinking, making sense and gaining experience like a human in a computer or machine environment. Scope and foundations of artificial intelligence; expert systems, robotics, natural language processing, speech-comprehension, computer vision, philosophy, psychology and mathematics. Artificial intelligence techniques are; artificial neural networks can be considered as fuzzy logic, neural fuzzy logic, genetic algorithms and expert systems. If we need to talk about each technique briefly; Artificial neural networks aim to model learning ability in humans, fuzzy logic aims to find answers to uncertainty, genetic algorithms can be defined as having the ability to learn like living things, and finally, expert systems can be defined as having the ability to create.

World of medicine and artificial intelligence

Thanks to artificial intelligence-based medical imaging, tangible results can be obtained in making more comprehensive and effective diagnoses while diseases of cardiovascular, endocrine, skin, etc. systems, cancers and many other diseases are at the diagnosis stage. When we consider artificial intelligence techniques, for example, we can see that artificial neural networks have an important place in the early diagnosis and treatment of cancer, in the early diagnosis and treatment of MI (Myocardial Infarction). Organizations that use artificial intelligence the most in the medical world are; It is covered by Google deep mind, IBM Watson Paths, Cares kore, Zephyr Medicine, On Cora Medicine, Butterfly Network Enlitic, Artery's, and Bay Labs. Let's take the Butterfly Network, one of the mentioned organizations [1]. The Butterfly network is a healthcare foundation founded in 2011 by DR Jonathan Rothberg, with plans to make medical imaging possible around the world. Hand ultrasound, which is one of the most striking products, can be used from Europe to Africa in the world and the product can be purchased at an affordable price from the organization's website. In addition, they have been working

actively during the pandemic period and have obtained COVID-19 kits that give fast results and offered them for sale at low cost. Another interesting Butterfly Network's Needle *viz* technology, which will benefit nurses all over the world, helps to easily detect needles in the body. Another popular organization; It is known that Google deep mind can diagnose eye diseases with artificial intelligence. Early diagnosis can be made with artificial intelligence, and the prognosis of the disease can be positive. For example, in DM (Diabetics Mellitus), one of the most common chronic diseases, diabetic retinopathy seriously affects the eye. It can lead to blindness. It is a complication that is among the early complications of diabetes mellitus. In a study on diabetic retinopathy in April 2018, artificial intelligence, which makes comments without the need for a doctor, has become the first artificial intelligence device approved by the FDA (Food and Drug Administration).

Artificial intelligence and nursing

Technologies and machines developed with artificial intelligence are very useful in the field of health in the nursing profession. In particular, it adds a lot of positivity to the development of nursing practices. On the other hand, it should not be forgotten that artificial intelligence and 3D imaging methods have both advantages and disadvantages for the nursing profession. Artificial intelligence nurse-care robots cause some concerns for nurses, patients and humanity, such as privacy, discrimination, responsibility issues, employment issues, security issues. Artificial intelligence robots are insufficient to understand and solve the unpredictable situations of patients, and it should not be ignored that nurses can provide better care to unpredictable patient problems by using their critical thinking skills in clinical decision making.

Robots that provide nursing care monitor and record patients and transmit information wirelessly. Thanks to this transfer, although the health services of the patients are provided by establishing virtual intimacy, the privacy of the elderly patients is endangered. Providing robots with access to information without adequate regulations and protocols endanger the patient privacy of all individuals. It is foreseen that nurse-care robots equipped with artificial intelligence will provide a lot of support to nurses in the clinic with their presence in the future, helping to reduce the existing workload and helping to provide more effective care. However, it should not be forgotten that nurse-care robots are never nurses and it should never be ignored that they cannot make decisions by thinking critically, holistically and solution-oriented like a nurse and act like a nurse.

Artificial intelligence and management of chronic diseases

Artificial intelligence has recently been seen as a savior against chronic diseases, so new developments and analyzes can be made constantly. In a master's thesis published in June 2019, artificial intelligence techniques and applications used in heart diseases were discussed. In the thesis, classifier methods consisting of hybrid system ANN and SVM consisting of three different algorithms as SNBM +TBA+Normalization were used. The accuracy rate of the Hybrid and ANN applied system with the Stat log dataset is 88.89%, the accuracy of the Hybrid and SVM applied system is 87.77%, and as a result of the study with the TFEBT dataset, the accuracy rate of the TBA +SNBM+Normalization and SVM algorithms is 89%. 17, the accuracy rate found with PCA+SNBM+Normalization and ANN was 89.91%. It has been concluded that the accuracy rates found with TBA+SNBM +Normalization and SVM, and the accuracy rates found with TBA

+SNBM+Normalization and ANN are quite better than what the doctors thought [2].

In a study conducted in June 2019, a thesis was conducted on the predetermination of diabetes with machine learning methods, and in this thesis, WEKA and Python were used as data mining. Comparisons are analyzed in detail as linear regression, logistic regression and deep neural network analysis methods in Python. According to linear regression, the success was found to be 70%. According to the logistic regression, the success was found to be 275.08%. According to the deep neural network, the success was found to be 80.51%. Linear regression and Logistic Regression analysis methods are discussed in detail in WEKA. According to logistic regression, success is 77.2135%, and according to Linear Regression, success was found to be 84.6013%. The thesis on the diagnosis of diabetes mellitus gave good results, and it was revealed once again that artificial intelligence is very effective and useful in diagnosis [3].

In a study on diabetes diagnosis in 2019, intelligent optimization-based support vector machines were used. The overall success rate of the PSO-DVM system was 74.74%, and the overall success rate of the GA-DVM system was 75.26%. The overall success rate of the GUI-DVM system is 94.27%. The overall success rate of the BYAO-DVM system is 90.63%. The overall success rate of the CTO-DVM system is 91.67%. As a result, it was determined that the desired level was achieved in the diagnosis of diabetes in all methods used [4].

In a thesis written on diabetes in 2010, diabetes classification was made using artificial neural networks. As a result of the study, it was determined that artificial neural networks had a success rate of 96.7% in individuals diagnosed as healthy and 98.3% in individuals diagnosed with diabetes. When considered in general, it has been proven once again that artificial intelligence is an accurate and always open technology in the field of health by giving 97.8% accurate results [5].

In a thesis written in June 2012, it was studied on the development of a system for the diagnosis of HT (Hypertension) with artificial neural network methods. For this study, data were collected from 150 patients and processed into the system. Multilayer sensors, one of the artificial neural network methods, were found to be 81% successful in medical data classification. A success rate of 88% was achieved with the Jordan-Elman method, and 82% with a radial basis function mesh. As a result of the study, it has been determined that it is reasonable to use the Jordan Elman Network method when the multilayer perceptron and radial basis function network performs poorly [6].

Discussion

In recent years, artificial intelligence and 3D technology have been given importance in the management of chronic diseases. In this study, the use of artificial intelligence and 3D technology in chronic patient management is discussed. In this direction, the studies carried out in the last 5 years in our country and in the world were examined.

In a study conducted in England in July 2020, an app was created that provides home rehabilitation for stroke individuals with 3D methods. The study was not completed with 16 participants, and in the clinical evaluations of the study, it was observed that there was an improvement in functional tests p:0.02 and dexterity p:0.02. Participants approached this application called rehab positively [7].

A patient-centered care model was created that deals with the multimorbidity method with the 3D approach, which was published in

July 2018. Studies were used in general practice in England and Scotland. Three or more chronic diseases were studied in the context of the study. Outcomes have been associated with significant improvements in patient-centered measures of care, although perceived burden of disease or treatment burden has mixed effects on life or secondary outcomes and course of care [8].

In a study conducted on Parkinson's patients in Turkey in July 2020, atlas and 3D magnetic resonance imaging-based stereotactic targeting were compared. Within the scope of the study, 11 patients were examined and as a result of the study, it was found that both groups were quite similar for the coordinate measurement and the intra-group correlation coefficients of each measurement were over 90% [9].

In general, studies prove that artificial intelligence and 3D imaging methods lead to very positive results in chronic disease management. It has been concluded that studies in this field should be increased in order to progress more positively in chronic disease management [10-12].

Conclusion

As seen in the examples we examined, artificial intelligence makes a great contribution to the field of health. However, the situation of fully trusting artificial intelligence in terms of ethics creates controversy and there are predictions that there may be negativities in the decisions made by artificial intelligence in the future. It is thought that the basis of these predictions is the idea that artificial intelligence will take over the world when it first exists, as well as the idea that it will destroy the human race. Considering the studies examined, it was determined that more comparative studies should be done in order to choose the most accurate one among the artificial intelligence systems and methods.

This study, which was conducted to determine the effects of using 3D programs with artificial intelligence in the management of chronic diseases, aims to contribute to the academic community in the developing health and artificial intelligence category. In this direction, the data and results obtained from 8 selected studies were shared. The information presented is only a minimal part of the developments. In recent years, the new ray of hope for the medical world will remain open and open to the development of artificial intelligence. The general purpose of the use of artificial intelligence in the field of health is to manage the prognosis and diagnosis of diseases well, and to benefit doctors and patients. Since the subject is human health, studies are of vital importance. Therefore, the data obtained are carefully examined and put into practice. In the developments made in artificial intelligence, the aim is never to replace the artificial intelligence with health workers. Each health worker has a separate importance and value. The aim is only to develop an assistant artificial health professional and to provide support to the health field.

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