



Investigation of the applicability of artificial intelligence and machine learning in the field of health

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Cite this study: Kayıran, H. F. (2022). Investigation of the applicability of artificial intelligence and machine learning in the field of health. 3rd Advanced Engineering Days, 16-19

Keywords

Composite materials
Hybrid composites
Artificial intelligence
Nano technology
Robots
Human health

Abstract

Today, computers and smartphones, tablets and other electronic gadgets have become indispensable for human life. Human health is paramount. It is very important to know the use of robotic applications in the health sector and to follow the general developments related to this issue closely. The human brain is in a constant state of interaction with this technology. Nano dentistry, which is formed by adapting nanotechnology to dentistry; tissue engineering, dental Nano robots and dental nanomaterials using oral health protection, is very important for people. Artificial intelligence is one of the greatest engineering studies in the history of mankind and the world. Artificial Intelligence technology has become an area that humanity has often heard of with the increase of epidemics. Artificial intelligence is a computer science for short. Artificial intelligence is the ability to exhibit human-like behavior, and it is a branch of science that reveals human abilities programmatically. Artificial intelligence is a tool that makes scientific research, an area where people focus, much more efficient, and has the potential to increase the speed of scientific research by a factor of. In this study, the importance of machine learning in the health sector was investigated with a literature review.

Introduction

Before defining artificial intelligence, we need to know the definition of intelligence. Intelligence can be briefly called all the abilities of a person to think, reason, perceive real events, comprehend, judge and draw conclusions. In addition, Intelligence can also be seen as the ability of the mind to learn, to take advantage of what has been learned, to adapt to new situations, and to find new solutions. In addition, intelligence, in other words, can be called the ability to adapt to technological events that can be developed through education, training, knowledge, accumulation and experience [1]. Artificial intelligence is based on the functions of the human brain, non-organic systems (computer, program, robot, etc.) that think like a human, perceive like a human, interpret like a human, analyze like a human, and make decisions like a human after all these stages). Scientists have defined Artificial intelligence differently. For example, artificial intelligence is the science of computer programs that mimic intelligent behavior, and artificial intelligence is the science of making things that require intelligence into machines when they are made by humans [2-4].

Artificial Intelligence (AI)

A number of processes have been left behind by artificial intelligence scientists. For example, some scientists describe artificial intelligence as "the study of mental abilities using computational models". Others 'artificial intelligence: a modern approach', 4 definitions can be classified under the heading of AI in the book suggest that like-minded people, systems, systems that behave like human beings, rational systems, rational systems [5-6]. Artificial Intelligence and its subsets are given in Figure 1.

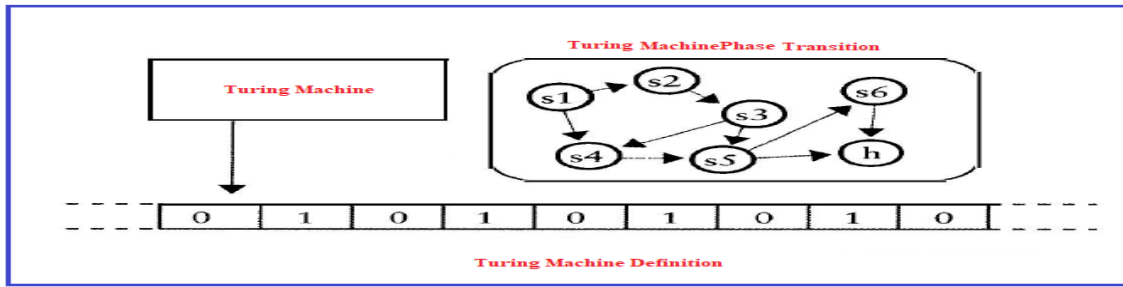


Figure 1. Artificial Intelligence and its subsets [7]

Literature Studies on Artificial Intelligence in the Health Sector

The use of artificial intelligence in the health sector continues rapidly. Artificial intelligence can also be used for dentists and oral health. Only first letter of first word is capital, left aligned, It should be separated from the former paragraph with single line. At a time when human health is paramount; health services are one of the fastest growing sectors in the health sector, generally covering the diagnosis, treatment and prevention of oral diseases. For example, diagnosis is of great importance because dental deficiencies cause malocclusion, loss of function and aesthetic problems in individuals. Intraoral or extra oral radiographs are used to detect dental deficiencies in dentistry. For example, in a study conducted; An artificial atomic algorithm of an individual-specific optimal nutrition schedule was used [9]. In a study conducted, lateral buckling behavior of hybrid composite materials using test data on the effects of different environmental conditions and different fiber combinations was estimated using Artificial Neural Networks (ANN) tool [10]. In a different study, a pilot study of artificial intelligence was conducted to detect dental deficiencies from panoramic radiography using a deep learning method. In a different study, the diagnosis and prediction of periodontally weakened teeth were investigated using an artificial neural network algorithm [11]. Applications of artificial intelligence in the field of health have been investigated [12]. In different studies; they have shared with the literature the software studies they have developed related to the detection of dental caries and dental problems on X-ray images using artificial neural networks, the diagnosis and classification of caries on digital radiographs [13-14].

Machine Learning

Machine Learning (Machine Learning) is a branch of artificial intelligence that uses statistics and computer science and has become very popular recently. Machine learning is all algorithms that mimic human intelligence, but do not need rules that we interpret and enter manually. In the machine learning model, learning is in the form of teaching-teaching (training) and testing (testing). At the learning stage, a learning model is created by learning algorithms and properties to the system using examples in the dataset. In the experimental phase, estimation is made for trial data with the learning model application Engine [8-9].

Deep Learning, Robotics, the Method of Artificial Neural Networks and Genetic Algorithms

Deep learning is a machine learning method consisting of multiple layers that predicts results with a given data set. Deep learning, machine learning and artificial intelligence are terms that have different meanings from each other. Deep learning has been defined as a class of machine learning techniques that uses many nonlinear hidden layers for supervised or unsupervised feature extraction, transformation, pattern analysis and classification [17]. Figure 2 shows the symbolic representation of deep learning and a photograph of Brain tumor, imaging of radiological images with deep learning.

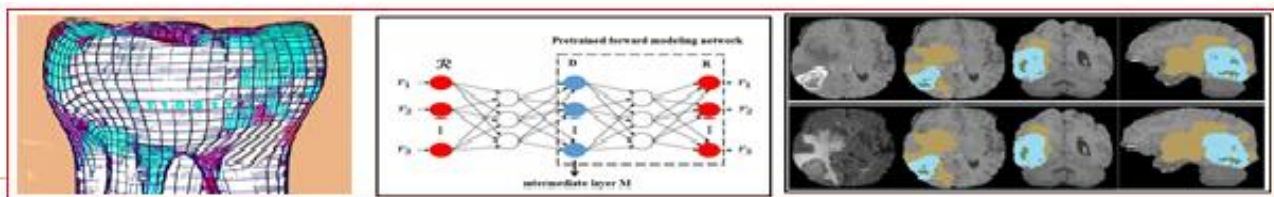


Figure 2. Structure of deep neural networks and Prediction of brain tumor through deep learning [18-19]

It is known that there will be a number of innovations in human life with robotic applications that are the basis of artificial intelligence. With robotic applications, computers and electronic robots are integrated with the principle of compatibility, the result of which is artificial intelligence, especially used in industry and cutting edge

technology, production and design robots are made with the help of computers. Figure 3 shows a symbolic robot produced by coding [20]. Artificial neural networks are a branch developed inspired by the human brain. Each one with its own memory and processing elements are connected through weighted links of parallel and distributed information processing structure. Artificial neural networks find wide application in many fields of science today due to these learning and generalization features and demonstrate the ability to solve complex problems successfully [21-22]. Genetic algorithms, a subDec branch of artificial intelligence, are a search and optimization method that works in a similar way to the evolutionary process observed in nature. It seeks the holistic best solution according to the principle of survival of the Dec in the complex multidimensional search space [21-23]. It has been researched with a literature study that it can be applied in the field of Artificial Intelligence, Food Engineering, Epidemic Artificial Intelligence (Robots) and Law [24-25].

Results

In this study, literature studies on the applicability of Artificial Intelligence and its sub-branch machine learning in the field of health have been investigated. In the study, the definition of artificial intelligence, its sub-branches and its applicability in dentistry and other health fields were investigated. As a result of the study, the following results were obtained: It has been concluded that artificial intelligence techniques can be achieved with a high degree of success in solving various dentistry problems. It is thought that the use of this robot may have a contribution to the health sector and physicians. Current sub branches of artificial intelligence; machine learning, artificial neural networks (ANN), generic algorithms, robotics, deep learning with applications in artificial intelligence technologies in the field of health sector with the popularization of design and are of the opinion that the desired goals can be reached fully. It is thought that online doctor robots, robots that can perform surgical procedures and nurse robots will play an important role in our lives in the future by using records in the hospital database. In the field of health and medicine, health care management with machine learning and artificial intelligence, artificial limb (arm, eye, etc.) applications, analysis of heart sounds, sound analysis for the deaf, classification of respiratory sounds, analysis of side effects of drugs it is thought that studies useful to humans can be produced by doing.

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