ISSN 2708-5546
www.revgacetaestudiantil.sld.cu

Volumen 5 No.1
enero-abril de 2024
ARK: ark/44464/gme.v5i1.216

EDITORIAL

Application of artificial neural networks in medicine

Aplicación de las redes neuronales artificiales en la medicina

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Received: December 29, 2023
Approved: February 11, 2024

How to cite this article:
Chibá-Muñoz E. Application of artificial neural networks in medicine. Gac Med Est [Internet]. 2024 [citado día mes año]; 5(1):e216. Disponible en:http://www.revgacetaestudiantil.sld.cu/index.php/gme/article/view/216

Dear Readers:

Neural networks are a type of computational model inspired by the functioning of the human brain and its network of neurons. They are used to perform machine learning and pattern recognition tasks. These networks are composed of processing units called artificial neurons or nodes, which are organized in interconnected layers.(1)

The learning process of a neural network involves adjusting the weights of the connections between neurons so that the network can perform the desired task effectively. This is achieved through optimization algorithms and error back propagation techniques, where the output of the network is compared to the desired values and the weights are updated based on the prediction error.(2)

Neural networks have proven to be very effective in multiple machine learning tasks, such as image classification, speech recognition, machine translation, natural language processing, among others. Their ability to assimilate and adapt data makes them an effective tool in the field of artificial intelligence.

Neurons, both in the biological context and in artificial neural networks, are fundamental units that process and transmit information. In the case of artificial neural networks, the

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artificial neurons are the essential building blocks that enable the network to learn and perform information processing tasks.

One of the areas where neural networks have had a significant impact is in medical diagnostics. Neural networks can be trained to recognize patterns in medical images, such as X-rays, Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) scans, which help physicians detect and diagnose diseases more accurately and earlier. For example, neural networks have been developed that can detect and classify cancer in mammography images, melanomas in skin images, and eye diseases in retinal images.

In addition to diagnosis, neural networks are also used in the prediction of medical outcomes. They can analyze clinical and genomic data to predict a patient's response to a specific treatment or the risk of developing certain diseases. This can help individualize treatments and optimize the positive effects on patients.

In medical research, neural networks are used to analyze large data sets and extract relevant information. For example, they can be trained to identify patterns in genomic data and help in the discovery of new drugs or in the identification of biomarkers for specific diseases. In addition, neural networks are also applied in the research of neurodegenerative diseases, such as Alzheimer's or Parkinson's, to better understand their progression and find possible therapies.

However, it is important to note that, although neural networks have great potential in medicine, they also present challenges. Interpreting the results generated by neural networks can be complex and requires additional validation. In addition, privacy and security of medical data must also be considered in the development of neural network-based applications.

Neural networks have shown great potential in the field of medicine and healthcare. Their ability to analyze and process large amounts of complex data has led to their application in various medical areas, from diagnostics to research and drug discovery.

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Declaration of conflicts of interest:
The authors declare that there are no conflicts of interest.

Author Contribution:
The author participated in conceptualization, data curation, writing, writing the original draft, revising, and editing.

Funding:
No funding was received for the development of this article.

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