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Artificial Neural Networks in Medical Sciences

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I. INTRODUCTION

The use of artificial intelligence has currently been largely utilised in medical diagnostic programs. these strategies are adaptive processing algorithms which might be capable of examine multiple and heterogeneous kinds of clinical information a good way to combine them into categorised outputs. in this examine, we in short review studies papers bearing on the problem and talk the idea, opportunities and applicability of artificial neural network techniques for scientific diagnosis. This study focuses on clinical researches from 2010 to 2021. Most of the papers studied in this review in particular targeted on bodily illnesses regardless of mental sicknesses, the utility of ANN in mental and comorbid disorders have no longer been thoroughly studied, ANN fashions and algorithms specifically don't forget homogeneous input records resources and now not heterogeneous enter records resources, and ANN models on multi-target output systems are few in comparison to single-output ANN fashions.

analysis is one of the fundamental tasks of all docs, and its importance for humans cannot be overemphasized. In analysis, medical doctors are tasked with inferring sure sicknesses or formulating treatments based on specific signs and symptoms and symptoms or observations and expertise. Defined diagnosis as "the system of assigning a label to a disorder or different trouble via examining observations and signs and symptoms." absolutely positioned, diagnostics is classed by using experts as a rigorous, complicated and multifaceted task this is related to many issues. some of those troubles encompass disorder signs and symptoms that are not unique to simplest one disease and occasionally overlap with the signs and symptoms of different diseases with a indistinct or inadequate description of ways and what the patient feels within the body because of memory or voice loss; have extreme mental conditions that impair cognitive abilities; ailment incidence; and hazard elements consisting of age, intercourse, and body mass index (BMI), which affect each the sample of dependencies between signs and diseases. Others encompass wrong and premature interpretation of data provided by using sufferers and pointless delays and mistakes in the evaluation of laboratory effects, loss of device, bad technicalities and unbalanced ratio of sufferers to docs inside the fitness quarter in particular in growing countries, and so on. no longer enormously, they claim that fifty% diagnoses are incorrect.

This paper takes a look and review based on clinical research papers related to the software of artificial neural network (ANN) strategies. especially, it makes a study of applicable literary works.

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Paper Title	Problem discussed/Technique	Framework	Result	Drawback
		setup		
Baxt, W. G (1991)	Author research shows that	The statistical	Use of easy process	The method studied
artificial neural	large aspects of clinical data	AI generated	of diagnosis and	in this can only be
network applied in	which has been produced	framework can	error free	used by practicing
diagnosing	regularly that possess small &	handle very	techniques,	and highly qualified
myocardial	accurate info as well as	large amounts	artificial	physicians
infarction [1]	variations, low level concepts	of data and	intelligence	
	of biochemistry	categorized	techniques can be	
		outputs	used for diagnosis	
			with regards to	
			artificial neural	
			networks.	
Eladia Maria Pena	To streamline the diagnostic	BPNN and	ANN's represent a	The research did not
Mendez,	process in daily routine and	ANFIS	powerful tool to	show the
	avoid misdiagnosis,		process large	categorization of
Artificial neural	Artificial intelligence		amounts of data,	types of ANN
Networks in	methods can be discussed		reduced likelihood	techniques and the

II. LITERATURE STUDY



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medical diagnosis [2] Egba. Anwaity Fraser, Okonkwo, Obikwelu R. Artificial Neural Networks for Medical Diagnosis: A Review of Recent Trends [3]	Discussion and review of concepts, The use artificial neural network techniques in medical sciences through consideration of collection of physical and Mental diseases.	MLP or multilayer perceptron	of overlooking relevant information & reduction of diagnosis time Adaptability and flexibility of the systems; Timely diagnosis of Diseases. Ability to process from voices, images symptoms, text messages etc, Improved accuracy.	different hybrid methods. the study needto improve on these limitations and applying the scope method and should give more weightage on mental and social health problems.
IHPME, University of Toronto, Toronto Health Economics Technology Assessment University Health Network Uses of artificial neural networks in health care organizations with scope review method [4]	The big goal of this review is to provide a much-needed comprehensive guide of the various applications of ANN in health care organizational decision-making at the low, medium, and high levels. The levels relate to decisions made on the (low) level of individual patients, or on a (medium) group level where patient preference may be important but not essential; and on a wider (high) level by large groups or public organizations related allocate resources regarding interests of society.	A feed-forward network is used which is single- layered (Perceptron, ADALINE) and multi-layered (Multilayer Perceptron, Radial Basis Function)	The study of this lists comprehensive searching ways involving many databases. selection of data were done on things with similar structure and scope.	Studies included in this review did not always use standardized reporting measures and included publications of lower quality.
The University of Warwick, UNITED KINGDOM Artificial Neural Networks in Health Care [5]	Competitive networks, Kohonen's self-organizing maps, Hopfield networks	Using complex adaptive systems (CAS) theory to understand the functionality of AI	The study found artificial neural networks can be applied across all levels of health care organizational decision-making. They found ANN- based solutions applied on the low and medium level of decision-making	This study requires the reader to be already well acquainted with the subject of ANN therefore is not understandable for a novice reader



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III. CONCLUSION

The research papers studied above gives us the conclusion of growing interest in computer science, especially artificial neural networks (ANNs), whose models and algorithms are becoming standard tools for decision support systems and expert systems. ANN is undoubtedly a powerful tool to help doctors, other healthcare professionals, and stakeholders implement diagnosis, prognosis, and other enforcement measures.

The various advantages of ANN as found by the studies are listed below:

- *1)* flexible and prone to adaptiveness regarding a system
- 2) Can process huge amounts of medical data
- 3) Overlooking of information which is relevant is reduced significantly
- 4) Diagnosis of diseases in a timely manner
- 5) processing of datasets from various sources not limited to symptoms etc.

This will be an important computational model in the development of modern clinical decision support and expert systems. The studies reviewed here suggest that ANNS has been shown to be useful in the satisfactory medical diagnosis of both physical and mental illness. Their use has improved the accuracy and reliability of the diagnosis, which in turn has improved patient satisfaction. Protecting patient privacy in all the methods discussed in the above paper is a major issue that needs to be addressed. Also, despite the widespread use of ANN and other intelligent computational algorithms, this tool is only considered as an intermediary in the final decision of the physician with the ultimate responsibility for critically assessing ANN's output.

LIMITATIONS OF ANN

This study shows that limitations are still there in all of these methods and ANN models which are employed to the solving of the problem of diagnosis of diseases.

- *a) Hardware Dependency:* Due to its structure, artificial neural networks require processors with parallel computing power. Therefore, the version depends on the device.
- *b)* Unexplained Network Function: This is the main problem with ANN. If ANN provides an exploratory solution, the reason and method will not be given. This reduces confidence in the network.
- *c)* Ensuring Proper Network Structure: There are no specific rules for determining the structure of artificial neural networks Appropriate network structure is realized by experience and trial and error.
- *d)* Difficult To Show Problems On The Network: ANN can handle numerical information. Before deploying to ANN, you need to convert the problem to a number. The display mechanism determined has a direct impact on network performance. This depends on the skill of the user.
- *e) Network Duration Unknown:* The network is reduced to a certain value of the error on the sample means that the training has been completed. The value does not give us optimum results.

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