Ilkogretim Online - Elementary Education Online, 2020; Vol 19 (Issue 3): pp. 4316-4328
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2020.03.735583

Machine Learning And Artificial Intelligence For Preventive Medicine And Wellness Program

Mrs.D.Thamizh Selvi AP- Sri Sairam Engineering College, Chennai

D.Shanthini Sri Sairam Engineering College , Chennai

Abstract—Artificial intelligence is the magnificent and formidable development in the milestone of Robotics industry. Recent researches and predictions have said that the artificial intelligence is found to be advantageous and can cause some remarkable changes in the field of heath care Most of the researches have been focusing on prediction algorithms of patients' diseases such as cancer, cardiology, breast pathology, etc. We know that health care industry is prone to changes and transformation. From deadly diseases to curable infections, cancer and chemotherapy, cardiology and heart transplant, the method of curing and treatment had endless improvement and developments. Global productivity, working patterns, and lifestyles have been set for transformation by artificial intelligence, machine learning and associated services. Applications of artificial intelligence and other concepts are implemented in the field of healthcare. Many sectors of health care department have begun to use these techniques and also are getting benefits from it. AI inspects appointment from doctors and plans according to patient's available time. It maintains and prompts doctors' schedule of upcoming surgery list and tutoring the patients before the surgery. The healthcare record of the patients is well inquired under the doctors' critique solutions to the problems and the post surgery effects of the patients are recommended. It acts as a collaborator between the doctor and patient during pre- surgery, surgery and post-surgery for the best dissemination. In this paper, we discuss about the in circulating methods in AI and ML and also some presumptions, significance and improvements to be done in the future.

Keywords—component, formatting, style, styling, insert (key words)

Artificial Intelligence Triple Play in Healthcare".Fig.1depicts the role of AI in healthcare.

Fig. 1. Artificial intelligence triple play in healthcare

Saying about the business processes – it creates a distinctive healthcare solutions, it increases the savings for healthcare and improves the experience ofmember's/patient's experience on the basis of service and impacts. The operational impact of implementing AI in healthcare includes accurate

prediction of generic disorders/conditions, automatic processing of customer details, fees and treatment and caring the patients. Cost is the most important factor that must be carefully noted down when we are implementing to the common people and it becomes the most degrading factor when not be able to serve the needy. Hence, cost effective treatment must be given.Fig.1.2 shows the applicability of AI in various treatment.

I. INTRODUCTION

The intelligence of machines is referred to as "Artificial Intelligence", more advanced than the intelligence of human beings or other living species. In other words, Artificial Intelligence (AI) can also be defined as the reflection of human intelligence in machines that are scheduled to think like humans and impersonate their actions. Application of Artificial Intelligence (AI) in machines and that enables the machines to learn and improve from their learning experience without being explicitly programmed is called Machine Learning (ML). It also includes the studying of computer algorithms and help in the development of computer programs.

Healthcare is the only field which can bring more changes in our lifestyle , being more predictive in case of future disease and teaches us to be or makes us more preventive in case of the serious infections. Researches and sciences done till now easily evaluate and asses the future of biomedical sciences in the hand of Artificial Intelligence.. The remainder of this paper is oriented toward the applications of AI and Ml. There is a concept called "The

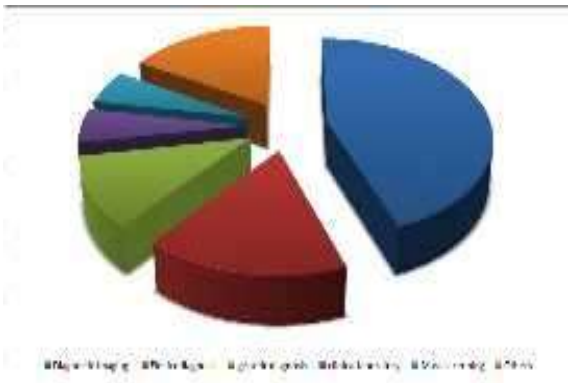


Fig.1.2 The use of artificial intelligence in healthcare

Artificial intelligence and machine learning is most widely used in mass screening which includes the smart screening of internal organs mainly soft, delicate organs such as small intestine, medulla oblongata and the cancer mutable cells. Electro diagnosis is the second most widely used in terms of AI and ML. The traditional and manual method of detecting a disease is a very long and slow process, yet the result can never be taken as approximate or accurate one. ButElectro diagnosis method can be most accurate and can spot

allowing them to view précised , detailed data with mostaccuracy.

the problem faster than the traditional normal method. Genetic diagnosis is nothing but taking the genes of a specific person for the purpose of research, detecting disease and etc. Genetic diagnosis by traditional method cannot havethe accuracy when compared to AI and ML.

Machine learning is nothing but an application of Artificial intelligence. This also has many advantages. ML has their specific computer algorithms to develop the computer programs and build their performance based on their working principle of the algorithm. It is widely used in the field of drug discovery and manufacturing. In drugdiscovery accurate measurements and automatic mixing of drugs is done by a single app controlled by human or sometimes automatically. Fig 1.3 explains the role ofmachine learning in different stages of healthcare.

Fig 2.1 depiction of AI,ML and Deep learning in pathology andradiology.

Fig 1.3 depiction of machine learning in healthcare

II. APPLICATIONS OF AI AND ML IN HEALTHCARE

A. AI assisted Radiology and Pathology

Both pathology and Radiology forms the base of cancer and diagnosis of cancer. Pathology is the detection of cancer

B. Tuberculosis and AI

Tuberculosis commonly known as TB is the most contagious disease that affects your lungs and is the reason for most death worldwide. Chest X rays(CXR) plays a major role in the detection of tuberculosis which is not even a confirmed method for TB detection but is very cost effective and traditional way of TB detection in the field of medical sciences. In case of pulmonary or lung TB , CXR plays a major role, it is actually a powerful screening test with low cost .some of the most traditional techniques include pathogenic tests by collecting blood tissues , mutant cells and analyzing the conditions, stage of mutation and percentage spread of the disease. This takes a long way to detect like more than 2 week in case of which a person might die due to severity which causes a fail in the test detection. fig 2.2 shows the ordinary human healthy lung and the TB affected one in comparison so that this does not show much difference and the bottom one is the dissectionof the TB tissue affected in pulmonary part

Computer Added Detection(CAD) which uses the techniques of Artificial Intelligence to detect Tuberculosis through tissues and blood cells and designates the in a very advanced and précised way. This technology

infinitesimal cells. Radiology is the method of lesion,clinical and typical mutant molecules by digital imagingsuch as X Ray, Magnetic ResourceImaging(MRI),Computed Tomography(CT), nuclear emission and ultrasound. Fig 2.1 perfectly shows the depiction and details of AI, ML and deep learning usedexclusively in healthcare sector as a preventive mechanism.

Digital pathology is the technique used by the medical and pharmaceutical industry to view image of the lesion or mutant cancer cells in specific areas of our body. Artificial Intelligence and Machine Leaning interlinked with Deep learning used in case of digital pathology in ease with radiology helps in getting a very clear and précised image of the lesions, mutant tumor in soft areas such as brain, digestion glands and nerves etc. This technique will help to prevent the minute technical errors and raises the standard ofthe disease prediction and improvised techniques in cancer detection. Machine learning and deep learning algorithms helps the pathologists to improvise the decision making and equipped with AI and ML helps to scan and read chest to search for TB related abnormalities .This technology might be useful to the countries with less resources , high burden of TB and limited resource access or knowledge deliver to the radiologists. This has at least more accuracy than the traditional and CXR's

Fig 2.2 scan image of ordinary human lung (left), TB affected lung(right) and microscopic TB affected tissue view

C. Detecting Alzheimer's disease

Alzheimer's disease can be detected with about 82 percent fidelity in less than a minute with AI-enabled. The span of pauses between any words, any proclivity or proper nouns, overly elementary interpretations, and deviations in speech frequency and amplitude can be organized by the AI systems. Detection with high level of precision is very challenging for the human listeners to note. AI systems are in-handed and fathomable in their analysis. Fig 2.3 shows the usage of AI&ML in identification of Alzhemier disease .

Fig 2.3 classification of Alzheimer's disease using artificial intelligence and machine learning

Alzheimer's disease (AD) is a lunacy or softening of the brain affecting mostly the elderly aged people. New propositions for the on the dot detection for AD is most treasured. Computer aided diagnosis(CAD) system in clinical practices plays a pivotal role in recognizing the disparities in the brain images detected by AI and that is why Artificial Intelligence is apprised as the most potent method in the detection of Alzheimer's disease. This paper reviews about the methods used in the detection and the function of it. This disease is briefed as the disorder where our cells itself generates and dies by destroying the memory and other major, key mental functions. The symptoms of this disease include memory loss and confusion. Medications and management strategies may temporarily improvise the symptoms and there is no specific cure for this disease.

Several techniques of AI, CAD are used for the detection of AD. Some of the machine learning algorithms can be applied to the PET scans to detect the Alzheimer's disease in its early stage. Patients with Alzheimer's disease, mild cognitive impairment disorder or no disorder are diagnosed by Alzheimer's disease Neuroimaging Initiative (ADNI), a massive public dataset of PET scans.As the technology is reliable and easy for detection, the algorithm itself started to learn and develop features for envisaging the examining of Alzheimer's disease and which are not.The scientists tested two innovative datasets for estimating its interpretation by tutoring on 1921. The ADNI database had given 188 images which had not dispensed the algorithm yet. The USCF Memory and aging center had an entirely gigantic set of data sets of scans of 40 patients with doable apprehensive stultification. The algorithm swept through and succeeded. 92 percent of the patients were correctly diagnosed with the disease in the first test and 98 per cent in the second test.Fig 2.3.a. shows the result with the help of AI.

Fig 2.3.a. the result of prediction of Alzheimer's using AI

D. Drug design with Artificial Intelligence and MachineLearning

Drug discovery is the most important process or factor in curing or abolishing certain disease in existence or for future use. The first step in the drug design is the diagnosis of a disease and the factors against certain disease. The collection of components and the quality, quantity etc should or can be found only by trial and error method by the scientists which is a breathtaking or long process.

AI and ML applications can be used in three stages of drug discovery pipeline in which first one denotes the target identification consisting of target discovery and deconvolution, the second process includes lead generation and optimization. This stage comprises of virtual screening, Quantitative structure activity relationships and support the automation and optimization of the drug design process. The third stage includes preclinical development taking up the physicochemical properties by processing huge quantities of chemical and physical data, getting the absorption, distribution, metabolism and excretion-toxicity and accuracy profiles. fig 2.4 shows the exact depiction of the AI and ML applications used in the drug discovery pipeline in order to find the desired product from the target

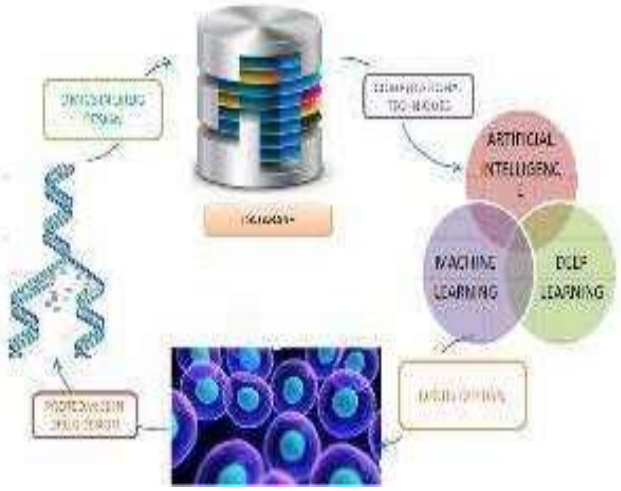
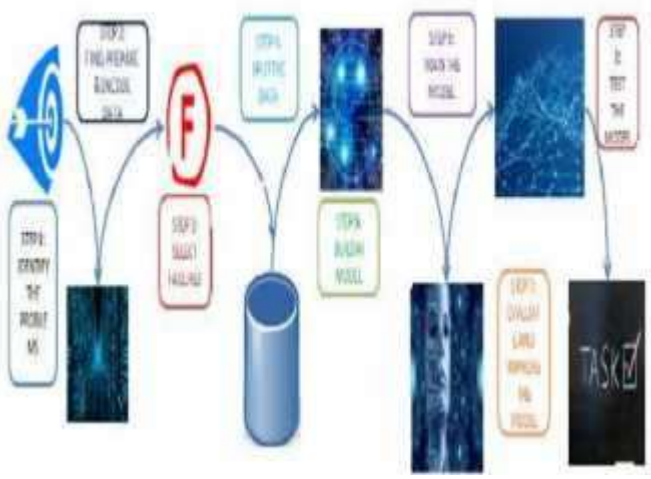


Fig 2.4 Three stages of drug discovery pipeline using AI and ML

The main eight steps in the drug discovery includes the finding of target means the source of disease or curation for the particular disaese and setting it as a target material and step 2 includes the analysing data of the target , and ofcourse like the trial and error method reducing the failure and increasing the success target approaches. Finding the perfect data and improving the particular data for the target approach after all these steps just test it on some independent data for knowing the perfect accuracy and approximacy of the particuLar target.after seeing the favourable results we can implement the changes or the invention in a large scale for the best impact and for the future implementations in the prevention of the disease and prottection of the public. fig 2.4a in



detail shows the stages involved in the infusion of AI built techniques for drug discovery.

Fig 2.4 a. steps for building an AI platform for drug discovery

III. COMPARISON OF TECHNIQUES USED IN HEALTHCARE USING AI AND ML

S. no	*AI and ML In heathcare*	*Author*	*Year*	*Inference*
3	Key challenges for deliverin g clinical impact with artificial intelligence	Christopher J Kelly, Alan Karthikesalinga m,Mustafa Suleyman, Greg Corrado, Domnic King	2019	AI algorithms of medical imaging found that only 6% of 516 eligible published studies performed external validations. The AI methods are only proposed and the way of implementing them s a tough process.
4	Artificial intelligence and machine learning in clinical development: a translational perspective	Pratik Shah, Frencs Kendall, Sean KhoziN, Ryan Goosen, Jianyinghu,Jason Laramie,Michael Ringel and NicholarSchork	2019	Using Ml based learning to predict pharmaceutical properties of molecular compounds and targets for drug discovery, pattern recognition and segmentation techniques on medical images to enable faster diagnosisand developing deep learning techniques on multimodel data sources such as combining genomic and clinical data to detect new predictive models
5	Artificial intelligence in healthcare: A new technology benefit for both patients and doctors	Tra Le Nguyen, Thi Thu Ha Do	2019	Using blockchain technology as a friendly assistant to communicate between the doctors and patients.
6	Artificial Intelligence and machine learning in clinical development:a translational perspective	Pratik shah, Francis Kendall, Sean Khozin, Ryan Goosen, Jianving Hu,Jason Laramie, Michael Ringel,Nicholas Schorl.	2019	Recently, perspectives and commentaries highlighting applications of DNN to imaging data sets, pharmaceutical properties of compounds, clinical diagnoses and genomics, computer vision applications for medical imaging, and applications of Natural Language

TABLE I.

S.no	AI and ML In heath care	Author	Year	Inference
1	Artificial Intelligence in Healthcare: Review and Prediction Case studies	Guogang Rong, Arnaldo Mendez,EliebBou Assi,Mohammad Sawan	2015	AI and ML methods can be used to predict the volume of the badder and the epileptic seizure. Bio sensors and biochips are used for in vitro diagnostics.
2	Artificial Intelligence in healthcare: past, present and future	Fei Jiang, Yng Jiang, Yi Dong, Sufeng Ma, Yilong Wang, Qiang Ding, Haipeng Shen,	2017	Machine learning, Natural Language Processing and deep learning can be best used

		Yongjun Wang		in stroke care. The accuracy of this prediction method is 87%.

S. no	*AI and ML In heathcare*	*Author*	*Year*	*Inference*
				EHR have been published.
7	Artificial Intelligence in Healthcare:A New technology benefit for both patients and doctors	Tran Le Nguyen, Thi Thu Ha Do	2019	AI application in healthcare in which not only doctors using it but also patients, drug companies, insurance companies and hospitals can

V. RISK ASSOCIATED WITH AI IN HEALTHCARE

V.Professional realignment:

This is nothing but every medical association and services employ their faculties in a shift basis. So when shift changes and the people change some may be assigned in serious section such as radiology and if any settings is changed due to the poor knowledge of the professionals or due to the confusion a serious risk will be ahead and it is more about the life of a patient. Therefore the settings should be automatic and well equipped staffs or professionals should be employed in these sectors and even if shift changesthe division should always have an expert or the best software.

I

V. FUTURE IMPLEMENTATIONS

I. Trauma and error:

Minor errors in case of false neuron hemisphere of the cerebrum predictions due to technical fault or the surgeons vision causes severe or major trauma in case of patient. Giving an overdose of anesthesia can cause even death to thepatient with all these continuing risks in the field of healthcare the ai built automatic system can be used to correct and conduct an errorless, efficient surgery.

II. Privacy concerns:

Privacy the word which is not even getting privacy of its own. The data's and the problems of the patients should be a private detail for the surgeon to access but with the advancement of hacking too some professional hackers exploit the resources and create trouble to the patients and even doctors. This might not only result in the release of the personal data of the patients but also the collapse of data between the patients and therefore becomes more complicated. so a software must be

developed in such a waythat hacking should not be done in an easy manner however hacking cannot be fully avoided.

III. Data accessibility:

Collection of data for a particular patient and information regarding a certain disease is a very big process. To make the process with ease AI systems has developed a data storage systems for the collection of data. The method of fragmentation is followed in distributing the data to different systems. So during this fragmentation process there are many chances that data gets lost or mismatched in different sets or gets collapsed with the records of the other patients. So carefully the data fragmentation process should be carried on in the software.

IV. Bias and Inequality:

Bias and inequality even lasts in healthcare but in terms of frequent visits of patients and less frequent patients, some even care about the race or gender. The interesting but worried fact is that even today some of the tribal races are deprived of proper healthcare and here exists a biased and in equalized healthcare. If the data is provided for the software is only from high medical associations then there might not be al data's available.

i. Abolishing or Decreased use of Medicines

We know that the intake of many medicine too can cause about various disease and makes us more weak and decreases the efficiency of the walls of the stomach which indirectly decreases the power of digestion and also causes some wounds in both externally and internally which relies pain . to avoid all these conditions AI in healthcare can cause a reasonable and big change so that abolishment of high power and many medicines can be decreased.

ii. Facility for the non experts to master the profession

The non experts in the field of healthcare can be a danger or a very big no because medical field is not a field for trails and practices. So to train the non experts to make them master or skill the profession AI can take some automatic and virtual classe .

iii. Increased Efficiency:

Education about healthcare and the procedure for following the techniques of AI in healthcare alone cannot help to master the profession and cure the disease of the patients.The method of traditional storing of data for this huge data is impossible so increasing the efficiency of data storage system and improving the privacy concerns of the user in case increases the efficiency of the health care sector invision with AI and ML.

V. CONCLUSIONS

This review paper gives information about the existing few methods and techniques in AI and ML to serve the people in ease in the field of healthcare. The detection of brain bleeds with AI techniques is the most effective as it is able to easily and precisely locate the brain hemorrhage and detect the type of it along with the percentage of risk. Alzheimer's disease is one of the lasting and fearful types of disease and which in turn can also be detected using computer aided design. Post

Traumatic Stress Disorder can only be treated with medications and psychotherapy but the techniques of AI and ML can be used to monitor the patient's record and the percentage of improvement with the curacy rate. The future is now in the hands of AI as it has played a very important role in the field of healthcare and it is impacting several changes in recent times very rapidly. It is expected that Machine learning techniques and AI can master the domain of healthcare with their most useful and efficient applications like radiology and pathology images being examined. For searching the clinical notes and for seeking the assistance for checking the status of the patient speech and voice recognition techniques have already been imparted and their usage will increase gradually in the upcoming years. There is a guess that this rapid development of AI can even replace the surgeons on a large scale but these surgeons might be placed in taking care of the data sets of the patients and will be over viewing the records of the patients through the AI But the important point to note is that technology can always replace humans but they cannot become humans, and therefore surgeons can never be replaced.

REFERENCES

[1] Rong, G., Mendez, A., Assi, E. B., Zhao, B., & Sawan, M. (2020). Artificial Intelligence in Healthcare: Review and Prediction Case Studies. Engineering, 6(3), 291-301.

[2] Jiang, F., Jiang, Y., Zhi, H., Dong, Y., Li, H., Ma, S., ... & Wang, Y. (2017). Artificial intelligence in healthcare: past, present and future. Stroke and vascular neurology, 2(4), 230-243.

[3] Kelly, C. J., Karthikesalingam, A., Suleyman, M., Corrado, G., & King, D. (2019). Key challenges for delivering clinical impact with artificial intelligence. BMC medicine, 17(1), 195.

[4] Shah, P., Kendall, F., Khozin, S., Goosen, R., Hu, J., Laramie, J., ... & Schork, N. (2019). Artificial intelligence and machine learning in clinical development: a translational perspective. NPJ digital medicine, 2(1), 1-5.

[5] Le Nguyen, T., & Do, T. T. H. (2019, August). Artificial Intelligence in Healthcare: A New Technology Benefit for Both Patients and Doctors. In 2019 Portland International Conference on Management of Engineering and Technology (PICMET) (pp. 1-15). IEEE.

[6] Murali[1], N., & Sivakumaran, N. (2018). Artificial Intelligence in Healthcare–A Review.

[7] Buch, V. H., Ahmed, I., & Maruthappu, M. (2018). Artificial intelligence in medicine: current trends and future possibilities. Br J Gen Pract, 68(668), 143- 144.

[8] Kalaichelvi, P., Sheela, T., Eniyan, S., & Sreeram, G. (2018, February). A Review on Energy Minimization Techniques in W SN. In 2018 International Conference on Power, Energy, Control and Transmission Systems (ICPECTS) (pp. 91-96). IEEE.

[9] An article named " Risks and remedies for artificial intelligence in healthcare", by W.Nicholson Price ll , November 14,2019.

[10] Char DS, Shah NH, Magnus D. Implementing machine learning in healthcare-addressing ethicl challenges. NEngl J Med 2018;378:981-3.

[11] Davenport TH, Dreyer K AI will change radiology, but it won't replace radiologists. Harvard Business Review 2018.

[12] Lee SI, Celik S, Logsdon BA, et al. A machine learnig approach to integrate big data for precision in acute myeloid leukemia. Nat Commun 2018;9:42.

[13] Sordo M. Introduction to neural networks in healthcare. Open clinical, 2002. www.openclinical.org/docs/it/neuralnetworks011.pdf

[14] Hussain A, Malik A, Halim MU, Ali AM . the use of robotics in surgery: a review. Int J Clin Pract 2014;68:1376-82.

[15] Bush J. How AI is taking the scut work out of health care. Harvard b=Business Review 2018. https://hbr.org/2018/03/how-ai-is-taking-the-scut-work-out-of-health-care.