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Role of Artificial Intelligence in Modern Medicine

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Abstract*— This document gives some insights on a new development in the field of Artificial Intelligence (AI). AI is already been used for few diagnosis and treatment to improve the accuracy and efficiency in various specializations. Some experts are predicting that the increasing use of AI in radiology might replace the radiologists. These suggestions lead to the question 'Will AI based systems replace the physicians or might augment the role of physicians in some specialization?' This research is focused to asses and understands this technology, its impact on physicians and how is it going to transform the field of medicine. In this paper we tried to find out the role of AI in medical field, with some specialization like pathology, radiology, cardiology etc. we conclude saying that AI is unlikely to replace the physician but will augment the role of physician thus keeping the traditional relationship between the physician and patient.

Keywords*— AI, Healthcare, Machine Learning, Medicine, Physician, Augment

I. INTRODUCTION

AI is playing a very prominent role in the field of healthcare because of its ability to learn the new algorithms on the datasets available in the field of healthcare and the computing power in terms of wearable health monitors. The health care market is expected to cross $6 billion by 2021 and is increasing at the rate of 40% (Frost & Sullivan, 2016). The endless storage capacity of Cloud storage supports big data practically. More precise learning algorithms interact with training data thus giving new insights into diagnostics, and treatment outcomes (Brenstic, 2018b). New applications of AI in healthcare are helping physicians to improve the efficiency and accuracy of patient care.

AI is well suited to manage large amounts of data, handle repetitive work processes, and also can provide decision support. As per the estimation by the research firm Frost & Sullivan, AI has the potential to improve patient outcomes by 30% to 40 % while reducing the treatment cost by up to 50%(Hsieh. 2017a). Diverse areas of health care such as chronic disease management and clinical decision-making (Bresnick, 2016) will have a significant AI impact. This research is to find out the potential uses of AI and the possibility of AI supplementing the role of physicians.

II. LITERATURE SURVEY

The emerging role of AI in the hospital setting is discussed by Sennaar (2018). Managing the growing amounts of clerical and clinical data is the biggest headache for physicians and AI applications can help in this regard. One of the risks identified by the author has to do with data quality. c Inaccurate clinical data caused by "poor data" quality or "bad data" may put patients at risk (Sennaar, 2018). As per the author, healthcare systems already possessing an effective data collection strategy may be better suited to implement AI-based applications for data management. The author also touches upon factors that may cause resistance in the adaptation of AI-based applications. It includes the limited amount of scientific literature demonstrating the clinical value of AI applications (Sennaar, 2018).

"The coming of age of artificial intelligence in medicine" authors reflect on the impact of AI in medicine. According to the authors, with the increasing use of Electronic Medical Records, Machine Learning research is gaining more popularity and importance in the field of healthcare(Patel et al., 2009).

Greenspan, Van Ginneken & Summers (2016) focus more on deep learning as it is the emerging machine learning tool. CNN is proved to be extremely effective in the recognition and localization of an object or natural images.

In the article named "Your Future Doctor May Not is Human" (Norman 2018), the author cites various examples of AI being capable as doctors when it comes to diagnosing patients. According to Norman, the role of AI is to help physicians to optimize and improve their work.

Bertalan Meskó, also known as The Medical Futurist, calls AI "The Stethoscope of the 21st Century". The author states that it will take some time for the medical community to accept AI as a full-fledged tool in health care.

Zaidi(2018) underlines the applications of AI in healthcare. One such area is Cognitive assisted robots, which can be utilized in miniaturized surgical instruments.

III. WHAT IS AI

AI could also be a subfield of bailiwick that deals with the look and development of intelligent machines (Society for the Study of engineering and Simulation of Behaviour, 2018). AI uses intelligent algorithms to mimic the psychological feature behaviour of humans. These algorithms learn from experience. AI has been utilized in medication before. Knowledgeable systems, a degree earlier quite AI, tried to cipher the alternatives of physicians into a gaggle of rules that computers would possibly execute (Schmidt-Erfurth et al., 2018). It was, however, unthinkable to cipher a gaggle of rules for all clinical things given the complexity of medication and variations in diseases. For these reasons, knowledgeable systems were replaced inside the 19 Nineties by Machine Learning (ML) where the "rules would be learned by algorithms directly from a gaggle of examples instead of being encoded by hand" (Schmidt-Erfurth et al., 2018).

A deep neural network (DNN) permits improved predictions from the information. the foremost advantage of DNNs is that their performance ceaselessly improves as a result of the scale of the employment dataset can increase (Schmidt-Erfurth et al., 2018). This started a spanking new subfield of millilitre referred to as deep learning that employs algorithms like DNN and convolutional neural networks (CNNs). the thought is "that a neural network, instead of merely acting as a classified as inside the case of a classic millilitre, will even perform as a result of the feature extractor as well" (Ahuja & Halperin, 2019). this allows for end-to-end employment as a result of a DNN learning to acknowledge degree output category from the signalling directly (Schmidt-Erfurth et al., 2018). CNN's unit is mainly applied to image segmentation and classification. Graphical method Units modifies necessary acceleration inside the case of CNN's (about forty times) compared to process alone (Schmidt-Erfurth et al., 2018).

IV. FUTURE TENDING WITH AI

AI ways that Associate in Nursing systems can advance the delivery of care in an extremely implies that outperforms what either can do alone. Ponder the case of preciseness medication that seeks to tailor medical treatment to the individual characteristics of a patient. This could be probably to transform the delivery of treatment by sanctionative physicians to identify ideal medication dosages, verify that genetic mutations drive positive cancers, and sequence our microbiome. To make precise medication accomplishable AI could add immense amounts of clinical, genomic, and imaging information, thus serving to reinforce health care provider efficiency, increase diagnostic accuracy, and modify treatment. AI-based systems attempt to increase diagnostic efficiency in various areas of medication what is more.

According to Pearl (2018), such AI-based systems will have a positive impact on various diagnostic fields along with "radiology (CT, resonance imaging and diagnostic technique interpretation), pathology (microscopic and general anatomy diagnoses), medication (lesion analysis for potential melanoma), and medical science (retinal vessel examination to predict the prospect for diabetic retinopathy and vas disease)." As per the American Cancer Society, regarding 1/2 the women getting annual mammograms over a 10-year quantity will have a false-positive finding (American Cancer Society, 2017).

False-positive mammograms can cause anxiety and typically cause further tests like MRIs, ultrasounds, and even invasive biopsies to form bound cancer isn't there that worth time and money, and physical discomfort (Griffiths, 2016). Another house where AI-based systems units are expected to possess an impression is robotic surgery. Robotic surgery can assist surgeons in treating patients with preciseness, decreased blood loss, and less pain (Kakar, 2017). It reduces the probability of tissue trauma as a result of the robotic system lowering grasping forces.

Robots enabled with AI can facilitate prune MD variations that might have an impact on patient recovery. Wearable tending devices (collectively expressed as tending Internet of Things) from fitness trackers to mobile pressure and agent monitors will modify remotely managed to tend.

V. FUTURE HEALTHCARE WITH AI

AI systems will advance the delivery of care during a method that outperforms what either will do alone. Take into account the case of exactness medication that seeks to tailor medical treatment to the individual characteristics of a patient. this can be possible to rework the delivery of medical aid by sanctionative physicians to spot ideal medication dosages, confirm that genetic mutations drive bound cancers, and sequence our microbiome. Central to creating exactness medication potential is AI and cc which may add up of huge amounts of clinical, genomic, and imaging knowledge, therefore serving to enhance MD potency, increase diagnostic accuracy, and personalise treatment.

AI-based systems are poised to extend diagnostic potency in alternative areas of drugs likewise. According to Pearl (2018), such AI-based systems can have a positive impact on numerous diagnostic fields together with "radiology (CT, MRI and diagnostic procedure interpretation), pathology (microscopic and microscopic anatomy diagnoses), medical specialty (lesion analysis for potential melanoma), and medical specialty (retinal vessel examination to predict the chance for diabetic retinopathy and vessel disease)." Annual mammograms obtained by Yankee Cancer Society over a 10-year amount can have a false-positive finding (American Cancer Society, 2017). These mammograms will cause anxiety and infrequently result in redundant tests like MRIs, ultrasounds, and even invasive biopsies to take care of cancer of which isn't there, causing the waste time and cash, and physical discomfort (Griffiths, 2016).

Another space wherever AI-based systems are expected to possess an impression is in robotic surgery. Robotic surgery will assist surgeons in treating patients with exactness, remittent blood loss, and fewer pain (Kakar, 2017). It reduces the likelihood of tissue trauma as a result of the robotic system lowers grasping forces. Robots enabled with AI will facilitate cut back operating surgeon variations that might have an effect on patient recovery.

VI. CONCLUSIONS

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The avalanche of medical information within the sort of clinical, genomic, and imaging information is barely probably to accelerate as preciseness and individualized drugs mature. The future drugs are probably going to be more data-dependent with the natural process between drugs and AI technology turning into a lot of pronounced. In recognition of this vital trend in trendy drugs, medical colleges area unit strengthening their rising technology curricula. Medical colleges are offering new courses in the area of technology infrastructure, ML, DL, and information management aboard their biology categories (Dyche, 2018).

AI can support the wants of medication by analyzing the large amounts and varied varieties of information that patients and care establishments record in each moment. AI is probably going to support and augment doctors by casting off the routine elements of a physician's work hopefully enabling a physician to pay a lot of precious time with their patients, rising the human bit. whereas AI is unlikely to interchange physicians within the predictable future, it's obligatory for medical professionals to be told teach the basics of AI technology similarly as however AI-based solutions will facilitate them at add providing higher outcomes to their patients.

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