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Future Aspects of Newer Techniques in Various Diagnostics & Hospital Management in Tertiary Health Care Centre

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I. Artificial Intelligence In Healthcare

"***Can a machine think and behave as humans do?***

Though this was a general thought, its curiosity leads to the development of artificial intelligence (AI).**Artificial intelligence** (**AI**) in **healthcare** is the use of complex algorithms and software assisted techniques in the analysis of complicated medical data. **AI does** this through machine learning algorithms. These algorithms **can** recognize patterns in behavior and create its own AI programs have been developed and applied to practices such as diagnosis processes, treatment protocol development, drug development, personalized medicine, and patient monitoring and care. Medical institutions such as The Mayo Clinic, Memorial Sloan Kettering Cancer Center and National Health Service, have developed AI algorithms for their departments.

Artificial intelligence (AI) and related technologies are increasingly prevalent in business and society, and are beginning to be applied to healthcare. These technologies have the potential to transform many aspects of patient care, as well as administrative processes within provider, payer and pharmaceutical organizations.

There are already a number of research studies suggesting that AI can perform as well as or better than humans at key healthcare tasks, such as diagnosing disease. Today, algorithms are already outperforming radiologists at spotting malignant tumours, and guiding researcher to arrive at a modified diagnosis and output in short duration for patient benefits. Companies are offering a range of solutions including automation of medical diagnosis, automated analysis of medical tests, detection and screening of diseases, wearable sensor-based medical devices and monitoring equipment, patient management systems, predictive healthcare diagnosis, and disease prevention.

Will Artificial Intelligence Revolutionize Healthcare?

In addition to better diagnosis, AI promises to assist in finding new treatments and drugs, monitor, support and interact with patients and the elderly, and radically change how physicians, hospitals, and insurance companies operate. Healthcare has undergone a transformation over the past several years, shifting from paper-based records to electronic records, and rapidly adopting new online platforms.The following are examples of large companies that have contributed to AI algorithms for use in healthcare.

IBM

IBM's Watson Oncology is in development at Memorial Sloan Kettering Cancer Center and Cleveland Clinic. IBM is also working with CVS Health on AI applications in chronic disease treatment and with Johnson & Johnson on analysis of scientific papers to find new connections for drug development.

Google

Google's DeepMind platform is being used by the UK National Health Service to detect certain health risks through data collected via a mobile app.[1] A second project with the NHS involves analysis of medical images collected from NHS patients to develop computer vision algorithms to detect cancerous tissues.[2]

The future of AI in healthcare:-

We believe that AI has an important role to play in the healthcare offerings of the future. In the form of machine learning, its technical application, it is the primary capability behind the development of precision

medicine,. Just a beginning of its initiation early efforts at providing diagnosis and treatment recommendations have proven challenging, we expect that AI will ultimately and help at the tertiary health care level. Given the rapid advances in AI for imaging analysis, it seems likely that most radiology and pathology images will be examined at some point by a machine. Speech and text recognition are already employed for tasks like patient communication and capture of clinical notes, and their usage will increase its main advantages in a health set up may be in reducing human error, time taking diagnostic methods. Daily Application and digital assistants, to analyze data – notes and reports from a patient's file, external research, and clinical expertise along with **Digital Consultation,** a digital nurse to help people monitor patient's condition and follow up with treatments, between doctor visits The National Institutes of Health have created the AiCure app to monitor the use of medication by a patient along with **Precision Medicine.**

Genetics and genomics look for mutations and links to disease from the information in DNA. With the help of AI, body scans can spot cancer and vascular diseases early and predict the health issues people might face based on their genetics An article by Jiang, et al (2017)[3] demonstrated that there are multiple different types of AI techniques that have been used for a variety of different diseases. Some of these techniques discussed by Jiang, et al include: Support vector machines, neural networks, Decision trees, and many more.All thease f these techniques are described as having a "training goal" so "classifications agree with the results and analysis."[3]

Applications in cytopathology and histopathology There has been recent interest in the literature in the use of Bayesian belief networks in different areas of pathol- ogy including surgical pathology. The main uses of ANNs in histopathology have been as statistical classifiers on data generated by other analytical methods, but there are few studies where digitalized images have been used as the input data for neural networks.

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Though lot of advantages in this growing fields some of its disadvantages are:-

High cost, no replicating humans, no improvement with experience, no original creativity and Unemployment.

The use of AI raises a number of ethical and social issues, many of which overlap with issues raised by the use of data and healthcare technologies more broadly. A key challenge for future governance of AI technologies will be ensuring that AI is developed and used in a way that is transparent and compatible with the public interest, Applications in cytopathology and histopathology There has been recent interest in the literature in the use of Bayesian belief networks in different areas of pathol- ogy including surgical pathology. The main uses of ANNs in histopathology have been as statistical classifiers on data generated by other analytical methods, but there are few studies where digitalized images have been used as the input data for neural networks.

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References

[1]. Bloch-Budzier, Sarah (22 November 2016). "NHS teams with Google to treat patients". BBC News. Retrieved 2018

[2]. 10-16. 2. Baraniuk, Chris (31 August 2016). "Google gets access to cancer scans". BBC News. Retrieved 201810-

[3]. Jiang F, Jiang Y, Zhi H, Dong Y, Li H, Ma S, et al. (December 2017). "Artificial intelligence in healthcare: past, present and future". Stroke and Vascular Neurology. **2** (4): 230–243. doi:10.1136/svn-2017-000101. PMC 5829945. PMID 29507784.

[4]. Hamilton PW, Anderson N, Bartels PH, Thompson D. Expert system support using Bayesian belief networks in the diagnosis of fine needle aspiration biopsy specimens of the breast. J Clin Path 1994; 47:329-36.

[5]. Kazi JI, Furness PN, Nicholson M. Diagnosis of early acute renal allograft rejection by evaluation of multiple histological features using a Bayesian Belief Network. J Clin Path 1998; 51:108-13.

[6]. Hamilton PW, Anderson N, Bartels PH, Thompson D. Expert system support using Bayesian belief networks in the diagnosis of fine needle aspiration biopsy specimens of the breast. J Clin Path 1994;47:329-36.

[7]. Wei JT, Zhang Z, Barnhill SD, Madyastha KR, Zhang H, Oesterling JE. Understanding artificial neural networks and exploring their potential applications for the practicing urologist. Urology 1998;52:161-72

[8]. Kazi JI, Furness PN, Nicholson M. Diagnosis of early acute renal allograft rejection by evaluation of multiple histological features using a Bayesian Belief Network. J Clin Path 1998;51:108-13.

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