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Artificial intelligence in the health sector

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ABSTRACT

Recently, artificial intelligence in the health sector has been a hot topic. It can help make medicine more efficient and safer. It has contributed significantly to the evolution of medical informatics and biomedicine. This communication takes a brief look at artificial intelligence in the health sector, especially in medicine.

KEYWORDS

artificial Intelligence; medicine; medical AI; health sector

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INTRODUCTION

Artificial intelligence (AI) today is associated with any task a machine can perform just as well as, if not better than, humans. AI may be regarded as the use of coded computer software routines with specific instructions to perform tasks that require the human brain. AI is an interdisciplinary field covering computer science, psychology, linguistics, philosophy, and neurosciences among others. The central objectives of AI research include reasoning, knowledge, planning, learning, natural language processing, perception, and the ability to move and manipulate objects [1]. Although AI is a branch of computer science, there is hardly any field that is unaffected by this technology. Common areas of applications include agriculture, business, law enforcement, oil and gas, banking and finance, education, transportation, healthcare, automobiles, entertainment, manufacturing, speech and text recognition, facial analysis, and telecommunications [2]. AI technologies are now increasingly being been adopted in many areas of the public sector such as education, social interventions, and healthcare. AI in medicine (AIM) and healthcare refers to the application of AI technology in the diagnosis and treatment of patients. The potential of AI to exploit a meaningful relationship with a data set can be used in the diagnosis, treatment, and predicting outcome in many clinical scenarios.

The work on medical expert systems is very much like artificial intelligence [3]. Artificial intelligence emulates human intelligence by means of a number of tools. Artificial intelligence is a rapidly evolving computerized technology affecting multiple aspects of our lives. It is increasingly performing various intelligent tasks, constituting a major source of innovation, yet threatening human jobs. For example, robots for homes, health care, hotels, and restaurants have automated many parts of our lives [4]. AI has the potential to personalize medicine and handle big data in the health sector. Common AI medical applications include diagnosis, classification, therapy, and robotics.

APPLICATIONS OF AI IN THE HEALTH SECTOR

AI is currently used in many industries and has several applications in health care and medicine. Today, AI is already being used in medicine in several areas such as decision support systems, laboratory information systems, robotic surgical systems, therapy, and reducing human error. The following are other common areas of applications.

- **Cancer**

The penetration of AI into cancer treatment affects treatment capabilities and safety. AI could be useful for head/neck cancers, prostate cancer, colorectal cancers, breast cancer, and cervical cancer. Machine learning algorithms include computer-aided detection applications that are used in mammography for the early diagnosis of breast cancer. AI will be part of the future of oncology [5].

• Medical imaging

The number of imaging performed annually has skyrocketed over the last two decades. Medical imaging data provides a rich source of information about patients. AI can support radiologists and pathologists as they use medical imaging to diagnose a wide range of conditions, accelerate their productivity, and improve their accuracy. For example, when a patient complains about the shortness of breath, the chest radiograph is likely the first imaging study to be conducted. AI could help improve the accuracy and efficiency of polyp detection at CT colonography (CTC). AI-based computer-aided detection is routinely used in breast cancer screening programs [6].

• Radiology

A radiologist is a medical doctor who is skilled in interpreting medical images such as CT scans, MRI, digital radiography, CT scans, and ultrasounds. Today, radiologists are overwhelmed by the amount of imaging data they must review. AI technology, working alongside the radiologist, has the potential to improve accuracy, safety, efficiency, and productivity. In radiology, machine learning algorithms are being used to detect breast cancer, colonic polyps, and pulmonary nodules [7].

• Aging

AI can be used in aging and longevity research. Aging is a gradual, time-dependent process leading to the loss of function, biological and physical damage. It is a universal unifying feature possessed by all living organisms, tissues, and cells. Modern deep learning techniques can be used to develop age predictors. Most of the advances in deep learning in the context of aging research are in the area of biomarker development [8].

Other applications include clinical medicine, neurosurgery, dermatology, and ophthalmology, diabetes care, obstructive sleep apnea, cardiology, internal medicine, retina disease, drug development, vision and eye care, psychiatry, and hematology.

PROS AND CONS

Multivariate analysis is perhaps the greatest strength of AI. AI is helping to uncover hidden insights into clinical decision-making. AI will help medicine move from traditional medical solutions towards targeted treatments and personalized therapies. Employing AI techniques in medical applications could reduce the cost, time, human expertise, and human error. Although AI technologies continue to attract much attention in medical research, real-life implementation is still facing obstacles. The first hurdle comes from the fact that current regulations lack standards to assess the safety and efficacy of AI systems. In response to this lack, the FDA made the first attempt to provide guidance for assessing AI systems [9]. The current healthcare environment does not provide incentives for sharing data on the system. There is a concern about the loss of the human touch in a people-focused profession. AI techniques in medicine are really very exotic and expensive. If AI technology is going to improve quality and lower costs in healthcare, some healthcare jobs will disappear. As governments develop and deploy AI in healthcare, enthusiasm for promised changes needs to be matched by caution [10].

CONCLUSIONS

Artificial Intelligence reflects the intelligence exhibited by machines and software. AI research in medicine is rapidly progressing. It is already having a great impact on healthcare and medicine and the future looks exciting. The current popularization of the Internet, universal existence of sensors, the emergence of big data, and other emerging technologies have caused rapid advancement in AI, leading to a new Artificial Intelligence 2.0 [11]. Medicine is undergoing an evolutionary change with great priority being paid to "cost-effective" delivery of care. Medical education is also changing, with or without AI [12]. It is unlikely that machines will replace human doctors any time soon, but those in the medical profession must be willing to adapt, learn, and work alongside technological advancements.

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