Chapter 6
Empowering Healthcare Professionals Through AI-Powered Lifelong Learning for Improving Patient Care

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ABSTRACT

Artificial intelligence (AI) is described as the power of a machine to emulate human intelligence. Since its development, AI has impacted business, daily life, and, most notably, the healthcare industry. The technology could make an impact on many facets of healthcare, including medical screening and treatment alternatives, drug design, and benchwork investigation. As technology progresses, AI will play a more significant role in medical education. The ability to implement AI effectively will lead to new opportunities for medical professionals in the future. AI and technology-enhanced learning should be integrated into medical education alongside the current emphasis on the biological and medical sciences. It is high time for educational institutions in the medical field to begin planning and revamping their curricula that would incorporate AI and machine learning along with a focus on transparency and compassion. The students who graduate will be competent to adopt AI-enabled technologies and to succeed in the AI-transformed healthcare system.

DOI: 10.4018/979-8-3693-2440-0.ch006

INTRODUCTION

The primary objective of the rapidly evolving computer science field known as Artificial Intelligence (AI) is to build devices that are capable of performing activities that typically necessitate human intelligence. AI encompasses a range of methodologies, including Natural Language Processing (NLP), Deep Learning (DL), and Machine Learning (ML). Large Language Models (LLMs) are a category of AI programmes that comprehend, summarise, produce, and forecast new text-based components using deep learning methods and exceptionally large data sets (Suleimenov et al., 2020; Davenport & Kalakota, 2019; Russell & Norvig, 2010). LLMs are broadly applicable for a range of NLP operations, such as content summary, sentiment assessment, redrafting, classification, and categorization. LLMs are designed to produce text-based content. The study of NLP is a branch of AI that encompasses the comprehension, interpretation, and production of human language by computers. Machine translation, recognition of speech, sentiment evaluation, mining of text, and other techniques are all part of NLP. AI has changed exponentially over time, from the initial stages of systems based on rules to the modern days of ML and DL programmes (Suleimenov et al., 2020; Davenport & Kalakota, 2019; Russell & Norvig, 2010).

Since Christopher Strachey developed the initial artificial intelligence program in 1951, the field has progressed significantly. In its early years, AI primarily existed as an academic pursuit. During the Dartmouth Conference in 1956, the term "Artificial Intelligence" was first coined by John McCarthy marking the commencement of the modern era of AI. In 1960s and 1970s, AI research focused mainly on rule-based and expert systems. However, this approach faced limitations due to the demand for increased data and processing power capacity (McCorduck & Cfe, 2004). In 1980s and 1990s, AI research shifted its focus on ML and neural systems, which enabled computers to learn from data and enhance their performance over time. For instance, during this period, systems like IBM's Deep Blue, which famously vanquished the world chess champion Garry Kasparov in 1997, were developed. In 2000s, the development of virtual assistants capable of comprehending natural language and responding to user requests, such as Apple's Siri and Amazon's Alexa, marked a notable achievement in the evolution of AI research. These virtual assistants marked the advancements in computer vision and NLP (Figure 1) (Russell & Norvig, 2010; McCorduck & Cfe, 2004).

In the academic field, AI has been applied to create computer programmes, described as smart systems for teaching, that can alter its methodology depending on the specific requirements of students. The learning outcomes of students in several subjects, particularly science and maths, have shown to be improved because of the incorporation of "smart teaching systems". In the research field, AI has been used to interpret enormous amounts of data and identify themes that would be difficult for humans to analyse, which has led to many innovations in areas such as drug development and genomics. In healthcare settings, personalised medical regimens and diagnostic instruments have been developed with the aid of AI. The development of AI needs to follow ethical guidelines and legislations for the betterment of the mankind as it advances further (Jordan & Mitchell, 2015; VanLehn, 2011; Topol, 2019; Papachristou & Bosanquet, 2020).

THE ROLE OF AI IN EDUCATION (CHEN ET AL., 2020)

AI-enabled education comprises smart education, creative online learning, and data prediction and analysis. Table 1 outlines the main applications of AI in educational settings along with the key tech-