


Chapter 20

Navigating the Promises and Perils of Generative AI in Transforming Healthcare Services

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ABSTRACT

This chapter focuses on the possibilities and risks of applying the Generative AI with the Healthcare System's Elements. The authors also discuss the role of Generative AI which has paved way for Drug Discovery, improvement of diagnosis as well as development of personalized medicine. In this aspect, they discuss the various ethical concerns such as Data Privacy and Algorithms' limitations that result from the use of AI in Healthcare. Reflective to the above elements, the chapter captures ways through which these challenges can be addressed. In sharing the ways of managing the risks and protecting patient's rights this chapter gives a step-by-step solution of how Generative AI can transform Healthcare for the better while paying attention to moral and pragmatic concerns. This chapter provides useful information on the topic for Healthcare Practitioners, Policy Makers and AI Specialists in the development of Artificial Intelligence in care delivery.

INTRODUCTION

The healthcare industry has been profoundly impacted by the rapid development of artificial intelligence technologies in recent years. Among these is generative AI, which shows promise. Generative AI represents a new transformative technology that would revolutionize patient care, streamline medical procedures, and create opportunities for breakthrough discoveries (Topol, 2019). Unlike any other form of artificial intelligence, AI generative creates new data, content or designs from learned patterns. In healthcare its applications range from

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finding novel compounds for drugs to tailoring treatment plans and inventing completely new diagnostic instruments (Goodfellow et al., 2020).

In view of the aging population, rising costs and increasing complexity of medical data generative AI gives reasons for hope for the future. Generative AI uses machine learning algorithms and massive datasets to reveal hidden patterns and forecast disease development thereby assisting physicians in making decisions. Nevertheless, there is immense enthusiasm about what such generative AI could do; however, it is also essential to consider the possible dangers and problems that come with prudently thinking about using health care.

The Rise of Generative AI in Healthcare

Generative AI is being turned into healthcare in a big way, especially during these past few years as a result of increased access to extensive medical data and computational power mostly coupled with the creation of complex AI algorithms (Jiang et al., 2017). For instance, generative models can produce diverse data with amazing realism including synthetic electronic health records as well as high- resolution medical images (Frid-Adar et al., 2018; Xue et al., 2018).

Drug discovery and development are two very promising potentials of generative AI in creating new effective therapeutics. In general, traditional drug discovery processes continue taking long time, require huge amounts of resources, and end up failing most times (Mullard, 2018). There are important applications under which generative AIs based strategies work such as de novo drug design as well as molecular generation that allows for rapid and sufficient design of new drug candidates within huge chemical spaces whilst predicting their properties (Zhavoronkov et al., 2019). Thus, it's possible to use generative AIs to create molecules thereby predicting their safety and efficacy thus establishing an effective pipeline for drug discovery saving on time needed to introduce new medicines into the market considerably cutting down associated costs involved with launching new therapies at all times (Popova et al., 2018).

One more thrilling use of generative AI within healthcare has been seen in personalized medicine. Generative models always work by analysing individual patient data like genetics, health records and lifestyle choices so as to create tailored treatment plans (Choi et al., 2016). Such an approach may significantly boost the effectiveness of treatments, reduce side effects from drugs, and therefore enhance patients' lives more directly targeted and effectively (Schork 2019).

The Purpose and Scope of this Chapter

In general, the scope of this chapter entails a wide-ranging interaction concerning the promises and threats involved in utilizing generative Artificial Intelligence (AI) in healthcare, thereby providing sound advice on how to effectively adopt such revolutionary technologies. This chapter will address prospective advantages and disadvantages in using generative AI so as to prepare stakeholders within the healthcare field with knowledge and strategic paths for steering through ethical and enduring integration of AI into the healthcare ecosystem (Bohr & Memarzadeh, 2020).

Beyond technical aspects surrounding generative AI, its broader implications for health are examined by this chapter. Such domains of health may include drug discovery as well as personalized medicine, diagnostic imaging and clinical decision support systems among others (Yu et al., 2018). Specifically examined are ethical, legal and social issues around generating such an AI including various data confidentiality questions like why it is important to keep patient data safe from untrustworthy individuals who might manipulate them; fairness bearings regarding algorithmic ignorance; finally, there is a need for some form of governance framework as far as responsible machine learning is concerned (Char et al., 2018).

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