

Chapter 5

Challenges and Limitations of Explainable AI in Healthcare

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ABSTRACT

Explainable AI (XAI) is at the forefront of healthcare innovation. It has the potential to revolutionize clinical decision-making, improve patient care, and transform healthcare delivery. Despite having said that, the integration of XAI into healthcare system is not devoid of challenges and limitations. This chapter explores the multifaceted landscape of shortcomings faced in the process of implementation of XAI in healthcare, providing valuable insights into the complexities and hurdles that needs to be given direction in order to utilize its full potential in interpreting AI in enhancing healthcare results. One of the initial challenges encountered in the implementation of XAI is the inherent complexity of healthcare data. This chapter is an attempt to identify and address challenges and embrace a collaborative commitment to transparency, fairness, and accountability, and also to navigate the complex nature of the Explainable AI in the process of implementation to lead to a new age of interpretable and trustworthy AI-generated healthcare systems.

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INTRODUCTION TO EXPLAINABLE AI IN HEALTHCARE

With coming of Artificial Intelligence (AI) in the recent years, there has been a revolutionized changes in various aspects of medical fields like treatment planning, patient monitoring, and diagnosis making AI an integral part of healthcare system globally (Fatima et al., 2023). Despite AI emerging as a player, yet due to its complexity and sophistication, apprehension related to its transparency, trustworthiness, and interpretability have also acquired awareness.

Explainable AI (XAI) can be defined as the capability of Artificial Intelligence to give critical explanations for their decisions and suggestions. The demand of XAI becomes crucially important in the healthcare domain where the stakes are considerably high and decisions directly influence patient results. The professionals in the healthcare field need to understand the logics and reasoning behind AI-driven choices to have faith and trust in order to utilize these systems clinically.

In the field of healthcare, XAI can aid in development of AI systems that generate forecasting or suggestions and also provide understandable explanations for their decisions (Seetharaman et al., 2023). XAI techniques create more accountable models to healthcare providers, patients, and other stakeholders. This will help to facilitate partnership among AI systems and human experts improving decisions and building trust in AI-driven healthcare solutions.

As the healthcare field continues to steer into the collaboration of AI and clinical practices, the necessity to comprehend variations of XAI becomes pivotal. By illuminating the AI-driven decision-making processes, we can entrust the stakeholders to take better decisions and finally enhance healthcare results for everyone.

Throughout this discourse, we will understand the technical challenges of AI models (Longo et al., 2020), ethical dilemmas accompanying accountability, barriers hindering the implementation, implications related to patient care, and the imperative of building trust among healthcare patients and providers.

Importance and Need for Explainable AI in Healthcare

The importance and need for Explainable AI (XAI) in healthcare must not be exaggerated as the crucial intricacies of medical field for outcomes related to patients. Some of the key reasons of the need for XAI in healthcare are as follows:

- **Safety and Accountability:** Patient safety is the most significant parameter in healthcare. XAI helps to analyse the safety and reliability of AI systems by finding the prospecting errors, limitations, or biases in the decision-making process for the healthcare providers. Moreover, explainability enhance accountability by permitting stakeholders to identify areas of malfunctions.

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