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RADemics

AI-Driven Telehealth Platforms to Improving Accessibility and Patient Engagement

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Abstract

The integration of AI in telehealth platforms was rapidly transforming healthcare delivery by improving accessibility, enhancing patient engagement, and optimizing clinical outcomes. AI-driven systems, leveraging technologies such as machine learning, predictive analytics, and natural language processing, offer personalized care solutions and real-time interventions, especially in underserved regions. This book chapter explores the potential of AI to revolutionize telehealth, focusing on key advancements such as virtual assistants, predictive analytics for identifying at-risk patients, and multi-device accessibility. By examining the challenges and opportunities associated with AI in telehealth, the chapter provides insights into how these technologies can overcome barriers to healthcare access and patient adherence. The chapter discusses the ethical considerations and data privacy issues integral to the widespread adoption of AI in healthcare systems. Through the exploration of these critical aspects, the chapter highlights the transformative impact of AI on telehealth, setting the stage for future innovations in digital healthcare solutions.

Keywords: Artificial Intelligence, Telehealth, Patient Engagement, Predictive Analytics, Multi-Device Accessibility, Healthcare Accessibility.

Introduction

AI was reshaping the landscape of modern healthcare, particularly through its integration with telehealth platforms [1]. As healthcare systems around the world grapple with increasing demands, limited resources, and disparities in care delivery, AI offers a transformative approach to providing timely and effective medical support [2]. Telehealth, which allows patients to access healthcare services remotely, was significantly enhanced by AI technologies that enable intelligent decision-making, automate administrative tasks, and facilitate personalized interactions [3]. By combining AI with telehealth, healthcare systems can overcome traditional limitations of distance, infrastructure, and clinical capacity [4]. The convergence of these technologies was not only optimizing operational efficiency but also democratizing access to quality healthcare services, especially in remote or underserved regions [5].

The adoption of AI-driven telehealth platforms was being accelerated by advances in machine learning, natural language processing, and computer vision [6]. These technologies empower systems to perform tasks such as predictive risk assessment, clinical decision support, and automated triaging with a high degree of accuracy [7]. AI-enabled chatbots and virtual assistants are improving the quality of patient-provider communication by offering 24/7 support, answering

queries, and assisting in appointment scheduling or medication reminders [8]. AI algorithms analyze vast datasets from electronic health records, wearables, and real-time monitoring devices to deliver actionable insights that can significantly improve patient care [9]. These innovations are not only supporting healthcare providers in diagnosing and treating conditions more effectively but also promoting a more proactive, preventive model of care that places patients at the center of the healthcare ecosystem [10].

The immense potential of AI in telehealth, challenges remain in ensuring equitable and inclusive access [11]. One of the major barriers was the digital divide, where populations lacking internet access or digital literacy are at risk of exclusion from these advancements [12]. AI models require diverse and representative datasets to function accurately, and disparities in data collection can lead to biased outcomes [13]. To truly improve accessibility, telehealth platforms must be designed with a focus on inclusivity ensuring multilingual support, simplified user interfaces, and compatibility with low-end devices [14]. The deployment of AI technologies must comply with regulatory standards and ethical principles to protect patient privacy and maintain trust. Addressing these challenges was essential for maximizing the societal benefits of AI-powered healthcare systems [15].

Patient engagement, a key determinant of health outcomes, was another critical area being transformed by AI [16,17]. Through personalized recommendations, behavior tracking, and gamified health interventions, AI can motivate patients to adhere to treatment plans and make informed lifestyle choices [18]. Predictive analytics, for example, can identify patients at risk of hospital readmission or disease progression, allowing for timely interventions that can prevent complications and reduce healthcare costs [19]. AI-driven platforms can tailor educational content based on patient preferences and learning styles, enhancing health literacy and encouraging greater involvement in care decisions [20]. These capabilities not only improve the quality of care but also foster a collaborative relationship between patients and providers, empowering individuals to take an active role in managing their health [21].