


Chapter 3


Navigating the Future of Healthcare: Predictive Analytics and Decision Support Through Large Language Models and Large Vision Model

Raaga Likhitha Musunuri

 <https://orcid.org/0009-0008-6823-8054>

Northeastern University, USA

Ashruti Bhatt

 <https://orcid.org/0000-0003-1191-7191>

Parul University, India

ABSTRACT

This chapter explores the transformative potential of large language models (LLMs) and large vision models (LVMs) in healthcare. These technologies can comprehend and generate human-like text and interpret complex visual information, revolutionizing healthcare delivery. Applications include medical documentation, clinical decision support, medical imaging, and patient education. The chapter also addresses challenges like data bias, transparency, and privacy, emphasizing robust frameworks and interdisciplinary collaboration. These models can enhance diagnostics, personalize treatments, optimize processes, and improve efficiency, addressing global health disparities and promoting equity.

DOI: 10.4018/979-8-3693-8552-4.ch003

Copyright © 2025, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

I. INTRODUCTION

Healthcare delivery is undergoing rapid transformation, integrating technological advancements more extensively than ever before (Lavrynenko, 2023; Stoumpos et al., 2023). The healthcare industry generates significant text and image-based data crucial for treatment processes, care delivery, and management (Batko, 2022). Effective utilization of this data is vital for improving care quality, patient outcomes, and advancing medical research (GoMo Health, 2018).

Large Language Models (LLMs) and Large Vision Models (LVMs), characterized by their ability to process, analyze, and interpret vast amounts of data, offer promising solutions to healthcare challenges (ExpertusONE, n.d.). These AI-powered models can improve diagnostic accuracy, personalize patient care, and streamline administrative processes (Karabacak, 2023). Trained on extensive datasets, LLMs and LVMs can comprehend and generate human-like text and interpret complex visual information, enabling healthcare professionals and researchers to unlock new insights, streamline processes, and enhance decision-making (Gu et al., 2020).

This chapter explores the transformative roles of LLMs and LVMs in healthcare, focusing on improving patient outcomes, reducing costs, enhancing efficiency, applications in medical documentation, clinical decision support, imaging analysis, and patient education

The objectives are to:

- Provide an overview of healthcare's current state and data's role in innovation
- Introduce LLMs and LVMs, their architectures, and potential healthcare impact
- Explore real-world healthcare use cases
- Discuss ethical considerations, challenges, and adoption best practices
- Outline future research directions and integration opportunities

By addressing these objectives, readers will gain a comprehensive understanding of LLMs' and LVMs' potential in healthcare, enabling informed decision-making and paving the way for improved patient outcomes and medical research advancements. The chapter also addresses challenges for ethical deployment, ensuring data privacy and security.

32 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/navigating-the-future-of-healthcare/357956

Related Content

Application of Fuzzy Multiple Attribute Decision-Making for Selecting the Best Sustainable Orientation: A Case Study

K. Jayakrishna, K.E.K. Vimal, L.N.U. Medha, Shubham Jainand S. Aravind Raj (2018). *International Journal of Applied Management Sciences and Engineering* (pp. 47-65).

www.irma-international.org/article/application-of-fuzzy-multiple-attribute-decision-making-for-selecting-the-best-sustainable-orientation/207340

Forgiveness in the Workplace: Fuel for Individual and Organizational Success

Nancy Kymn Harvin Rutigliano, Sandra Barkevichand Betty Hurley (2017). *Encyclopedia of Strategic Leadership and Management* (pp. 877-889).

www.irma-international.org/chapter/forgiveness-in-the-workplace/173569

Gender Equality and the Importance of Gender-Based Violence at International and National Levels

Nino Botchorishvili (2024). *Gender Issues in Government and Management* (pp. 119-138).

www.irma-international.org/chapter/gender-equality-and-the-importance-of-gender-based-violence-at-international-and-national-levels/356104

Consumer Perceptions of 100% Pure Olive Oil: Implications for Marketing

John L. Stantonand Ekaterina Salnikova (2016). *International Journal of Food and Beverage Manufacturing and Business Models* (pp. 40-47).

www.irma-international.org/article/consumer-perceptions-of-100-pure-olive-oil/145324

Managing Human Resources in Family Businesses: A Review on the Current State of Research and New Proposals for the Future

Santiago Gutiérrez-Broncano, Mercedes Rubio-Andrésand Pedro Jiménez Estévez (2016). *Project Management: Concepts, Methodologies, Tools, and Applications* (pp. 98-115).

www.irma-international.org/chapter/managing-human-resources-in-family-businesses/155262