

CHAPTER 1

Data processing

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1.1 Introduction to data processing in artificial intelligence

In the rapidly evolving healthcare field, artificial intelligence (AI) is poised to transform how medical professionals diagnose, treat, and manage diseases (Lee & Yoon, 2021). Data processing is central to this transformation, a fundamental aspect of AI that ensures the vast amounts of health data generated daily are converted into actionable insights. This chapter provides an overview of how effective data processing is critical in developing AI systems that are not only technologically advanced but also capable of delivering precise and empathetic healthcare solutions. From collecting and cleaning data to sophisticated techniques like data augmentation, each step plays a vital role in enhancing the functionality and reliability of AI applications within the e-health framework.

1.2 Importance of data processing in artificial intelligence

Data processing forms the backbone of AI systems, particularly in the healthcare sector, where the quality and precision of data directly influence the outcomes of AI analyses and interventions (Sengupta & Bhunia, 2020). At its core, data processing in AI involves the systematic transformation of raw data into meaningful and usable information, which AI models can then utilize for learning and making informed decisions. This process is crucial because AI systems require clean, accurate, and well-structured data to perform effectively. AI models might generate misleading results without proper data processing, leading to incorrect diagnoses or ineffective treatment plans.

In healthcare, the stakes are exceptionally high, as data-driven decisions can significantly affect patient outcomes (Cascini et al., 2021). Effective data processing enhances the reliability of AI applications by