


Chapter 3

Reimagining Emotional Ergonomics through the Integration of Human Emotion and Artificial Intelligence for Sustainable Healthcare Wellbeing

Krishnaveni Subramani

 <https://orcid.org/0009-0000-9785-4595>

SR University, India

Geetha Manoharan

 <https://orcid.org/0000-0002-8644-8871>

SR University, India

ABSTRACT

Combining emotional ergonomics and AI was a disruptive solution to improving the sustainability of healthcare by focusing on patient wellbeing and staff performance. Clinical decision-making, patient adherence, and professional performance are highly dependent on emotional states, which are usually not considered with the traditional healthcare system. AI-based affective computing can provide real-time identification and analysis of physiological, behavioral, and situational emotional cues to support adaptive interventions that can streamline the clinical processes and interactions between patients and staff. In this chapter, the theoretical background,

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methodological principles, and practical use of AI-driven emotional ergonomics are reviewed, and pilot implementations and case studies are discussed, which show that patient satisfaction, reduction of errors, and resilience in the workplace have been improved. Ethical aspects such as privacy of data, fairness in algorithms, and trust are considered to promote responsible use of emotion-sensitive technologies.

INTRODUCTION

Healthcare systems are becoming more complicated environments with large patient flows, a wide range of medical conditions, and dynamic technology infrastructures (Cinar & Bilodeau, 2024). The quality, safety, and efficiency of care delivery are strongly determined in such settings by the emotional well-being of both patients and healthcare professionals (Dey, 2024). The accuracy of decision-making, the adherence to treatment, the engagement of a patient, or the staff performance are influenced by the emotional states, and stress, anxiety, or fatigue usually lead to negative outcomes (George, 2024). The main focus of traditional ergonomics has been on physical relationships and efficiency of the working process, but the emotional aspect was not studied thoroughly (Azour et al., 2024). Emotional ergonomics comes in to fill this gap by looking at the interaction between the emotional factors with task requirements, environmental conditions, and technological systems (Kolomaznik et al., 2024). The process of creating healthcare settings that support the emotional reaction of humans can alleviate stress, improve the performance of healthcare personnel, and build resilience in both staff and patients (Kaklauskas et al., 2022). By acknowledging emotion as a fundamental part of healthcare provision, one can have a ground to introduce technological solutions that can help improve emotional control and management in a clinical environment (Bibri & Jagatheesaperumal, 2023).

With the development of artificial intelligence (AI), new opportunities to implement operational emotional ergonomics in healthcare emerge (Kumar et al., 2023). The systems with affective computing can respond to emotional cues of a human in real time and identify them (Bekbolatova et al., 2024). Such systems are based on machine learning algorithms, natural language processing, and computer vision to process multi-mode data, such as physiological measurements, facial expressions, vocal intonations, and behavioral cues (Farahat et al., 2023). Transforming emotional data into actionable information, AI will make possible adaptive interventions to enhance interactions between patients and staff, optimize resource distributions, and enable personalized care (Stone et al., 2022). Not only do such technologies lead to a higher patient satisfaction level and better clinical outcomes but also facilitate workforce well-being by detecting and eliminating the sources of occupational stress

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