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Towards Modeling of Distributed Intelligence Systems in Modern Healthcare

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Introduction. From the perspective of Distributed Intelligence, this study assesses the practical application of Artificial Intelligence (AI) in healthcare. It reveals that despite AI's efficacy across medical datasets, its deployment in healthcare settings is relatively limited. The research identifies a scarcity of technical studies directly focused on "Distributed Intelligence in Healthcare" and a lack of a specific developmental paradigm. It emphasizes the complex interactions between healthcare professionals (HCPs) and AI, highlighting the necessity of research on trust-building from a social value-sharing perspective, and identifying gaps in technical implementation. This includes examining the role of 'practice sharing' in these interactions, as a means of enhancing decision-making and knowledge transfer in healthcare settings. Additionally, the study discusses the need for clear legal, operational norms, and protocols for HCPs using AI. Addressing these challenges will enable effective AI integration in healthcare, proposing a significant advancement in the field [1].

Main part. In the evolving landscape of healthcare, the fusion of Artificial Intelligence (AI) and Distributed Intelligence Systems is emerging as a key area of research. This study, adhering to PRISMA guidelines, offers an exhaustive review of the English literature to delve into AI's practical applications in healthcare, particularly from the perspective of Distributed Intelligence. We address both the current status and potential challenges in implementing AI in medical systems, acknowledging the gap between AI's demonstrated effectiveness in various medical issues and its limited actual deployment in real-world healthcare scenarios.

The research initially explores the characteristics of hospital systems as dynamic, multidisciplinary, and complex components within Distributed Intelligence, highlighting the role of information, practice, and goal sharing in enhancing healthcare system functionality. The subsequent analysis focuses on the integration of AI with Healthcare Professionals (HCPs), examining emergent phenomena in distributed healthcare systems. This includes establishing collaboration based on value sharing and trust relationships, extending beyond doctor-patient interactions to encompass the broader socio-medical system.

Further, the study investigates datasets analyzing behaviors of natural intelligence within these systems. These datasets, covering aspects like clinical decision-making, patient interactions, and medical professionals' clinical practices, are crucial for understanding the interface between medical professionals and AI systems.

The paper culminates with a discussion and outlook, summarizing the main findings and their potential impacts on healthcare practice. It also contemplates future directions for AI in healthcare, considering the legal, operational norms, and protocols that medical professionals must follow when utilizing AI tools.

Overall, this study aims to provide a comprehensive and insightful perspective on the integration of AI with Distributed Intelligence Systems in healthcare, guiding future research directions and enlightening the field [2].

Conclusions. Our comprehensive analysis underscores the urgent need for a focused research agenda and a holistic approach to implement AI in healthcare, emphasizing the development of robust technical frameworks and regulatory guidelines to enhance the practical application and ethical governance of AI in the medical domain.

List of sources used:

1. Rajpurkar, P., Chen, E., Banerjee, O., & Topol, E.J. (2022). AI in health and medicine. Nature Medicine, 28, 31 - 38.

2. Schoenherr, J.R. (2021). Trust and explainability in A/IS-mediated healthcare: Operationalizing the therapeutic alliance in a distributed system. 2021 IEEE International Symposium on Technology and Society (ISTAS), 1-8.

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