

From body-data to narrative body: Reconfiguring the human body in medical discourse in the age of Artificial Intelligence

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Abstract: The rapid integration of artificial intelligence into biomedical research and clinical practice is transforming the ways in which the human body is conceptualized and represented in medical knowledge. Rather than functioning merely as descriptive tools, scientific vocabularies and research frameworks contribute to shaping epistemic models of the body. This study investigates how contemporary medical literature reproduces particular representations of the body in the context of digital medicine and artificial intelligence. Methodologically, the research combines bibliometric mapping with discourse analysis. A systematic search of the PubMed database identified 2,518 articles published between 1973 and 2025 that include references to the body and artificial intelligence. From these articles, 7,275 keywords were extracted and analysed, with 499 terms meeting the minimum occurrence threshold for co-occurrence mapping using VOSviewer. The bibliometric analysis reveals the centrality of technical concepts associated with computational modelling, including neural networks, image processing, and computational biology. Complementary discourse analysis of the articles indicates that the body is predominantly conceptualized as a biomechanical structure, an imaging object, a network of physiological sensors, or a dataset analysed through predictive algorithms. In contrast, experiential and narrative dimensions of embodiment appear significantly less visible within the dominant vocabulary of biomedical research. Based on these findings, the study proposes a conceptual model of the digital body, describing the transformation of the body from a clinically observed organism into a data-driven object embedded within technological infrastructures of monitoring, modelling, and prediction. The analysis suggests that while digital medicine expands the technological capacities of healthcare, it also risks narrowing the conceptual space in which the body is understood. In this context, the integration of perspectives from medical humanities becomes increasingly important for reconnecting biomedical innovation with the lived, ethical, and narrative dimensions of human embodiment.

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Introduction

The increasing integration of artificial intelligence into biomedical research and clinical practice is reshaping the ways in which the human body is investigated, interpreted, and represented within contemporary medical knowledge. Machine learning algorithms, large biomedical datasets, and advanced imaging technologies enable the analysis of biological processes at an unprecedented scale, allowing researchers to identify patterns that would be difficult to detect through traditional clinical observation.

In this context, the body is increasingly represented in the medical literature as a system of biological data that can be modelled, classified, and predicted through computational methods. Recent research has explored the use of artificial intelligence for automatic classification of anatomical regions in CT or MRI images (Raffy et al. 2023; Najjar 2023), for systemic health assessment through retinal image analysis (J. H. Wu and Liu 2022), and for predicting medical risks using machine learning models (Alanazi et al. 2021). These developments illustrate a broader transformation in which the body becomes an object of algorithmic analysis within digital infrastructures of biomedical knowledge. At the same time, wearable technologies and sensor-based monitoring systems have introduced new forms of continuous data collection about the body. Systems designed to detect falls through wearable sensors (W. Wu et al. 2012) or smart textiles capable of monitoring movement and physiological signals (Oatley et al. 2021; Zahid et al. 2022; Ahmed et al. 2025) reflect a growing interest in representing the body as a dynamic network of measurable signals. Within these technological environments, bodily processes are increasingly translated into streams of data that can be analysed, visualized, and interpreted through computational models. These developments do not simply introduce new tools into medicine; they also reshape the epistemological frameworks through which the body is conceptualized in biomedical discourse. Scientific language plays a crucial role in this transformation. The concepts used to describe the body (model, image, sensor, dataset, or algorithmic prediction) reflect underlying assumptions about what the body is and how it can be known.

Scholars in science and technology studies and medical humanities have emphasized that scientific vocabularies do not merely describe biological reality but actively participate in constructing the objects of biomedical knowledge (Rose 2007; Lupton 2017). In the context of digital medicine, this observation raises an important question: how does contemporary medical literature reproduce particular representations of the body in the age of artificial intelligence?

Most existing studies on artificial intelligence in medicine focus on the technical performance of algorithms or on their clinical applications. Far less attention has been devoted to examining how biomedical research itself conceptualizes the body through its vocabulary and research frameworks. Understanding these representations is important because they shape how medicine approaches diagnosis, treatment, and the broader relationship between technology and human embodiment. To address this gap, the present study investigates how the body is represented in contemporary medical literature by combining bibliometric mapping of keywords with discourse analysis of articles indexed in PubMed. This approach allows the study to examine both the conceptual architecture of the literature and the discursive patterns through which the body is described. By analysing the vocabulary and thematic structures of biomedical research, the study aims to identify dominant representations of the body and to explore how these representations relate to broader debates about digital medicine, datafication, and embodiment. This study contributes to the field of medical humanities by combining bibliometric mapping with discourse analysis to examine how contemporary biomedical literature constructs the human body as a digital and data-driven entity in the context of artificial intelligence. To understand how these transformations relate to broader theoretical debates about medicine, technology, and embodiment, the following section reviews key perspectives from science and technology studies, posthuman theory, and medical humanities that have examined the changing relationship between the human body and digital technologies.

Theoretical framework: The body between biology, data, and experience

The body as an object of biomedical knowledge

Modern medicine has historically conceptualized the human body as the central object of clinical observation and scientific investigation.

Since the emergence of anatomical pathology in the nineteenth century, medical knowledge has increasingly relied on systematic observation of bodily structures and processes through diagnostic technologies, laboratory analysis, and imaging techniques. Within this framework, the body becomes a site of classification, measurement, and intervention.

During the twentieth century, the development of molecular biology and genetics expanded this biomedical perspective by framing the organism as a complex biological system composed of interconnected biochemical and genetic processes. As biomedical technologies evolved, medical knowledge increasingly relied on technological infrastructures capable of producing and analysing large volumes of biological data.

Nikolas Rose (2007) describes this transformation as part of a broader shift in the politics of life itself, in which biological processes become objects of technoscientific knowledge and governance. In contemporary biomedicine, life is increasingly understood through biological data and molecular processes that can be monitored, analysed, and manipulated through technological systems. As a result, the body becomes embedded within complex networks of biomedical knowledge production.

These developments have prepared the ground for a more recent transformation in which digital technologies and artificial intelligence play an increasingly central role in how the body is investigated and represented in medical research.

The digitalization of the body and the emergence of the “data body”

The expansion of digital infrastructures in healthcare has accelerated the transformation of the body into a source of measurable and analysable data. Across multiple domains of medicine (from medical imaging to physiological monitoring) biological processes are increasingly represented through datasets that can be processed by computational methods.

Deborah Lupton (2016) describes this phenomenon as the datafication of the body, referring to the growing tendency to translate bodily processes into digital data streams generated by sensors, health applications, and biomedical monitoring systems. Through wearable technologies and digital health platforms, the body becomes continuously tracked and quantified, producing what Lupton terms a “data body”. Digital health technologies have expanded the ability to

monitor and analyse bodily processes through data infrastructures that integrate sensors, mobile applications, and artificial intelligence systems (Lupton 2017).

Similarly, Ruckenstein and Schüll (2017) argue that contemporary health technologies are transforming the relationship between individuals and their bodies by encouraging new forms of self-monitoring and data-driven health management. In these environments, bodily functions are increasingly interpreted through digital infrastructures that convert physiological signals into analysable data.

These theoretical perspectives resonate with developments in contemporary biomedical research. Studies using machine learning for the classification of anatomical structures in medical images or for predicting disease risk illustrate how the body is increasingly conceptualized as a dataset analysed through computational models (J. H. Wu and Liu 2022; Alanazi et al. 2021). Within this epistemological framework, the body becomes a data-driven entity embedded within technological systems of monitoring and prediction.

The posthuman body and human–technology relations

The transformation of the body into a digitally analysable object is closely related to broader debates about posthumanism and the relationship between humans and technology. In science and technology studies, several scholars have examined how technological systems reshape the boundaries between biological organisms and technological infrastructures.

Donna Haraway's influential concept of the cyborg highlights the hybrid nature of contemporary human–technology relationships. Haraway (1991/1985) argues that modern societies increasingly blur the boundaries between humans, machines, and information systems, producing new forms of technologically mediated embodiment.

Building on these ideas, Rosi Braidotti (2013) argues that contemporary societies are entering a posthuman condition, in which technological, biological, and cultural processes are deeply intertwined (Braidotti 2013a). Within this framework, the body can no longer be understood as a stable biological entity but rather as a dynamic assemblage shaped by interactions between biological processes and technological infrastructures.

Similarly, Katherine Hayles (1999) emphasizes the growing importance of information technologies in shaping how bodies are conceptualized. In her analysis of cybernetics and digital culture,

Hayles argues that the body is increasingly understood as an informational pattern, where biological processes are represented through data structures and computational models.

These perspectives provide an important theoretical lens for analysing how contemporary medical literature conceptualizes the body in the context of digital technologies and artificial intelligence.

The experiential body and perspectives from medical humanities

While digital technologies have expanded the analytical capacities of medicine, scholars in medical humanities have emphasized the importance of maintaining attention to the lived experience of the body. Medical humanities integrate insights from philosophy, literature, anthropology, and cultural studies in order to examine how medicine shapes human experiences of illness, health, and embodiment.

Recent work in critical medical humanities further emphasizes the importance of interdisciplinary approaches for understanding how medicine intersects with culture, technology, and social experience (Whitehead et al. 2016).

One influential approach within this field is narrative medicine, developed by Rita Charon (2006). Narrative medicine emphasizes the importance of listening to patients' stories and understanding illness as a lived experience rather than solely as a biological condition. From this perspective, the body is not only a biological object or a set of measurable parameters but also a site of meaning, identity, and narrative.

Phenomenological approaches to illness further highlight the experiential dimension of embodiment. Havi Carel (2016) argues that illness fundamentally alters an individual's experience of the body and the world, producing changes that cannot be fully captured through biomedical data alone.

Similarly, Alan Bleakley (2015) stresses the importance of integrating humanities perspectives into medical education and research. According to Bleakley, medical humanities can help expand the conceptual frameworks of medicine by reconnecting technological innovation with ethical reflection, empathy, and cultural understanding.

The growing field of health humanities has also expanded the scope of medical humanities by integrating perspectives from literature,

history, philosophy, and the arts in order to examine the cultural and social dimensions of health and illness (Crawford et al. 2015).

Together, these perspectives emphasize that the body should not be understood solely through technological representations but also through the lived experiences and narratives that shape human embodiment.

Medical language and the production of bodily representations

Within this broader theoretical context, analysing the language of biomedical research becomes an important way of understanding how contemporary medicine conceptualizes the body. Scientific vocabularies do not merely describe biological phenomena; they also shape how bodies become intelligible objects of knowledge.

When medical literature repeatedly describes the body through concepts such as models, images, sensors, or datasets, these terms contribute to stabilizing particular epistemic frameworks for understanding the body. Conversely, concepts related to experience, narrative, or embodiment highlight alternative ways of conceptualizing bodily processes.

Examining the vocabulary and conceptual structures of medical literature therefore provides insight into how different representations of the body coexist within biomedical discourse. In particular, such analysis can reveal whether technological representations of the body dominate the literature or whether experiential and narrative perspectives remain visible.

Building on these theoretical insights, the present study investigates how contemporary medical literature represents the body by combining bibliometric mapping with discourse analysis of articles indexed in the PubMed database. To explore these representations empirically, the following section presents the methodological framework used to analyse the conceptual structure of the literature and the discursive patterns through which the body is described in contemporary biomedical research.

Methodology

Research design

This study adopts a mixed methodological approach combining bibliometric mapping with qualitative discourse analysis. The purpose of this design is to examine how contemporary medical literature

represents the human body in the context of artificial intelligence and digital medicine.

Bibliometric analysis provides a macro-level perspective on the conceptual architecture of the literature by identifying patterns in the use and co-occurrence of keywords across a large corpus of publications. Through this approach, it becomes possible to map dominant thematic clusters and observe how different concepts related to the body and artificial intelligence are connected within biomedical research. At the same time, bibliometric mapping alone cannot fully capture the discursive ways in which the body is described in individual studies. For this reason, the present study complements the bibliometric analysis with a discourse-oriented examination of the articles included in the corpus. This second level of analysis focuses on how the body is conceptualized within the research topics, titles, and thematic orientations of the publications.

By combining these two methodological perspectives, the study aims to investigate both: the conceptual structure of contemporary medical literature and the discursive patterns through which the body is represented in biomedical research. This dual analytical framework makes it possible to connect large-scale patterns in the literature with more detailed observations about the language used to describe the body in the age of artificial intelligence.

Data source and corpus construction

The dataset used in this study was constructed using the PubMed database, one of the most widely used repositories for biomedical and clinical research. PubMed was selected because it provides standardized bibliographic metadata and keyword indexing for a large body of medical publications.

A systematic search was conducted on 1st August 2025 using the following Boolean query:

((“body representation” [Title/Abstract] OR “human body” [Title/Abstract] OR “embodiment” [Title/Abstract] OR “body image” [Title/Abstract]) AND (“artificial intelligence” [MeSH Terms] OR “artificial intelligence” [Title/Abstract] OR “AI” [Title/Abstract] OR “machine learning” [Title/Abstract] OR “algorithm*” Title/Abstract))).

This query was designed to identify publications that explicitly refer to the body or embodiment in relation to artificial intelligence or computational analysis. The search returned 2,518 articles published between 1973 and 2025. The temporal scope was intentionally broad in

order to capture the historical development of research connecting bodily representation and digital technologies. A preliminary examination of the dataset revealed a significant increase in publications in the last decade, reflecting the rapid expansion of research on artificial intelligence and digital health technologies.

Keyword extraction and preprocessing

From the 2,518 articles identified in the search, a total of 7,275 unique keywords were extracted. In order to reduce noise and ensure analytical clarity, a minimum occurrence threshold was applied. Only keywords appearing at least five times across the dataset were included in the bibliometric analysis. After applying this threshold, 499 keywords remained eligible for network mapping.

Before analysis, the keyword list was manually cleaned and normalized. This preprocessing step included: merging lexical variations of the same term, removing redundant expressions and overly generic descriptors, standardizing singular and plural forms where appropriate. The purpose of this step was to ensure that the resulting network accurately reflected meaningful conceptual relationships rather than purely lexical variation.

Bibliometric analysis

The bibliometric analysis was conducted using VOSviewer, a widely used software tool for constructing and visualizing bibliometric networks (van Eck and Waltman 2014). The analysis focused on keyword co-occurrence, which measures how frequently two terms appear together within the same publication. Co-occurrence analysis allows the identification of clusters of related concepts and helps reveal the thematic organization of the literature.

The main analytical parameters were: unit of analysis (author keywords), type of analysis (keyword co-occurrence), normalization method (association strength) and minimum occurrence threshold (5). The resulting bibliometric map represents keywords as nodes connected by links indicating their co-occurrence within the literature. In this visualization: the size of each node corresponds to the frequency of the keyword, the distance between nodes reflects the strength of their association, and the colour of nodes indicates cluster membership identified through the algorithm. Through this mapping process, it becomes possible to observe which conceptual areas

dominate the literature and how different research themes are interconnected.

Discourse analysis of the PubMed corpus

To complement the bibliometric mapping, the study includes a qualitative examination of the articles included in the dataset. This analysis focuses on how the body is described and conceptualized within the research topics and thematic orientations of the publications.

Particular attention was given to recurring patterns in how the body is framed within different types of research. For example, many studies conceptualize the body as a biomechanical structure modelled through computational simulations, as an imaging object analysed through digital imaging techniques, or as a set of physiological signals captured through wearable sensors.

Examples include research on biomechanical modelling of anatomical structures (Jones et al. 2015; Gao et al. 2021), studies on automated recognition of anatomical regions in medical images (Liu et al. 2019), and work on sensor-based monitoring of bodily movement or health status (F. Wu et al. 2015). These studies illustrate how contemporary biomedical research frequently approaches the body through technological frameworks of modelling, monitoring, and prediction. The discourse analysis therefore allows the study to move beyond abstract keyword patterns and examine how the body is concretely represented within biomedical research.

Limitations of the study

Several limitations should be acknowledged when interpreting the results of this study. First, the dataset is limited to literature indexed in the PubMed database, which primarily represents biomedical and clinical research. As a result, perspectives from other disciplines (such as anthropology, sociology, or cultural studies) may be underrepresented. Second, bibliometric analysis captures patterns in keyword usage but cannot fully account for the conceptual complexity of individual articles. While the co-occurrence of terms provides valuable insight into the structure of the literature, it does not replace close reading of individual studies. Finally, the search strategy focused on specific keywords related to the body and artificial intelligence. Although this approach ensured analytical coherence, it may have excluded studies discussing similar themes using different terminology.

Despite these limitations, the combined use of bibliometric mapping and discourse analysis offers a robust framework for examining how contemporary medical literature represents the body in the context of digital technologies. Bibliometric mapping should therefore be understood as an exploratory method that reveals conceptual patterns in the literature rather than providing a complete interpretation of individual studies.

Building on this methodological framework, the following section presents the results of the bibliometric analysis, focusing on the conceptual structure of the literature and the thematic clusters identified within the PubMed corpus.

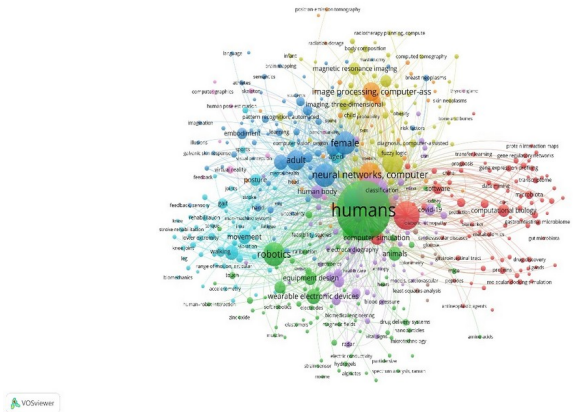
Results

Overview of the bibliometric network

The bibliometric analysis produced a conceptual map based on the co-occurrence of 499 keywords extracted from the 2,518 articles identified in the PubMed corpus. The resulting network reveals the thematic structure of the literature addressing the relationship between the human body and artificial intelligence.

In the visualization generated by VOSviewer (Figure 1), each keyword appears as a node whose size corresponds to its frequency of occurrence across the dataset. The links between nodes represent co-occurrence relationships, while the distance between nodes reflects the strength of their conceptual association. Colours indicate clusters identified through the network clustering algorithm.

Figure 1: Bibliometric map obtained using VOSviewer.
Representation of the body in medical language (PubMed)



Across the map, four major clusters emerge as dominant areas of research: computational and data-driven medicine, medical imaging and image analysis, biomedical engineering and technological augmentation, and embodiment and bodily movement. These clusters are interconnected through shared methodological approaches and technological infrastructures, forming a network in which different modes of investigating the body coexist.

Central concepts in the literature

The largest nodes in the network correspond to keywords that appear most frequently across the dataset and that maintain multiple connections with other terms. These central nodes indicate the dominant conceptual areas of the literature. Among the most prominent keywords in the network are terms related to computational analysis and digital technologies, including: “humans”, “neural networks”, “image processing”, “computational biology”, “classification” and “computer simulation”.

The prominence of these terms suggests that much of the literature conceptualizes the body through computational frameworks that involve modelling, image analysis, and algorithmic classification. In particular, terms associated with neural networks and image processing appear as central nodes connecting several thematic clusters, highlighting the importance of artificial intelligence techniques in contemporary biomedical research.

Thematic clusters in the network

The clustering algorithm applied in VOSviewer identified several major thematic groupings within the dataset. These clusters represent areas of research where particular sets of keywords frequently co-occur.

- **Computational and data-driven medicine**

One of the largest clusters in the network (visualized in red in the VOSviewer map) is centred on terms associated with computational analysis and data-driven biomedical research. This cluster includes a dense group of interconnected keywords, among which the most prominent nodes are “machine learning”, “neural networks”, “data mining”, “classification”, and “computational biology”.

The strong co-occurrence relationships between these terms indicate that contemporary biomedical research frequently relies on algorithmic methods capable of analysing large volumes of biomedical data.

Within the network, these keywords occupy relatively central positions and show numerous links with other clusters, particularly those associated with medical imaging and sensor-based technologies.

The prominence of computational concepts suggests that artificial intelligence has become a major methodological framework for analysing biological processes. Rather than focusing exclusively on direct clinical observation, many studies approach the body through datasets that can be processed by machine learning algorithms in order to detect patterns, support diagnosis, or generate predictive models of disease. Within the context of the theoretical framework discussed earlier, this cluster reflects the growing tendency in biomedical research to conceptualize the body as a data-generating system embedded within digital infrastructures of analysis and prediction.

- Medical imaging and image analysis

A second major cluster (displayed in yellow in the bibliometric map) is associated with the analysis of medical images and digital visual representations of the body. The cluster contains a set of closely related keywords including “image processing”, “computer-assisted diagnosis”, “medical imaging”, “tomography”, and “radiology”.

The nodes in this cluster are tightly connected, indicating a strong conceptual coherence within the literature focused on imaging technologies. Several of these terms also maintain strong links with keywords from the computational cluster, particularly those related to neural networks and classification algorithms.

This structure suggests that medical images increasingly function as datasets that can be analysed through computer vision techniques and deep learning models. In this context, digital imaging technologies enable the reconstruction of anatomical structures and physiological processes in visual form, which can then be interpreted through computational methods. From the perspective of the theoretical framework presented earlier, the research represented in this cluster contributes to the emergence of what can be described as an imaged body, where the body becomes accessible primarily through digital visualizations generated by imaging technologies and analysed through algorithmic systems.

- Biomedical engineering and technological augmentation

Another significant cluster in the network (represented in green) includes keywords associated with biomedical engineering and technological systems designed to interact with or augment bodily functions. Among the most prominent nodes in this cluster are

“wearable devices”, “robotics”, “biomedical engineering”, “assistive technology”, and “human–robot interaction”.

The terms in this cluster are connected through research that investigates technological devices capable of monitoring, supporting, or extending bodily functions. Several keywords related to sensors and wearable technologies also show links with computational concepts from the data-driven cluster, suggesting that biomedical engineering research frequently integrates sensing technologies with machine learning techniques.

The presence of terms related to robotics and assistive technologies further indicates an area of research concerned with the development of technological systems that interact directly with the body. These systems include wearable health monitoring devices, rehabilitation technologies, and robotic interfaces designed to assist individuals with mobility or motor impairments.

Within the broader structure of the network, this cluster reflects the growing integration of biological and technological systems. As discussed in the theoretical framework, such developments contribute to hybrid forms of embodiment in which bodily functions are increasingly mediated by technological infrastructures.

- Embodiment and bodily movement

A smaller cluster (displayed in blue in the bibliometric map) includes keywords related to bodily movement and embodiment. The most frequent terms in this cluster include “embodiment”, “movement”, “posture”, and “walking”.

Compared with the computational and imaging clusters, the nodes in this group are smaller and fewer in number, indicating that these concepts appear less frequently across the dataset. Nevertheless, the cluster remains connected to the broader network through links with research on rehabilitation technologies, motion analysis, and sensor-based monitoring systems.

The presence of these keywords suggests that some areas of biomedical research continue to explore bodily experience and movement, particularly in fields such as rehabilitation medicine or human–machine interaction. However, the relatively peripheral position of this cluster indicates that such perspectives occupy a less central place within the broader literature dominated by computational and technological approaches. This observation resonates with discussions in medical humanities that highlight the relative

marginalization of experiential and phenomenological perspectives on embodiment within technologically oriented biomedical research.

Summary of bibliometric patterns

Although the clusters described above represent distinct thematic domains, the network map also reveals numerous connections between them. In particular, concepts related to machine learning and data analysis often function as bridges linking computational research with studies in medical imaging and biomedical engineering. Similarly, wearable technologies and sensor-based systems connect research on bodily movement with computational analysis of physiological signals. These interconnections suggest that contemporary biomedical research increasingly relies on integrated technological systems combining data collection, imaging, sensing, and algorithmic analysis.

The bibliometric analysis therefore reveals a conceptual landscape in which technological approaches to the body occupy a dominant position. Computational analysis, digital imaging, and sensor-based monitoring form the core methodological frameworks through which the body is investigated within the literature captured in the PubMed corpus.

At the same time, research focusing on experiential aspects of embodiment appears less prominent within the network. While present, such perspectives remain comparatively peripheral in relation to the larger clusters associated with artificial intelligence and digital technologies. The implications of these patterns for the conceptualization of the body in contemporary biomedical knowledge are discussed in the following section.

Peripheral concepts in the network

In addition to the dominant clusters described above, the network also includes several keywords that appear in more peripheral positions. These nodes typically have lower frequencies and fewer connections to other terms. Keywords associated with experiential aspects of embodiment (such as “embodiment”, “movement”, or “virtual reality”) appear within the network but remain comparatively smaller and less connected than the central technological concepts.

This distribution suggests that while research on bodily experience exists within the literature, it occupies a less prominent position relative to studies focused on computational analysis and technological systems.

Conceptual absences

Beyond the distribution of existing terms, the bibliometric map also reveals certain conceptual absences. Terms explicitly related to ethical, narrative, or experiential dimensions of medicine (such as “ethics”, “narrative medicine”, “patient experience”, or “equity”) do not appear as central nodes within the network. The relative absence of these concepts indicates that the literature captured in the dataset tends to prioritize technical and computational approaches to the study of the body. Ethical and narrative perspectives, while present in other areas of medical scholarship, are less visible in the vocabulary of the biomedical research examined in this study.

While bibliometric mapping provides an overview of the conceptual structure of the literature, examining individual articles allows for a closer understanding of how the body is described within biomedical research itself. The following section therefore analyses recurring discursive patterns in the PubMed corpus in order to identify the different ways in which the body is represented in contemporary medical literature.

Discursive analysis of the PubMed corpus

While the bibliometric mapping presented in the previous section reveals the conceptual structure of the literature, examining the articles included in the PubMed corpus allows a closer analysis of how the body is described within contemporary biomedical research. A qualitative examination of the titles, themes, and research objectives of the articles reveals several recurring discursive patterns through which the body is conceptualized. These patterns correspond to distinct technological frameworks through which the body is investigated in contemporary biomedical research.

Across the corpus, the body is most frequently represented through six overlapping modes: the structural body, the imaged body, the sensor body, the data body, the predictive body, and the augmented body. In contrast, the experiential body appears only sporadically within the literature.

The structural body

One of the most common representations of the body in the corpus conceptualizes it as a biomechanical structure that can be modelled mathematically. In this perspective, the body is analysed as a system of physical components whose behaviour can be simulated through

computational models. For example, research on finite element modelling of anatomical structures investigates the mechanical behaviour of the skull or thoracic structures under different experimental conditions (Jones et al. 2015; Schoell et al. 2015). Similar approaches appear in studies analysing seating biomechanics or prosthetic wear through computational simulations (Gao et al. 2021; Ashkanfar et al. 2024). Studies on human gait and posture analysis also reflect this perspective, using inertial sensors or kinematic modelling to estimate body movement and joint dynamics (Miripour Fard 2019; Abhayasinghe et al. 2019).

Within this framework, the body is conceptualized primarily through parameters such as force, motion, and mechanical interaction, emphasizing its structural and physical properties.

The imaged body

A second major discursive pattern conceptualizes the body as a visual object reconstructed and analysed through medical imaging technologies. Advances in digital imaging and image-processing algorithms have transformed the body into a dataset composed of visual information that can be analysed computationally. Numerous studies in the corpus examine automated recognition of anatomical structures in CT or MRI images. For example, research on automatic anatomy recognition in whole-body CT scans uses computational algorithms to identify and classify different anatomical regions (Liu et al. 2019). Similarly, studies on total-body photography and digital dermatology employ three-dimensional imaging to monitor skin lesions across the entire body surface (Korotkov et al. 2019; Ahmedt-Aristizabal et al. 2023). More recent work using deep learning for body-region classification in CT or MRI images further illustrates this trend toward algorithmic interpretation of visual medical data (Raffy et al. 2023).

In this discursive regime, the body is conceptualized as an imaged body, reconstructed through digital visualizations and interpreted through computational analysis.

The sensor body

A third mode of representation conceptualizes the body as a network of physiological signals captured through sensors and wearable technologies. In this perspective, bodily functions are monitored continuously through technological systems capable of collecting and

transmitting physiological data in real time. Studies on fall detection systems using wearable sensors illustrate this approach, employing accelerometers and other devices to monitor bodily movement and detect abnormal patterns (F. Wu et al. 2015). Other studies focus on wearable health technologies such as smart textiles or nanofiber sensors capable of detecting body movement and physiological activity (Horev et al. 2021; Meena et al. 2023). Machine learning models are also used to analyse sensor data and identify patterns related to fall risk or mobility changes in elderly populations (Zheng et al. 2022; Wang et al. 2023).

Within this framework, the body appears as a sensor body, defined through continuous streams of physiological data generated by technological monitoring systems.

The data body

A closely related representation conceptualizes the body as a dataset that can be analysed through machine learning algorithms. In this perspective, bodily processes are translated into structured datasets that enable computational modelling and classification. Studies applying machine learning to retinal imaging for systemic health assessment illustrate this approach, where images of the retina are analysed to detect patterns associated with cardiovascular or metabolic conditions (J. H. Wu and Liu 2022). Other research employs machine learning models to identify risk factors and predict the occurrence of medical events such as stroke (Zhi et al. 2024). Similarly, studies using data mining techniques to analyse clinical datasets reflect the increasing role of computational analysis in contemporary medicine (Fu et al. 2021; Sak and Suchodolska 2021).

In this discursive framework, the body is conceptualized as a data body, composed of measurable variables that can be processed through computational models.

The predictive body

Beyond the transformation of the body into datasets, many studies conceptualize the body as an object of predictive modelling. Machine learning algorithms are used not only to analyse current health data but also to anticipate future medical outcomes. Predictive models identifying the likelihood of stroke or other medical conditions illustrate this shift toward anticipatory medicine (Zhi et al. 2024). Similarly, studies using artificial intelligence to detect early signs of

disease in imaging data or physiological signals demonstrate how biomedical research increasingly focuses on forecasting potential health risks.

In this framework, the body becomes a predictive body, understood not only through its present biological state but also through statistical projections of future health trajectories.

The augmented body

Another emerging discursive pattern conceptualizes the body as a hybrid system integrating biological and technological components. Research on artificial muscles and soft robotic technologies illustrates how biomedical engineering seeks to replicate or enhance bodily functions through technological systems (Duduta et al. 2019). Similarly, studies exploring robotic interfaces or telepresence robots used by individuals with motor impairments demonstrate new forms of interaction between human bodies and technological devices (Huynh et al. 2019; Grice and Kemp 2019).

In these contexts, the body is conceptualized as an augmented body, where biological processes interact with technological systems that extend or support bodily capabilities.

The experiential body

In contrast to the technological representations described above, a smaller group of studies focuses on the experiential dimensions of embodiment. Research examining body representation in patients with neurological conditions explores how individuals perceive and experience their bodies under altered neurological conditions (Nuara et al. 2019). Other studies investigate the role of embodiment in learning processes or human-machine interaction (Clay et al. 2021; Gilbert et al. 2019).

Although these studies highlight the importance of subjective bodily experience, they remain relatively rare within the broader literature dominated by computational and technological approaches.

Toward a conceptual model of the digital body

Taken together, the discursive patterns identified in the PubMed corpus suggest that contemporary biomedical research increasingly conceptualizes the body through technological frameworks associated with modelling, imaging, sensing, and prediction.

These patterns can be summarized through a conceptual model (Figure 2) describing successive regimes of representation: structural

body - imaged body - sensor body - data body - predictive body - augmented body - experiential body (peripheral). This model suggests that the dominant trajectory in contemporary biomedical discourse moves from the observation of the biological body toward the construction of a digital body embedded within technological infrastructures of data collection, analysis, and prediction.

Figure 2: Conceptual regimes of the digital body in contemporary biomedical discourse



The emergence of these technological representations raises broader questions about how digital medicine reshapes the conceptualization of the body within biomedical knowledge. The following section discusses the implications of these findings in relation to debates in science and technology studies and medical humanities.

Discussion: The emergence of the digital body in contemporary medical discourse

The results of the bibliometric analysis and the examination of the PubMed corpus suggest a significant transformation in the ways contemporary biomedical research conceptualizes the human body. Rather than appearing primarily as a biological organism observed through clinical practice, the body increasingly emerges in medical literature as an object embedded within digital infrastructures of data generation, computational modelling, and algorithmic prediction.

This transformation becomes visible in both levels of analysis conducted in the present study. At the macro level, the bibliometric network reveals the centrality of concepts associated with computational analysis, including neural networks, image processing, computational biology, and classification algorithms. At the micro level, the discursive analysis of individual publications shows that the body is frequently described through technological frameworks involving biomechanical modelling, digital imaging, wearable sensing systems, and machine learning–based predictive models.

Taken together, these patterns suggest the emergence of what can be described as a digital body, a conceptual model of the body constructed through the integration of biological processes with digital infrastructures of data collection, analysis, and prediction. In this

article, the term digital body refers to the representation of the human body as a data-generating and computationally analysable entity embedded within digital infrastructures of sensing, imaging, modelling, and prediction.

From the biological body to the digital body

The transformation identified in the present study reflects broader changes in the epistemology of contemporary biomedicine. As Rose (2007) argues, modern biomedical knowledge increasingly operates through the production and management of biological data rather than through direct observation alone. Advances in digital technologies have expanded this process, enabling the body to be represented through large-scale datasets derived from imaging technologies, wearable sensors, and clinical databases. Artificial intelligence does not merely introduce new analytical tools into medicine; it also reshapes the epistemological framework through which the human body is understood, shifting attention from direct clinical observation toward computational modelling and predictive analytics.

Within this framework, the body becomes a system of biological information that can be processed and interpreted through computational models. Machine learning algorithms capable of identifying patterns in medical images or physiological signals exemplify how contemporary biomedical research increasingly treats the body as a data-generating system (J. H. Wu and Liu 2022; Zhi et al. 2024). This shift reflects what Lupton (2016) describes as the datafication of the body, in which bodily processes are translated into digital data streams that can be analysed, visualized, and interpreted through technological systems. Rather than replacing earlier biomedical models, this transformation extends them by integrating biological knowledge into digital infrastructures of analysis and prediction.

Data infrastructures and the reconfiguration of medical knowledge

The emergence of the digital body also reflects the growing importance of data infrastructures in contemporary healthcare. Biomedical knowledge is increasingly produced through systems capable of collecting, storing, and analysing large volumes of physiological and clinical data.

Wearable devices and sensor-based monitoring systems illustrate how bodily functions can be continuously recorded and analysed in

real time (F. Wu et al. 2015; Zheng et al. 2022). Similarly, imaging technologies combined with artificial intelligence allow researchers to reconstruct detailed representations of the body and identify patterns that may signal the presence of disease (Liu et al. 2019; Raffy et al. 2023). From this perspective, the body becomes embedded within complex technological systems that transform biological signals into analysable data. Ruckenstein and Schüll (2017) argue that such infrastructures reshape the relationship between individuals and their bodies by introducing new forms of data-driven health monitoring and decision-making. In the context of biomedical research, this transformation contributes to a shift toward predictive and data-intensive approaches to health and disease.

Posthuman perspectives and human–technology assemblages

The transformation of the body identified in this study resonates with broader debates in science and technology studies concerning the relationship between humans and technological systems.

Haraway's (1991/1985) concept of the cyborg emphasizes the increasingly hybrid nature of contemporary human existence, in which biological organisms and technological systems become deeply intertwined. Similarly, Braidotti (2013) argues that contemporary societies are entering a posthuman condition characterized by the integration of biological, technological, and informational processes. The representations of the body observed in the PubMed corpus reflect this hybridization. When the body is conceptualized as a system of sensors, datasets, or algorithmic predictions, it becomes inseparable from the technological infrastructures used to analyse it. In this sense, the digital body can be understood as a form of human–technology assemblage, where biological processes are interpreted through technological mediation.

Hayles (1999) further highlights how information technologies have encouraged the perception of the body as an informational pattern rather than solely as a material organism. This perspective aligns with the discursive patterns identified in the present study, where the body frequently appears as a set of data structures analysed through computational systems.

The marginalization of experiential embodiment

Despite the prominence of technological representations of the body in the corpus analysed, the study also reveals that experiential and

narrative dimensions of embodiment appear relatively rarely within the literature. Although some studies examine body representation in neurological conditions or explore embodiment in human-machine interaction (Nuara et al. 2019; Clay et al. 2021), these topics occupy peripheral positions within the broader network of biomedical research.

From the perspective of medical humanities, this imbalance raises important questions about the conceptual frameworks guiding contemporary medicine. Narrative medicine and phenomenological approaches emphasize that illness and health are lived experiences that cannot be fully captured through biomedical data alone (Charon 2006; Carel 2016). Similarly, Bleakley (2015) argues that integrating perspectives from the humanities into medical education and research can help maintain attention to the ethical and experiential dimensions of healthcare. As digital technologies continue to transform biomedical practice, the importance of these perspectives becomes increasingly evident.

Rebalancing technological and humanistic perspectives

The emergence of the digital body does not imply that technological approaches to medicine are problematic in themselves. On the contrary, artificial intelligence, medical imaging, and wearable technologies have contributed significantly to improvements in diagnosis, treatment, and preventive care. Recent research has also highlighted potential risks associated with algorithmic bias and unequal data representation in medical AI systems, which may affect clinical decision-making and healthcare equity (Obermeyer et al. 2019). These concerns further underline the importance of integrating ethical reflection and humanistic perspectives into the development and implementation of digital medical technologies.

However, the dominance of computational and data-driven representations of the body in biomedical literature suggests the need for a broader conceptual framework that can integrate technological innovation with humanistic perspectives on embodiment. Medical humanities offer one possible avenue for achieving this balance. By incorporating insights from philosophy, narrative studies, anthropology, and ethics, medical humanities can help reconnect biomedical knowledge with the lived experiences of patients and the social contexts of healthcare. In this sense, the expansion of digital medicine does not diminish the relevance of humanistic approaches to

medicine. Rather, it makes them increasingly necessary for understanding how technological transformations reshape the meanings of the body, health, and medical practice.

Building on these observations, the final section of this article summarizes the main findings of the study and reflects on their implications for future research on the relationship between digital medicine, artificial intelligence, and the representation of the human body.

Conclusions

This study examined how contemporary biomedical literature conceptualizes the human body in the context of artificial intelligence and digital medicine. By combining bibliometric mapping with discourse analysis of articles indexed in the PubMed database, the research aimed to investigate how scientific vocabulary and research frameworks shape representations of the body in medical knowledge.

The bibliometric analysis revealed a conceptual network dominated by keywords associated with computational analysis, medical imaging, and algorithmic classification. Concepts such as neural networks, image processing, computational biology, and classification algorithms occupy central positions in the network, indicating the growing importance of data-intensive approaches within biomedical research.

The discourse analysis of the PubMed corpus further demonstrated that the body is frequently conceptualized through technological frameworks associated with computational modelling, imaging systems, wearable sensors, and predictive machine learning models. Across the corpus, several recurring representations of the body could be identified, including the structural body, the imaged body, the sensor body, the data body, the predictive body, and the augmented body. Taken together, these patterns suggest the emergence of a conceptual model that can be described as the digital body. In this model, the body appears not only as a biological organism but also as a system of biological information embedded within technological infrastructures of monitoring, modelling, and prediction.

While these technological approaches have significantly expanded the analytical capacities of contemporary medicine, the analysis also revealed that experiential and narrative perspectives on embodiment remain relatively marginal within the biomedical literature examined in this study. Concepts related to lived bodily experience, narrative medicine, or ethical reflection appears far less frequently than those

associated with computational analysis. From the perspective of medical humanities, this imbalance highlights the importance of integrating humanistic perspectives into the evolving landscape of digital medicine. Technological innovation in healthcare does not eliminate the need for attention to the lived experiences of patients, the ethical dimensions of medical practice, and the cultural meanings attached to the body.

Rather than replacing humanistic perspectives on embodiment, the expansion of digital medicine makes them increasingly necessary. As artificial intelligence continues to reshape biomedical research and healthcare systems, interdisciplinary dialogue between biomedical sciences and the humanities will be essential for developing a more comprehensive understanding of the human body in the age of digital medicine. Future research could further explore how representations of the body differ across biomedical, social science, and humanities literature, as well as how AI-driven concepts of the body influence clinical decision-making, healthcare policy, and patient experience. Such interdisciplinary investigations would contribute to a deeper understanding of how technological transformations reshape not only medical practice but also the conceptual frameworks through which the human body itself is understood.

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