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Artificial Intelligence in Kriya Sharir: Emerging Perspectives in Precision Ayurveda and Digital Healthcare — A Narrative Review

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Abstract

Introduction

Artificial Intelligence (AI) is increasingly being integrated into healthcare through machine learning, wearable technologies, predictive analytics, and virtual reality systems. *Ayurveda*, particularly *Kriya Sharir*, emphasizes individualized physiology based on concepts such as *Dosha*, *Prakriti*, *Agni*, and *Ojas*.

Methods

A narrative review was conducted using literature retrieved from PubMed, Scopus, Google Scholar, AYUSH Research Portal, and peer-reviewed journals published between 2018 and 2026. Articles related to Artificial Intelligence, wearable systems, virtual reality, and Ayurveda physiology were included.

Results

The review identified emerging applications of AI in Ayurveda physiology including AI-based Prakriti assessment, multidimensional wearable monitoring systems, 3D–7D physiological analysis, virtual reality laboratories, natural language processing tools, digital twin technologies, and AI-assisted Nadi Pariksha. These technologies demonstrated potential utility in improving standardization, physiological monitoring, personalized healthcare, and educational simulation.

Discussion

AI may support modernization and scientific validation of Kriya Sharir through improved objectivity and reproducibility. However, limitations such as lack of standardized datasets, validation challenges, ethical concerns, and infrastructural barriers remain significant.

Conclusion

The integration of AI with *Ayurveda* physiology represents a promising advancement in Precision Ayurveda and digital healthcare. Future multidisciplinary research integrating *Kriya Sharir*, wearable systems, immersive educational technologies, and computational intelligence may strengthen the scientific foundation and global applicability of *Ayurveda*.

Index Terms: *Ayurveda*, *Kriya Sharir*, Artificial Intelligence, Prakriti, Virtual Reality.

Introduction

Artificial Intelligence (AI) is a rapidly evolving branch of computer science that enables machines to simulate human intelligence through machine learning, deep learning, neural networks, predictive analytics, natural language processing, and computer vision[i]. AI applications in healthcare include disease prediction, clinical decision support, medical image interpretation, physiological monitoring, robotic systems, wearable devices, and simulation-based medical education[ii].

Ayurveda is an ancient holistic medical science that emphasizes individualized healthcare based on constitutional principles and dynamic physiological balance[iii]. *Kriya Sharir* explains normal body functioning through concepts such as *Dosha*, *Dhatu*, *Mala*, *Agni*, *Ojas*, and *Prakriti*. Among these, *Prakriti* represents the unique psycho-physiological constitution established at conception and maintained throughout life.

Recent advances in computational biology, systems medicine, wearable technologies, and digital health platforms have opened new avenues for correlating *Ayurvedic* physiology with modern biomedical sciences[iv]. AI-assisted systems are increasingly being explored to improve objectivity, reproducibility, and standardization in *Prakriti* assessment, *Nadi* analysis, physiological monitoring, and educational simulations.

The integration of Artificial Intelligence with *Ayurveda* may contribute toward the development of "Precision *Ayurveda*," which aligns classical *Ayurvedic* constitutional principles with genomics, metabolomics, digital phenotyping, and predictive healthcare models[v].

Review Methodology

This narrative review was conducted using literature retrieved from PubMed, Scopus, Google Scholar, AYUSH Research Portal, and peer-reviewed integrative medicine journals published between 2018 and 2026.

Search Keywords

- Artificial Intelligence in *Ayurveda*
- *Prakriti* assessment tools
- Wearable technologies in *Ayurveda*
- Virtual reality in medical education
- Machine learning in traditional medicine

Inclusion Criteria

- Peer-reviewed articles
- Original research studies
- AI and healthcare technology papers relevant to *Ayurveda*
- English language publications

Exclusion Criteria

- Non-peer reviewed sources
- Duplicate articles
- Non-scientific opinion papers
- Articles unrelated to physiology or AI integration

Relevant peer-reviewed articles, review papers, and technology-based healthcare studies related to Artificial Intelligence, wearable technologies, virtual reality systems, and *Ayurveda* physiology were critically reviewed and synthesized narratively for the present article.

Concept of *Kriya Sharir* in *Ayurveda*

Kriya Sharir explains normal physiological functioning and adaptive homeostasis through the coordinated action of *Dosha, Dhatu, Agni, Mala, Ojas*, and *Manas*[vi].

Ayurvedic Concept	**Physiological Role**	**Modern Correlation**
Vata	Movement and neural regulation	Nervous system and neurotransmission
Pitta	Metabolism and transformation	Enzymatic and endocrine activity
Kapha	Stability and nourishment	Structural and immune functions
Agni	Digestion and metabolism	Metabolic pathways and enzymes
Ojas	Vitality and immunity	Immunological resilience

Traditional assessment methods rely on physician observation and clinical interpretation. However, subjective variability and lack of standardization remain major limitations. AI-assisted systems are being developed to improve reproducibility and objective assessment.

Application of Artificial Intelligence in *Ayurveda* Physiology

1. AI-Based *Prakriti* Assessment

- *Prakriti* refers to the unique psycho-physiological constitution of an individual formed at the time of conception through the predominance of *Vata, Pitta, and Kapha Dosha*.
- Classical *Ayurvedic* texts describe *Prakriti* as relatively stable throughout life and responsible for variations in body structure, metabolism, behavior, disease susceptibility, psychological traits, and therapeutic response.*Prakriti* assessment forms the foundation of personalized diagnosis and treatment planning in *Ayurveda*.
- Traditionally, *Prakriti* assessment depends upon physician observation, clinical expertise, and questionnaire-based evaluation. However, subjective interpretation and inter-observer variability remain major challenges. *Prakriti* analysis is one of the most extensively researched areas in AI-integrated *Ayurveda*[vii].
- Recent AI-based systems attempt to improve objectivity and reproducibility by utilizing machine learning algorithms to classify individuals into *Vata, Pitta, Kapha,* or mixed constitutions.
- AI-based Prakriti assessment utilizes parameters such as facial morphology, voice analysis, body composition, skin texture, behavioral traits, physiological parameters, genetic markers, and questionnaire datasets.

- These parameters correlate with classical Ayurvedic descriptions of Dosha characteristics including body frame, skin quality, gait, speech, appetite, psychological behavior, sleep pattern, and thermoregulation.
- Commonly used AI models include Support Vector Machine (SVM), Artificial Neural Networks, Random Forest Algorithms, Deep Learning Models, and multimodal predictive systems.
- AI-assisted Prakriti assessment resembles modern precision medicine and phenotyping approaches, where individualized physiological variability guides diagnosis and therapeutic planning[viii].

2. Wearable Technologies, 3D–7D Systems and Physiological Monitoring

Recent advances in AI have enabled the development of wearable and multidimensional physiological monitoring systems for personalized healthcare assessment.

- **3D Systems in Ayurveda Physiology**

  - Three-dimensional wearable systems analyze body posture, facial morphology, gait pattern, thermal distribution, and body composition.
  - AI-integrated 3D imaging technologies may assist in objective Prakriti assessment through anthropometric and phenotypic analysis.
  - In modern correlation, Vata is associated with irregular movement and autonomic variability, Pitta with increased thermal activity and metabolic intensity, and Kapha with structural stability and reduced activity.

- **7D Systems in Wearable Healthcare**

  - Seven-dimensional wearable systems integrate multiple physiological parameters such as heart rate variability, respiratory pattern, sleep cycle, stress response, physical activity, metabolic parameters, and emotional or cognitive assessment.
  - In Kriya Sharir, these systems may assist in dynamic evaluation of Dosha fluctuations, Agni status, circadian imbalance, stress-induced Vata aggravation, and Ojas depletion.
  - AI-enabled wearable systems may further contribute toward real-time Dosha monitoring, preventive healthcare, personalized Dinacharya recommendations, early disease prediction, stress management, and the advancement of Precision Ayurveda.

3. Virtual Reality Laboratories in *Ayurveda* Physiology

- Virtual Reality (VR) is an immersive computer-generated technology capable of creating interactive three-dimensional environments for education, diagnostics, rehabilitation, and physiological modeling.
- Integration of AI with VR laboratories has opened new possibilities in *Kriya Sharir* education and physiological simulation.
- Applications of VR in Ayurveda physiology include visualization of Tridosha physiology, simulation of Dosha imbalance, virtual Srotas demonstration, digital Panchakarma modules, meditation and stress physiology simulation, AI-assisted educational laboratories, and neurophysiological visualization of Vata functions.
- VR laboratories may improve interactive postgraduate teaching, conceptual understanding, simulation-based learning, research training, and standardized Kriya Sharir education.
- Future developments may include AI-driven virtual patient simulations, haptic-feedback Nadi simulators, metaverse-based Ayurveda classrooms, virtual Dinacharya modules, and biofeedback-integrated meditation systems.

4. AI in *Nadi Pariksha*

Nadi Pariksha is a classical Ayurvedic diagnostic technique based on pulse examination. Modern AI systems integrated with pulse sensors, signal processing systems, pattern recognition algorithms, and deep learning models are being explored for objective pulse waveform analysis. AI-assisted Nadi analysis may improve reproducibility and reduce observer variability.

5. Digital Twin Technology and *Ayurveda*

Digital Twin Technology refers to the creation of virtual physiological replicas using real-time patient data, wearable sensors, predictive analytics, and AI systems.

Potential Applications in *Ayurveda*

- Personalized *Dosha* simulation
- Predictive disease modeling
- Dynamic *Agni* assessment
- Lifestyle adaptation analysis
- Individualized therapeutic planning

Digital twin systems may eventually contribute toward fully personalized Precision Ayurveda models.

Comparative Analysis of Emerging Technologies in *Ayurveda*

Technology	Ayurvedic Application	Advantages	Limitations
Artificial Intelligence	Prakriti assessment	Standardization	Dataset limitations
Wearable Devices	Dosha monitoring	Real-time data	Validation issues
3D Systems	Anthropometric analysis	Objective phenotyping	High infrastructure cost
7D Systems	Multidimensional monitoring	Personalized healthcare	Data complexity
Virtual Reality	Kriya Sharir teaching	Better visualization	Expensive technology
Digital Twin Technology	Predictive modeling	Precision Ayurveda	Requires large datasets

Explainable Artificial Intelligence and *Ayurveda*

One of the major concerns in medical Artificial Intelligence is the lack of transparency in algorithm-based clinical decision-making. Many AI systems function as “black box” models in which the reasoning process behind predictions or recommendations cannot be clearly understood by clinicians. This creates challenges in reliability, ethical accountability, patient trust, and clinical applicability.

Explainable Artificial Intelligence (XAI) is an emerging branch of AI designed to improve interpretability, transparency, and accountability of machine-generated outputs. XAI systems attempt to provide understandable explanations regarding how a particular decision, prediction, or recommendation was

generated. In healthcare, explainability is particularly important because medical decisions directly influence patient outcomes.

In *Ayurveda*, diagnosis and therapeutic planning are traditionally based on multidimensional clinical reasoning rather than isolated data interpretation. Ayurvedic physicians utilize:

- *Yukti* – logical and analytical reasoning
- *Anumana* – inferential assessment
- *Pratyaksha* – direct clinical observation
- *Aptopadesha* – authoritative classical knowledge

These principles collectively form a holistic decision-making framework integrating clinical expertise, patient individuality, environmental factors, and experiential understanding.

From an *Ayurvedic* perspective, AI systems should therefore function as assistive technologies rather than autonomous replacements for physicians. Explainable AI may help practitioners understand the rationale behind algorithmic outputs, thereby improving trust, reproducibility, and clinical integration. XAI-based systems may also support standardization in *Prakriti* assessment, physiological monitoring, and predictive healthcare while preserving the physician-centered and individualized nature of Ayurvedic practice.

The integration of XAI with *Ayurveda* may ultimately facilitate a balanced approach in which computational intelligence supports classical clinical wisdom without compromising the holistic foundation of *Ayurvedic* medicine.

Current Challenges

Major challenges in integrating AI with Ayurveda includes:

- Lack of standardized datasets, small sample sizes, and heterogeneous methodologies limiting reproducibility.
- Subjective Ayurvedic parameters such as Dosha dominance, Agni, and Ojas remain difficult to quantify objectively.
- Many AI-based Prakriti tools lack multicentric validation and psychometric standardization.
- Ethical concerns including data privacy, algorithmic bias, clinical accountability, and cultural sensitivity also persist.
- High infrastructure costs and limited accessibility remain barriers in developing countries.
- Excessive dependence on AI may further compromise the holistic physician-patient interaction central to Ayurvedic practice.

Discussion

Ayurveda and Artificial Intelligence share a common focus on individualized healthcare and pattern recognition. *Kriya Sharir* provides a systems-based physiological framework that may align with modern computational biology, systems medicine, and precision healthcare.

Recent advancements in AI-based *Prakriti* assessment, wearable technologies, multidimensional physiological systems, virtual reality laboratories, and predictive analytics demonstrate the possibility of objective and interactive understanding of *Ayurvedic* physiology.

Despite promising developments, significant methodological and ethical challenges remain. Current AI-based *Prakriti* tools show limitations in validation, reproducibility, and contextual applicability. Moreover, excessive mechanization may reduce the holistic and experiential dimensions of *Ayurvedic* medicine.

The future of AI in *Ayurveda* lies in collaborative integration rather than replacement. Combining classical Ayurvedic principles with computational intelligence, immersive educational technologies, and physiological monitoring systems may contribute significantly toward preventive, predictive, personalized, and participatory healthcare.

Future Prospects

Future directions in AI-integrated *Ayurveda* include AI-assisted preventive healthcare, smart wearable systems, virtual physiology laboratories, AI-based decision support systems, genomics-integrated Prakriti analysis, metaverse-based Ayurveda education, digital twins in personalized healthcare, and global integrative physiology databases. Large-scale multicentric studies with validated tools may further strengthen the scientific foundation of Precision Ayurveda.

Conclusion

Artificial Intelligence has emerged as a promising tool for integrating *Ayurvedic* physiology with modern computational sciences. Applications such as AI-based *Prakriti* assessment, wearable physiological monitoring, 3D–7D multidimensional systems, virtual reality laboratories, digital twin technologies, and predictive analytics indicate the growing potential of Precision *Ayurveda*.

Despite current limitations related to standardization, validation, infrastructure, and ethics, AI may significantly contribute toward objective assessment, personalized healthcare, medical education, and global scientific acceptance of Ayurveda. Future multidisciplinary research integrating *Kriya Sharir*, systems biology, immersive technologies, wearable healthcare systems, and computational intelligence may establish a stronger scientific foundation for *Ayurveda* in modern healthcare systems.

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