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APPLICATION OF ARTIFICIAL INTELLIGENCE AND TECHNOLOGY IN *AYURVEDA*

Dole V.[1], Deshpande P.[2]

1. Assistant Professor, Department of Rachana Sharir, Govt. Ayurved College, Nanded.
2. Assistant Professor, Department of Rachana Sharir, Govt. Ayurved College, Nanded.

ABSTRACT:

Background: The fusion of **Artificial Intelligence (AI)** and ***Ayurveda*** is opening exciting possibilities for personalized, preventive, and integrative healthcare. India's AI-driven *Ayurveda* model is now globally recognized as a blueprint for integrating traditional medicine with modern tech. **Aim and objectives**: This comprehensive review aims to explore the role of application of Artificial Intelligence and Technology in Ayurvedic diagnostic enhancements through *Prakriti* analysis, Ayurgenomics, Drug discovery, knowledge digitalization and preservation. **Methods**: This comprehensive review is done by using books, various research articles, peer reviewed journals, Wikipedia. **Result & discussion**: Artificial intelligence systems examine patient data to improve diagnosis precision. To determine *Prakriti* precisely, they can combine environmental, behavioural, and genomic data. AI can standardize diagnostic procedures like tongue and pulse examinations by digitizing them. Based on a person's imbalances and constitution, AI creates customized remedies. AI forecasts interactions between plants and drugs and speeds up the search for therapeutic herbs. By creating customized herbal blends, it maintains traditional wisdom. Personalized lifestyle suggestions based on Ayurvedic principles are provided by AI-driven health monitoring. **Conclusion**: Application of AI technology with *Ayurveda* model is now globally recognized in health sector. Ayurveda education curriculum and research model are expanded by using AI tools. Ayur genomics field validates and improves *Ayurvedic* classifications for individualized treatment plans using genomic tools.

KEYWORDS: *Prakriti,* Ayurgenomics, Artificial Intelligence, *Ayurveda*.

CORRESPONDING AUTHOR:

Dr. Vidya Bhaskarrao Dole

Associate Professor, Department of

Rachana Sharir, Govt. Ayurved College, Nanded.

Email: drvidyadole@gmail.com

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INTRODUCTION:

- The fusion of **AI and *Ayurveda*** is transforming how traditional diagnostics are performed, making them more **precise, scalable, and personalized.**
- Artificial Intelligence (AI) shows promising improvement in various sectors of *Ayurveda* like *Prakriti* Analysis, Diagnosis, Drug discovery, Ayur genomics, etc. The potential of artificial intelligence (AI) to improve and integrate traditional medical systems—especially *Ayurveda*—is being intensively investigated by the World Health Organization (WHO). This initiative, which is motivated by acknowledging India's innovative work in this area, intends to use AI to enhance healthcare accessibility, knowledge, and individualized treatment.

Aim

- This comprehensive review aims to explore the role of application of Artificial Intelligence and Technology in Ayurvedic diagnostic enhancements through *Prakriti* analysis, Ayurgenomics, Drug discovery, knowledge digitalization and preservation.

- **Objectives**
- To explore the role of application of Artificial Intelligence and Technology in Ayurvedic diagnostic enhancements through Prakriti analysis.
- To explore the role of application of Artificial Intelligence and Technology in Ayurgenomics.

- **Methodology** - This comprehensive review is done by using books, various research articles, peer reviewed journals, Wikipedia.
- The fusion of **Artificial Intelligence (AI)** and ***Ayurveda*** is transforming how ancient wisdom meets modern innovation. Here is a breakdown of how AI and technology are being applied in this traditional system of medicine:
  - [1] Diagnostic Enhancements
- **AI-powered *Prakriti* analysis**: Machine learning models assess facial features, voice patterns, and body metrics to determine an individual's Ayurvedic constitution (*Vata, Pitta, Kapha*).
- **Pulse and tongue analysis**: AI tools interpret subtle variations in pulse waveforms and tongue textures to assist in diagnosis.
- **Symptom clustering**: Algorithms group symptoms to identify underlying *doshic* imbalances more accurately.

Table 1.: Tools & Technologies in Use

Tool/Tech	Function in Ayurveda Diagnosis
***Prakriti* Analyser**	Determines body constitution using facial metrics
Nadi Tarangini	Digitizes pulse diagnosis with waveform analysis
***Tridosho* Scanner**	Quantifies dosha levels using AI algorithms
CureMetrix	Applies AI to medical imaging for Ayurvedic insights

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- [2]**Ayurgenomics**: Combines genetic data with Ayurvedic principles to tailor treatments based on DNA and *Prakriti*.
- It correlates the combination of three doshas, Vata, Pitta and Kapha, with the expression of specific genes and physiological characteristics.
- Table.2. Example of Prakriti and Gene Expression

Prakriti Type	Gene Expression	Disease
Kapha/Vata	EGLN 1 higher	High Altitude Pulmonary Edema
Pitta	EGLN 1 lower	more adaptive for higher altitudes

- Personalized Medicine
  - **Predictive analytics**: AI forecasts potential health issues and suggests preventive measures aligned with Ayurvedic philosophy.

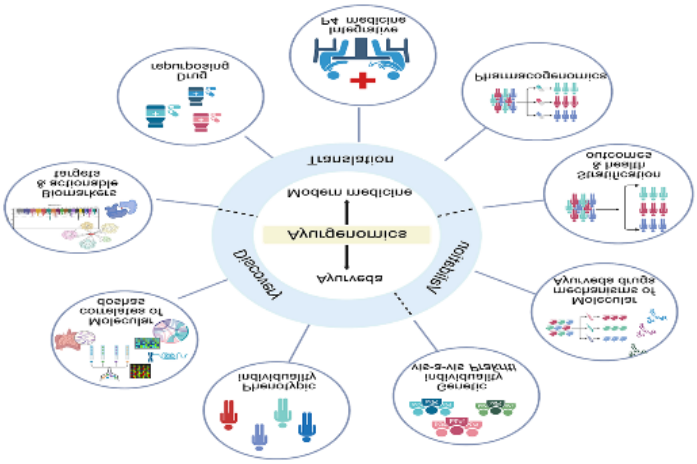

Fig.1. **Predictive analytics**

- Drug Discovery & Standardization[3]
  - **AI in *Rasashastra***: Helps analyse mineral and herbal formulations for safety and efficacy.
  - **Formulation optimization**: AI suggests ideal combinations, dosages, and shelf-life improvements for Ayurvedic medicines.

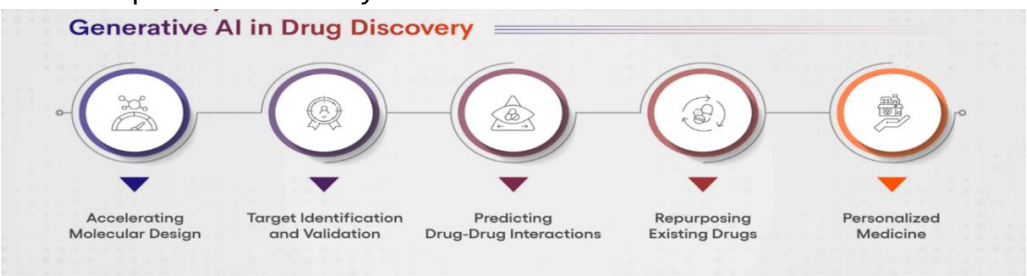

Fig. 2. Drug discovery: The pivotal role of Gegerative AI

- Knowledge Digitization & Preservation
  - **Traditional Knowledge Digital Library (TKDL)**: India has digitized thousands of ancient formulations using AI, making it the first country to do so.
  - **Semantic processing**: AI organizes centuries-old texts into searchable formats, protecting against biopiracy and enabling global research.
- Integration with Modern Healthcare

- **Wearable tech**: Devices track vitals and lifestyle data, feeding AI systems that generate Ayurvedic health insights.
- **Telemedicine platforms**: AI supports online consultations, enabling remote diagnosis and personalized treatment plans.[4]

Fig. 3.: Examples of types of wearable devices, a accessories and b implantable

- Disadvantages and Limitations of AI in Ayurveda

  Since *Ayurveda* is an ancient science, cultural disconnect may cause misconceptions about its concepts. Oversimplification of treatment can occur in personalized medicine. Standards and regulations for drug discovery and standardization are lacking. Using technology excessively might result in data limitations and the loss of traditional wisdom.[5]

DISCUSSION:

The integration of Artificial Intelligence (AI) with Ayurveda is creating new possibilities for enhancing diagnostic precision, personalized care, and knowledge dissemination in traditional medicine. AI-based tools such as machine learning algorithms and predictive modeling are being actively explored for applications like Prakriti analysis, pulse and tongue diagnosis, and symptom clustering. For instance, AI-powered software can evaluate facial features, speech patterns, or biometric data to determine an individual's constitution (Vata, Pitta, Kapha) with greater objectivity. Similarly, digital tools that analyze pulse waveforms and tongue textures are improving diagnostic consistency, which has traditionally relied heavily on the physician's subjective expertise.

Another promising application is Ayurgenomics, where AI integrates genomic data with Ayurvedic classifications to validate and refine personalized treatment strategies. This convergence provides a strong platform for preventive healthcare by forecasting disease susceptibility based on Prakriti and lifestyle data. Additionally, AI is revolutionizing drug discovery and herbal research by identifying active phytochemicals, designing novel formulations, and predicting therapeutic outcomes. Such advancements not only preserve ancient knowledge but also make it more accessible and adaptable for global healthcare needs.Despite these benefits, limitations exist. The complexity of Ayurvedic principles often risks oversimplification when translated into algorithmic models. Cultural nuances and the holistic philosophy of Ayurveda may not always align with rigid technological frameworks. Furthermore, regulatory guidelines for standardization, quality assurance, and ethical use of AI in Ayurveda are still evolving.Nevertheless, WHO's acknowledgment of India's innovative efforts in AI-driven Ayurveda highlights its growing global recognition. The fusion of AI and Ayurveda represents a step toward bridging traditional wisdom with modern science, enabling more precise, individualized, and preventive approaches to healthcare.

CONCLUSION:

Global Recognition & Future Potential[6]

- **WHO endorsement**: India's AI-driven Ayurveda model is now globally recognized as a blueprint for integrating traditional medicine with modern tech.
- **Education & research**: AI is being used to train practitioners, simulate case studies, and expand Ayurvedic curricula.
- **Ayurgenomics:** Uses genomic tools to validate and refine Ayurvedic classifications for personalized treatment strategies.
- By streamlining and optimizing several procedures, AI integration into Ayurveda holds promise for more precise, individualized, and successful therapies as well as illness prevention.
- AI algorithms analyze patient data—like Prakriti (constitution), lifestyle, and medical history—to recommend tailored herbal formulations and therapies.
- AI can improve knowledge and application of Ayurvedic concepts through its sophisticated data analytics, machine learning, and predictive modeling.
- AI can help find trends in patient health, forecast illness susceptibilities based on Prakriti (body constitution), and optimize individualized treatment approaches by analyzing enormous volumes of history and current data.
- AI-powered technologies can also aid in the development of novel herbal mixtures and their uses, hence broadening the range of Ayurvedic therapies. By fusing traditional knowledge with cutting-edge technology, the combination of AI and Ayurveda has the potential to completely transform healthcare and produce more individualized, efficient, and preventative treatment options.

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Fig. 4. Global implications of combining AI and Ayurveda

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