IMPORTANCE OF ARTIFICIAL INTELLIGENCE IN THE INDIAN KNOWLEDGE SYSTEM

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Abstract :

One of the world's oldest and most varied knowledge systems, including Ayurveda, Yoga, Vedic mathematics, classical arts, and traditional ecological understanding, is found in India. These Indigenous Knowledge Systems (IKS) provide comprehensive frameworks that are based on ethics, sustainability, and profound cultural significance. There is a great chance to preserve, improve, and incorporate this extensive traditional knowledge into the contemporary digital environment as artificial intelligence (AI) develops quickly in India. This study examines the various ways in which artificial intelligence (AI) supports Indian knowledge systems, including the preservation of endangered manuscripts and languages, intellectual property protection, the facilitation of new research through data-driven analysis, and the accessibility of knowledge through language and personalized learning technologies. While warning about possible hazards such data falsification, loss of authenticity, infrastructure inadequacies, and cultural insensitivity, it also looks at how AI may promote ethical, inclusive, and culturally aligned development. AI can help national efforts to digitize, validate, and globalize Indian knowledge, as demonstrated by case studies such as the Traditional Knowledge Digital Library (TKDL). In order to guarantee that AI serves as more than just a technical instrument but also as a catalyst for cultural revitalization, health equity, and sustainable development, the essay ends with actionable suggestions for the ethical integration of AI, curriculum reform, and infrastructure development.

Keywords : IKS Indian Knowledge System, TKDL Traditional Knowledge Digital Library, AI Artificial Intelligence

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Introduction :

India's systems of philosophy, medicine, literature, linguistics, mathematics, astronomy, and ecology prepare a massive reservoir of indigenous or traditional knowledge systems (IKS), making it one of the world's oldest continuous knowledge traditions. These include traditional agriculture, folk wisdom, classical arts, Sanskrit and local literatures, Ayurveda, Siddha, Unani, Yoga, and Vedic mathematics. India is also making quick strides in AI and digital technologies at the same time. There is great potential for integrating AI into

the Indian Knowledge System in a number of ways, including heritage preservation, access democratization, new discovery facilitation, ethical framework assurance, and inclusive development. This essay explores the significance of artificial intelligence (AI) for Indian knowledge systems, as well as the advantages, difficulties, and recommendations for their careful integration. Artificial intelligence is a technology that provides intelligent, methodical support and encourages the improvement of applications in the IT sector. AI has drawn a lot of interest from businesses and academics.

The Significance of AI in Indian Knowledge Systems.

1. A**. Preserving Endangered Information :**

Many traditional manuscripts are handwritten, on palm leaves, in ancient or regional languages (such as Sanskrit, Tamil, Prakrit, etc.), or they are not well maintained. They can be digitized, decoded, translated, categorized, and stored with the aid of artificial intelligence (AI) methods such as optical character recognition, natural language processing, and machine translation.

As an illustration, consider India's Traditional Knowledge Digital Library (TKDL), which digitizes Ayurvedic, Unani, Siddha, and Sowa-Rigpa systems to make them searchable, prevent biopiracy, and allow for greater accessibility.

B. **Intellectual property rights and protection from misuse :**

In the past, even though Indian traditional medicine remedies were already widely available locally, they were occasionally patented by foreign organizations claiming innovation. AI and digitization facilitate prior art searches, reducing the likelihood of erroneous patents. Here, TKDL plays a crucial role.

C. Strengthening Innovation and Research :

Pattern recognition across large corpora is made possible by AI. For example, contrasting herbal formulations, examining the molecular characteristics of plants, assessing empirical data regarding toxicity or efficacy, and making links between conventional diagnostic markers and contemporary biomedicine. For instance, in order to pursue individualized medicine, "Ayurgenomics" integrates genomic information with Ayurvedic classifications of prakriti (body constitution). The required large-scale data analytics is aided by AI.

D. Democratizing Education and Access :

Many Indians reside in rural or isolated places where they lack access to knowledgeable practitioners of traditional knowledge. Chatbots, apps, AR/VR, and virtual learning are examples of AI-powered systems that can assist in educating people in their native tongues.

AI in education can automate some teaching tasks, evaluate student progress, personalize instruction, and free up more time for mentoring. AI can improve secondary education in India, according to studies.

E. Guidance based on values, ethics, and culture :

Indian knowledge systems are rooted in ethics, values (such as Dharma, non-violence, harmony, and balance), ways of relating to nature, and holistic thinking. They are not just about empirical practices. Such values may be disregarded by AI systems built solely on technical parameters, which could result in bias, the deterioration of cultural identity, environmental damage, etc.

IKS philosophy and AI design can be combined to create human-centric AI, or systems that uphold social fairness, moral responsibility, and ecological balance. These themes are emphasized in Anju Agrawal's work, "Artificial Intelligence and Indian Knowledge Systems."

F. Fostering Soft Power and National and International Identity :

India's identity is rooted in its traditional wisdom. Its preservation and promotion through contemporary means is a type of cultural diplomacy that makes India's contributions to knowledge more widely known. AI can assist in the translation, interpretation, and presentation of Indian philosophy, literature, and the arts to audiences around the world.

G. Assisting with agriculture, the environment, public health, etc. :

There are strong connections between environmental sustainability and traditional medical and agricultural methods. AI can assist with climate-adapted crop identification, biodiversity tracking, supply chain optimization for herbal medicines, safety standards assurance, adulteration detection, and more.

Combining AI and traditional medicine (Ayush systems) in public health can provide diagnostics, preventive care choices, and more. India's initiatives have been acknowledged by the WHO.

3. Key Applications / Examples in India

Here are some real applications (recent and emerging) illustrating the importance of AI in Indian Knowledge Systems:

Application	Description
TKDL with AI	The Traditional Knowledge Digital Library uses AI/ML/NLP to organize traditional medical formulations in multiple languages; helps in patent search, pattern identification, discovering linkages between traditional remedies and modern illnesses. India Today+2The Economic Times+2

Application	Description
Ayurgenomics	Combining Ayurveda's prakriti with genomics and AI to move toward personalized preventive healthcare. The Economic Times+1
AI diagnostics for traditional medicine	Use of sensor-based tools / machine learning for tongue analysis, pulse reading, etc., to reduce variability across practitioners. The Economic Times+1
Education sector	Use of AI in secondary education—personalized learning, automated grading, identifying weak spots in learning, remote learning etc. IJISAE+3Granthaalayah Publication+3icmai-rnj.in+3
Agricultural knowledge & chatbots	Systems helping farmers via AI based question answering in local languages referencing traditional agricultural wisdom + modern practice. (Though some of this is emerging research.)

4. Difficulties and Hazards :

There are a few obstacles and dangers to be aware of in order to guarantee that the advantages are realized:

A. **Translation Loss, Authenticity, and Quality :**

Tactic knowledge, verbal or oral transmission, context, rituals, and ethical or spiritual aspects are all common components of traditional knowledge that are challenging to measure or digitize. There may be some subtle nuances missed.

misinterpretation while incorporating symbolic material or metaphors from ancient languages into computer models.

B. Interoperability, Standardization, and Data Availability :

A large number of traditional texts are either dispersed and fragmentary or have not been digitized. Different standards apply when digitizing (formats, languages, metadata). System-to-system interoperability is frequently poor. Although the TKDL and related projects have made strides, much more needs to be done.

C. Cultural sensitivity and ethical issues :

avoiding exploitation, sharing benefits, and possessing traditional wisdom. AI use needs to avoid biopiracy, respect community rights, and give credit where credit is due.

AI systems have the potential to reinforce prejudices; if they are exclusively educated on particular populations or varieties, they may overlook or misrepresent others.

F. **Harmonizing Tradition and Modernity** :

Reducing conventional knowledge to data or algorithms runs the risk of commodifying, de-contextualizing, or eroding its spiritual, ethical, or philosophical aspects.

Additionally, an over-reliance on AI may diminish mentor-disciple learning (guru-shishya) and experience learning, which are essential components of many Indian knowledge systems.

5. How to Carefully Include AI in Indian Knowledge Systems :

The following are recommendations for best practices and avenues to guarantee AI strengthens Indian Knowledge Systems rather than weakens them:

Frameworks for Collaboration It is necessary for scholars, technologists, government agencies, and traditional knowledge holders (gurus, practitioners, and elders) to form partnerships. Co-creation promotes ethical sharing, cultural awareness, and authenticity.

Policy and Ethical Guidelines :

Create guidelines for benefit sharing, data rights, intellectual property, and community consent. Make that AI systems based on IKS follow values such as openness, equity, and non-exploitation.

Linguistic Technology and Language :

Invest in computational linguistics by creating NLP tools for languages like Tamil and Sanskrit, as well as digitizing regional languages and dialects. AI is still unable to access a large amount of knowledge without language support.

Metadata and Standardization :

Make that all metadata, indexing, formats, and versions are consistent when digitizing texts. Additionally, if feasible and in accordance with their original frameworks, classify and standardize the measurement of conventional diagnostic categories (Rasa, Guna, Virya, etc.).

AI + Exchange of Modern Science :

When possible, support studies that test conventional wisdom using contemporary scientific techniques (e.g., molecular analysis, clinical trials), but in a way that respects conventional epistemologies.

Reforming Education and Curriculum :

Incorporate information on Indian Knowledge Systems into the arts, humanities, science, health, and technology curricula at the high school and university levels. Include modules on digital humanities, cultural heritage, and AI ethics as well.

Access & Infrastructure :

Enhancing computer and Internet infrastructure in rural and tribal communities; guaranteeing digital device access; educating practitioners in digital literacy; and developing locally relevant tools (user-friendly, in local languages).

Sustainability and Environmental Issues :

Living in balance with nature is emphasized in several Indian knowledge systems. AI initiatives that use IKS should also respect sustainability, refrain from overusing herbal resources, and maintain ecological equilibrium.

6. The Wider Cultural and Societal Effects :

Maintaining cultural variety, which is threatened by urbanization and globalization, is made possible by AI-assisted preservation of traditional arts, languages, rituals, and folklore.

Economic opportunities : The demand for digitization services, artificial intelligence (AI) tools, and cultural tourism can result from the use of traditional knowledge as an intellectual asset in new sectors like herbal products and Ayush medicine.

Global leadership : India can continue to serve as a model for many other nations with rich indigenous knowledge (such as those in Africa, Asia, and Latin America) if it is successful in combining ethical AI with traditional knowledge. The WHO has already acknowledged India's efforts.

Health equity : AI can help lessen health disparities by safely delivering traditional medication to those in isolated places where access to modern healthcare may be limited.

7.Traditional Knowledge Digital Library (TKDL) Case Study :

Since it effectively illustrates a number of the themes, this merits special attention. What is it? In order to prevent unjust patents and to facilitate research, the Indian government (CSIR & AYUSH) established a repository to gather traditional medicinal knowledge from Ayurveda, Siddha, Unani, and other sources.
The Economic Times +3

Improvements in AI : Newer versions employ AI/ML/NLP to organize the data, make it searchable, cross-reference it, connect symptoms to treatments, and more. recognizing trends in different formulations.

India Today Plus Impact : Assists researchers and authorized practitioners; helps patent offices around the world verify traditional knowledge scientifically; aids in demographic outreach; and checks previous art to prevent biopiracy. WHO acknowledges these initiatives.

Challenges include preserving ethical access, avoiding commercialized exploitation,

standardizing recipes, mapping out old measurement systems, and ensuring translation correctness.

8. **Prospects for the Future** :

Among the new trends and potential advancements in the future are: Knowledge graphs enabled by AI that connect texts, authors, times, and disciplines in Indian philosophy, medicine, mathematics, and language. To create immersive learning experiences, augmented reality and virtual reality can be used to educate traditional arts, dancing, ceremonies, Sanskrit scripts, etc. Integrating omics, sensor data, and AI for diagnostics, precision traditional medicine through ayurgenomics, etc.Combining traditional farming knowledge with artificial intelligence forecasts regarding weather, soil, pest management, crop rotation, etc. is known as "digital traditional agriculture."AI translation and localization algorithms ensure that IKS remains meaningful for non-Sanskrit/English speakers.

AI in environmental knowledge : Tribal tribes' traditional ecological knowledge (TEK) regarding flora, water, forests, and seasons might be digitalized, and models could be created to support climate resilience.

Conclusion :

There is a lot of potential for artificial intelligence to improve, preserve, and enrich Indian knowledge systems. When carefully incorporated, it can support the preservation of endangered texts and practices, safeguard intellectual property, personalize ecological, educational, and health solutions, democratize access, and enhance cultural heritage. However, AI may potentially commodify or damage the living traditions it aims to support if ethics, authenticity, infrastructure, and local involvement are not carefully considered.

Therefore, India's future depends on respectfully, inclusively, and fairly bridging the gap between traditional wisdom and cutting-edge technology. AI has the potential to be a force for cultural renewal and societal well-being in addition to modernity if it is supported by laws, solid partnerships, investments in human and technical capabilities, and a strong ethical compass based on Indian philosophical ideals.

References :

Here are some of the key sources used:

- "Artificial Intelligence And Indian Knowledge Systems" by Dr. Anju Agrawal, *International Journal Of Innovation In Engineering Research & Management*, Vol. 12, No. 4, 2025. journal.ijierm.co.in
- "Ayurveda meets AI: India becomes first country to digitise traditional medicine with AI-powered library", India Today, July 20, 2025. India Today
- WHO recognition of India's pioneering AI integration with traditional medicine (Ayush systems) in technical brief "Mapping the Application of Artificial Intelligence in Traditional Medicine". News On Air

- "India Takes a Lead in the World by Digitizing Traditional Medicine Using an AI-Based Library" – The Economic Times, 2025. The Economic Times+1
- "Artificial Intelligence in Secondary Education in India", Pathak, R. A., & Waghmare, S. S. (2024), *ShodhKosh: Journal of Visual and Performing Arts*. Granthaalayah Publication
- "Role of Artificial Intelligence in Indian Education System", Rajesh Saxena, *Integrated Journal for Research in Arts and Humanities* (IJRAH). Ijrah
- "An Analysis of AI Intervention in Education Systems of India", Atheeq Sultan Ghori. IJISAE
- "AI Ethics Education in India: A Syllabus-Level Review of Computing Courses" by Anshu M Mittal, P. D. Parthasarathy, Swaroop Joshi; arXiv preprint 2025