The Role of Artificial Intelligence in Promoting Bharatiya Bhashas in the Digital Age

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DOI: https://doi.org/10.5281/zenodo.18328900

ABSTRACT:

In the digital age, Artificial Intelligence (AI) has emerged as a powerful catalyst in preserving, promoting, and revitalizing Bharatiya Bhashas (Indian languages), which embody India's rich cultural, literary, and civilizational heritage. AI–driven technologies such as Natural Language Processing (NLP), Machine Translation, Speech Recognition, Text–to–Speech systems, and Optical Character Recognition (OCR) have significantly enhanced the digital presence and accessibility of Indian languages across platforms. These tools enable real–time translation, voice–based interfaces, and multilingual content creation, thereby bridging the digital divide between English and non–English speakers.

AI also plays a crucial role in language preservation by digitizing classical manuscripts, folk literature, and oral traditions, ensuring their transmission to future generations. Government initiatives like Bhashini and Digital India leverage AI to promote inclusive governance by facilitating citizen–centric services in regional languages. Furthermore, AI–powered educational technologies support personalized learning in mother tongues, improving literacy and learning outcomes.

Despite challenges such as data scarcity, linguistic diversity, and script complexity, continuous advancements in AI research and collaborative efforts between the state, academia, and industry are strengthening the digital ecosystem for Bharatiya Bhashas. Thus, AI not only democratizes digital access but also reinforces linguistic diversity, cultural identity, and inclusive development in contemporary India.

KEYWORDS:

Artificial Intelligence, Bharatiya Bhasha, Indian Languages, Language Preservation, Digital Inclusion, Translation Technology.

1. Linguistic Diversity of India and Contemporary Challenges

India is globally recognized as one of the most linguistically rich nations. The Census of India (2011) records over 1,300 distinct mother tongues, while 22 languages enjoy constitutional recognition under the Eighth Schedule. These languages represent multiple language families, reflecting India's long civilizational history. Bharatiya Bhashas are not merely tools of communication but carriers of indigenous knowledge systems, ethical values, and cultural memory.

Despite this richness, modernization and globalization have created linguistic hierarchies. English dominates domains such as higher education, science, technology, law, and digital communication. As a result, many Indian languages are perceived as unsuitable for professional or academic advancement. UNESCO estimates that nearly 200 Indian languages are endangered, with several tribal languages facing extinction due to declining usage and lack of documentation.

Artificial Intelligence offers an opportunity to reverse this trend by integrating Bharatiya Bhashas into digital systems. When Indian languages are supported by AI–driven tools, they regain functional relevance in education, governance, and technology, encouraging continued use across generations.

2. Artificial Intelligence and Language Preservation

2.1 Digitization of Manuscripts and Texts

India is estimated to possess over five million manuscripts, making it one of the world's largest manuscript repositories. These texts cover subjects such as philosophy, astronomy, mathematics, Ayurveda, linguistics, and literature. However, many manuscripts

are fragile and inaccessible due to script complexity and physical deterioration.

AI–powered Optical Character Recognition (OCR) systems are capable of recognizing diverse Indian scripts, including complex ligatures and handwritten forms. Digitization allows these texts to be preserved permanently and shared globally. Once digitized, manuscripts can be indexed, searched, translated, and analyzed computationally. This process not only protects ancient knowledge from decay but also integrates it into modern research and education, ensuring that Bharatiya intellectual traditions remain relevant in the digital age.

2.2 Preservation of Oral Traditions

A significant number of Indian languages depend entirely on oral transmission. Folk narratives, devotional songs, ritual chants, and indigenous knowledge related to agriculture and medicine are passed verbally across generations. Languages such as Nihali, Andamanese, and several northeastern tribal languages lack extensive written records.

AI–based speech recognition systems can record and transcribe oral narratives with high accuracy. These tools preserve pronunciation, intonation, and emotional expression, which are often lost in written transcription. UNESCO reports that one language disappears approximately every two weeks, emphasizing the urgency of digital preservation. Through AI–enabled documentation, oral traditions gain digital permanence, ensuring cultural continuity and intergenerational knowledge transfer.

2.3 Support for Linguistic Research

Traditional linguistic research is time–intensive and limited by human capacity. AI accelerates this process by analyzing large linguistic datasets efficiently. Machine learning models can identify phonetic patterns, grammatical structures, and semantic relationships within languages.

For under–resourced Bharatiya Bhashas, AI helps create dictionaries, grammatical descriptions, and standardized writing systems. This is essential for introducing these languages into education, publishing, and digital communication. By supporting systematic linguistic research, AI strengthens the academic and institutional foundation of Indian languages.

3. AI–Driven Translation and Multilingual Communication

3.1 Breaking Communication Barriers

India's multilingual nature often leads to communication challenges across regions and communities. AI–powered machine translation systems allow real–time translation between Indian languages and English, enabling smoother communication in education, commerce, and administration.

Studies show that over 70% of Indian internet users prefer content in their native language, yet much digital content remains English–dominated. AI translation tools address this gap by enabling people to consume and produce information in their mother tongue. This promotes linguistic dignity and reduces dependence on English as a gatekeeping language.

3.2 Governance and Public Accessibility

Language accessibility is essential for democratic governance. Many citizens struggle to understand government policies, legal documents, and welfare schemes due to language barriers. AI–based translation enables such information to be available in multiple Indian languages.

Research indicates that multilingual governance improves citizen trust and participation. When people access information in their own language, they are more likely to engage with public institutions and exercise their rights. AI thus strengthens democracy by ensuring linguistic inclusivity in governance.

3.3 National Language Technology Initiatives

India's focus on digital inclusion has led to increased investment in language technologies. AI–based platforms are being developed to support speech recognition, translation, and voice–based interfaces in Indian languages.

These initiatives align with national goals such as Digital India and inclusive governance. By prioritizing Bharatiya Bhashas, they demonstrate how AI can be used as a tool of cultural and social empowerment.

4. Role of AI in Education through Bharatiya Bhashas

4.1 Mother–Tongue–Based Learning

Educational research consistently shows that children learn best in their mother tongue during early schooling. UNESCO emphasizes that mother–tongue instruction improves comprehension, critical thinking, and emotional development.

AI–powered learning platforms deliver personalized content in regional languages, adapting to individual learning speeds. This approach is especially effective in rural areas, where English–medium education often leads to poor learning outcomes. Thus, AI enhances educational quality by aligning pedagogy with linguistic identity.

4.2 Speech and Literacy Development

Literacy remains a challenge in India, with over 250 million adults lacking adequate reading and writing skills. AI–based text–to–speech and speech–to–text tools provide interactive learning opportunities for both children and adults.

These tools offer instant feedback on pronunciation and grammar, making learning more engaging. They are particularly useful for first–generation learners and adult education programs. AI thus strengthens literacy by making learning accessible and language–friendly.

4.3 Access to Higher Education and Knowledge

Higher education in India is predominantly English–centric, limiting access for students from regional language backgrounds. AI enables translation of textbooks, research papers, and technical content into Indian languages.

This democratizes access to advanced knowledge in science, technology, and humanities. By reducing linguistic barriers, AI promotes academic inclusion and social mobility. As a result, Bharatiya Bhashas become vehicles of higher knowledge rather than barriers to progress.

5. AI, Digital Inclusion, and Social Empowerment

5.1 Empowering Rural and Marginalized Communities

Over 65% of India's population lives in rural areas, where literacy and digital exposure are limited. AI–based voice interfaces allow users to interact with technology using spoken language rather than text. Farmers can access crop advisories, weather forecasts, and market prices in their local language.

Healthcare chatbots provide preliminary medical guidance in regional languages. These applications empower communities by making technology accessible and useful.

5.2 Economic and Employment Opportunities

Language technology has become a growing economic sector. AI–based translation, content creation, and voice technologies generate employment for linguists, educators, translators, and digital creators. India's digital economy is projected to reach USD 1 trillion by 2030, with regional language content driving much of this growth. Promoting Bharatiya Bhashas through AI supports local entrepreneurship and creative industries. Thus, linguistic inclusion contributes directly to economic development.

5.3 Strengthening Social Equity

Language often determines access to education, employment,

and governance. AI reduces linguistic inequality by ensuring that services are available in multiple languages. When citizens can interact with digital systems in their mother tongue, social exclusion decreases. This aligns with constitutional ideals of equality and justice. AI therefore functions as a tool for social empowerment and democratic inclusion.

6. AI in Media, Literature, and Cultural Expression

AI has transformed cultural production by expanding the reach of Indian languages. Automated subtitling and dubbing allow regional films to reach national and international audiences. AI-assisted writing tools support authors in composing content efficiently.

Audiobooks and digital storytelling platforms revive interest in regional literature and folklore. These technologies ensure that Bharatiya Bhashas remain vibrant and adaptable in modern media ecosystems. By blending tradition with technology, AI sustains cultural continuity.

7. Ethical Challenges and Limitations

Despite its benefits, AI presents ethical challenges. Smaller languages often lack sufficient digital data, leading to biased AI models. Cultural nuances, idioms, and emotional expressions are difficult for machines to interpret accurately.

Additionally, unequal access to digital infrastructure may exclude marginalized populations. Ethical AI development requires inclusive data collection, cultural sensitivity, and supportive public policy. Without these safeguards, AI risks reinforcing existing inequalities.

Conclusion

Artificial Intelligence plays a transformative role in promoting Bharatiya Bhashas in the digital age. By supporting preservation, education, governance, inclusion, and cultural expression, AI bridges

the gap between tradition and modernity. Rather than replacing Indian languages, AI strengthens their relevance and vitality. With ethical implementation and sustained institutional support, AI can ensure that Bharatiya Bhashas continue to thrive as living languages of knowledge, culture, and identity.

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Funding:

This study was not funded by any grant.

Conflict of interest:

The Authors have no conflict of interest to declare that they are relevant to the content of this article.