

Contribution of Artificial Intelligence to the Growth and Preservation of Gujarati Language and Literature

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I. INTRODUCTION

Language is the foundation of human civilization, functioning not only as a medium of communication but also as a carrier of culture, history, and collective identity. Literature, as the artistic manifestation of language, preserves social values, emotional experiences, philosophical thought, and historical consciousness. Each language reflects a unique worldview, and the decline or loss of a language results in the erosion of cultural diversity and intellectual heritage.

Gujarati, one of the prominent Indo-Aryan languages of India, possesses a rich and continuous literary tradition spanning several centuries. From the devotional poetry of the Bhakti movement to medieval narrative literature, folk traditions, and modernist experimentation, Gujarati literature mirrors the socio-cultural evolution of its people. Literary figures such as Narsinh Mehta, Mirabai, Akha, Premanand, Govardhanram Tripathi, Zaverchand Meghani, Pannalal Patel, Umashankar Joshi, Sundaram, and Suresh Joshi have played a decisive role in shaping Gujarati literary identity (Gujarati Sahitya Parishad). Despite this rich legacy, Gujarati—like many Indian regional languages—faces serious challenges in the contemporary globalized environment. The increasing dominance of English in education, administration, science, and technology has marginalized regional languages in digital and academic spaces. Younger generations often prioritize global languages for professional advancement, resulting in reduced engagement with literature in their mother tongues. In this context, Artificial Intelligence (AI) emerges as a powerful technological intervention capable of addressing linguistic decline. AI facilitates large-scale digitization, intelligent language processing,

automated translation, speech recognition, and personalized learning systems. When applied ethically, AI does not threaten linguistic authenticity but instead functions as a bridge between tradition and modernity.

The National Education Policy (NEP-2020) reinforces this possibility by emphasizing mother-tongue-based education, multilingualism, and technology-enabled learning (University Grants Commission). This research paper examines how AI can act as a catalyst for the preservation, transformation, and global expansion of Gujarati language and literature in the digital age.

II. OBJECTIVES OF THE STUDY

The objectives of this research are:

- To analyse the role of Artificial Intelligence in preserving ancient, medieval, and modern Gujarati literary heritage.
- To examine the effectiveness of AI-based digitization techniques, particularly Optical Character Recognition (OCR), in safeguarding manuscripts and rare texts.
- To evaluate the accuracy and limitations of AI-driven machine translation tools for Gujarati literature.
- To study the contribution of Natural Language Processing (NLP) in grammar correction, spell-checking, sentiment analysis, and semantic understanding of Gujarati.
- To explore the role of AI in improving accessibility through speech technologies such as text-to-speech and speech-to-text.

- To assess the relevance of AI in education in alignment with the National Education Policy (NEP-2020).
- To examine AI's role in creative writing and literary research.
- To identify technical, linguistic, ethical, and cultural challenges associated with AI adoption.
- To suggest future possibilities for AI-driven growth of Gujarati language and literature.

III. RESEARCH METHODOLOGY

This study follows a qualitative and comparative research methodology. The research is analytical and interpretative, emphasizing conceptual understanding rather than statistical analysis.

Research Approach

The study includes qualitative analysis of AI applications in Gujarati language and literature, comparative evaluation of human and machine-based translation, and thematic analysis of AI's impact on preservation, education, and creativity.

Data Sources

Primary data sources include digitized Gujarati literary texts and manuscripts, while secondary sources consist of books, academic journals, AI tools such as OCR software, NLP models, translation platforms, and policy documents like NEP-2020.

Scope of the Study

The scope of the research is limited to linguistic and literary applications of Artificial Intelligence in Gujarati and does not extend to technical algorithmic design or engineering aspects.

IV. ARTIFICIAL INTELLIGENCE: CONCEPT AND EVOLUTION

Artificial Intelligence refers to the development of computer systems capable of performing tasks that typically require human intelligence, including learning, reasoning, language understanding, pattern recognition, and decision-making. The term "Artificial Intelligence" was coined by John McCarthy in 1956. Initially, AI relied on rule-based systems and symbolic logic. With advancements in computational power and

data availability, machine learning and deep learning techniques emerged, enabling AI to process large datasets and learn patterns autonomously (Russell and Norvig).

The evolution of AI can be categorized into early symbolic AI, expert systems, data-driven machine learning, and the current era of deep learning and Natural Language Processing. These advancements have made AI particularly relevant for language-based applications.

V. GUJARATI LANGUAGE AND LITERATURE: AN OVERVIEW

Gujarati literature has evolved through multiple historical phases. The Bhakti period emphasized devotional poetry and social reform, while the medieval period focused on narrative poetry, folklore, and philosophical discourse. The modern period introduced novels, short stories, essays, and experimental poetry influenced by realism and modernist thought (Trivedi).

Gujarati folk literature, rooted in oral traditions, includes folk songs, ballads, riddles, and legends that reflect regional dialects and cultural practices. Preserving this diverse literary heritage requires innovative technological interventions, which AI is uniquely positioned to provide.

VI. ROLE OF AI IN THE PRESERVATION OF GUJARATI LITERATURE

Digitization of Manuscripts

Many Gujarati manuscripts exist on fragile materials such as palm leaves and old paper. AI-based OCR technology converts scanned images into editable and searchable text, ensuring long-term preservation and scholarly accessibility.

Restoration and Enhancement

AI-driven image processing tools enhance faded ink, remove stains, and reconstruct damaged sections, improving readability without compromising textual authenticity.

Digital Archiving

AI enables systematic cataloging, metadata tagging, and classification of texts, making large digital

libraries searchable and accessible for researchers and readers alike.

VII. AI AND FOLK LITERATURE PRESERVATION

Gujarati folk literature is predominantly oral in nature. AI-based speech recognition technologies allow transcription of folk songs and narratives, archiving of endangered dialects, and thematic analysis across regions. Dialect identification models document linguistic diversity, ensuring cultural inclusivity (Meghani).

VIII. MACHINE TRANSLATION AND GLOBAL OUTREACH

Neural Machine Translation (NMT) has significantly improved the quality of Gujarati translations. AI enables Gujarati classics such as *Manvini Bhavai* and *Saraswatichandra* to reach global audiences while also making world literature accessible in Gujarati (Patel; Tripathi).

However, literary translation remains challenging due to metaphors, idioms, and poetic rhythm. A hybrid approach combining AI efficiency with human editorial expertise yields the most accurate results.

IX. NATURAL LANGUAGE PROCESSING AND LANGUAGE DEVELOPMENT

NLP technologies support grammar correction, spell-checking, semantic search, sentiment analysis, and speech applications. Voice-to-text and text-to-speech tools enhance accessibility, particularly for visually impaired users and digital learners.

X. AI IN EDUCATION AND NEP-2020

The National Education Policy (NEP-2020) emphasizes mother-tongue instruction and technology-enabled education. AI facilitates personalized learning platforms, AI tutors in Gujarati, digital libraries, and interactive educational content, democratizing education while strengthening linguistic identity (University Grants Commission).

XI. AI IN CREATIVE WRITING AND LITERARY RESEARCH

AI assists writers by generating drafts, summaries, and ideas, supporting brainstorming and stylistic analysis. However, AI lacks emotional depth, lived experience, and cultural intuition, making human creativity irreplaceable.

XII. CHALLENGES AND LIMITATIONS

Major challenges include limited availability of high-quality Gujarati digital data, dialectal and script variations, grammatical complexity, ethical concerns regarding authorship and originality, and the digital divide between urban and rural regions.

XIII. FUTURE POSSIBILITIES

With strategic planning, AI can enable real-time multilingual translation, smart libraries, revival of endangered literary forms, advanced grammar and style correction tools, and hyper-local AI-based education systems.

XIV. CONCLUSION

Artificial Intelligence should not be perceived as a threat to Gujarati language and literature but as a powerful ally. When applied responsibly and ethically, AI can preserve literary heritage, enhance educational access, expand creative possibilities, and globalize Gujarati literature. The convergence of AI and Gujarati language marks a crucial step toward a culturally rich and technologically empowered future.

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