Bridging Antiquity and Innovation: The Use of AI In Learning Sanskrit for Beginners

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***Abstract*—Sanskrit's precise grammar is often a barrier for new students [1, 2]. Artificial Intelligence (AI) is now transforming this learning process. AI tools leverage the language's logical structure [3]. Natural Language Processing (NLP) breaks down complex words automatically [4]. Machine Learning (ML) creates personalized, adaptive lessons [5]. AI tutors offer instant feedback on grammar and pronunciation [6]. Platforms like Little Guru and AI chatbots make study engaging [5, 7]. They overcome limitations like finding skilled human tutors. AI ensures Sanskrit is globally accessible, 24/7 [8]. This technology vitalizes the ancient language. It supports both preservation and worldwide learning.**

***Index Terms*—Sanskrit, Artificial Intelligence (AI), Natural Language Processing (NLP), Adaptive Learning, Pāṇinian Grammar, Beginner Learning, Computational Linguistics, EdTech, Sanskrit Pedagogy, Machine Learning (ML).**

I. INTRODUCTION

SANSKRIT MEETS THE DIGITAL AGE

Sanskrit is a very important classical language. It holds vast knowledge and literary traditions [2]. Yet, learning Sanskrit can be quite difficult. Its grammar is highly intricate and complex [3]. Beginners struggle with verb and noun endings. Finding qualified, accessible tutors is often hard [1]. The rise of **AI** offers a powerful new solution [8]. AI uses the language's inherent logic [3, 4]. It transforms traditional Sanskrit pedagogy. AI moves learning into an interactive digital space [5]. This change benefits students all around the world.

II. THE AI TOOLKIT FOR BEGINNER SANSKRIT

AI is simplifying the toughest parts of Sanskrit [6]. It uses specific computational tools effectively.

2.1. NATURAL LANGUAGE PROCESSING (NLP)

NLP directly tackles the complex grammar rules [4]. Sanskrit words are often combined forms. AI can instantly break down long words. This process is called morphological analysis. It clarifies a word's root and its endings. AI also handles Sandhi-Viccheda rules [9]. This is the complex joining of nearby words. Beginners often find this task overwhelming. NLP tools instantly split compound words correctly. This helps students understand sentence structure. The complex Pāṇinian system becomes easier [3, 4, 10].

2.2. SPEECH AND VOICE AI

Sanskrit pronunciation demands high accuracy. AI provides critical help with this important skill. Automatic Speech Recognition (ASR) listens to the student. It gives immediate feedback on speaking. ASR helps perfect difficult retroflex sounds. Text-to-Speech (TTS) synthesizes spoken Sanskrit. This allows practice of basic dialogue [6]. Students get a 24/7 practice partner. This overcomes the lack of human conversationalists.

III. PERSONALIZED LEARNING WITH MACHINE LEARNING

Machine Learning (ML) algorithms customize the education [5]. This makes the learning highly efficient.

- Adaptive Learning: ML tracks a student's progress. It identifies specific areas of weakness.

The AI then adjusts the content accordingly. If a student struggles with a case ending, it gives more practice [5]. This ensures the student masters the concept first.

- Spaced Repetition: AI determines the optimal time for review [1, 5]. It uses data to predict when memory fades. The system presents flashcards just before forgetting. This maximizes vocabulary and grammar retention. It saves time and enhances memory skills.
- Gamified Platforms: AI is integrated into fun learning games. Apps like Little Guru are prime examples. They transform grammar study into interactive levels. This boosts student motivation and engagement. Learning becomes rewarding and highly addictive

IV. SPECIFIC AI APPLICATIONS IN PRACTICE

Many platforms show AI's practical benefits today.

- AI Chatbots and Tutors: Generative AI creates specialized tutors [5, 6]. They provide instantaneous, tailored grammar explanations. A beginner can ask any simple question. The chatbot gives a concise, custom response immediately [6]. The AI can also help interpret short texts. This provides immediate scaffolding for new texts.
- AI-Powered OTT Platforms: Foundations like Vyoma offer AI platforms. These use the technology for content delivery. They feature videos, games, and e-books. The AI interface organizes the learning path [8]. This makes high-quality content easy to find.
- Translation Tools: Tools like Anuva Dini help with translation. They show the potential of AI for texts. This support allows beginners to read faster [11].

V. KEY ADVANTAGES FOR THE BEGINNER

AI offers substantial benefits over old methods.

- Global Accessibility: Learning is now available worldwide. Students can access lessons 24 hours a day. They do not need a local human tutor.
- Objective Feedback: The AI tutor is impartial and patient. Students can ask questions repeatedly. They can practice without self-consciousness.
- Precision and Consistency: AI is highly consistent with rules. It teaches complex formulas reliably. This is hard to maintain in large classrooms.
- Affordability: Digital platforms reduce the cost greatly. This makes learning widely available. It democratizes the study of Sanskrit.

VI. CHALLENGES AND THE FUTURE OUTLOOK

Some challenges still remain in this field. AI needs high-quality data for training. Handling complex compound words is still tricky. The nuances of ancient literature are difficult [2]. Human instructors remain absolutely necessary. They provide the cultural and philosophical context [12]. The best future model is hybrid learning [5]. AI handles the mechanical, rule-based tasks. Human teachers focus on meaning and higher wisdom. AI is securing Sanskrit's future existence. It promotes its wide study globally.

REFERENCES

[1] Talk pal. How to Learn Sanskrit Language: Easy Steps for Beginners [Internet]. [cited 2025 Oct 26]. Available from: https://talkpal.ai/how-to-learn-sanskrit-language-easy-steps-for-beginners/

[2] Varakhedi S, Sharma R, Bhattacharya A, Nag A, Goyal P, Kulkarni A, et al. Sanskrit and AI: Harnessing Computational Tools to Enrich Bharat's Languages, Culture, and Heritage [Internet]. 2025 Aug 18 [cited 2025 Oct 26]. Available from: https://www.youtube.com/watch?v=RN9m7VvGz7s

[3] Narain B, Kumar A. Sanskrit Language in Contest to Machine Learning. Int J Tech [Internet]. 2020 [cited 2025 Oct 26];10(1):62–6. Available from: https://www.ijtonline.com/AbstractView.aspx?PID=2020-10-1-12

[4] Bathulapalli C, Desai D, Kanhere M. Use of Sanskrit for natural language processing. Int J Sanskrit Res [Internet]. 2016 [cited 2025 Oct 26];2(6):78–81. Available from:

https://www.anantaajournal.com/archives/2016/vol2issue6/PartB/2-5-21.pdf

[5] OR Wave. Sanskrit Wisdom and Artificial Intelligence: Bridging Past and Future in Education [Internet]. 2025 Sep 9 [cited 2025 Oct 26]. Available from: https://orwave.org/uploads/ORWave_122.pdf

[6] Parekh A. Sanskrit AI: Using Python and AI to Teach Myself Sanskrit [Internet]. Medium. 2024 Dec 16 [cited 2025 Oct 26]. Available from: https://medium.com/@akshparekh123/sanskritai-using-python-and-ai-to-teach-myself-sanskrit-6947c9b817d6

[7] Little Guru. Learn Sanskrit Online | Best Online Sanskrit Language Course [Internet]. [cited 2025 Oct 26]. Available from: https://little-guru.com/

[8] Newsbytes. You can now learn Sanskrit through this AI-powered OTT platform [Internet]. 2025 Jul 19 [cited 2025 Oct 26]. Available from: https://www.newsbytesapp.com/news/science/vyoma-launches-india-s-first-ai-powered-ott-platform-for-learning-sanskrit/story

[9] ResearchGate. Sanskrit in the Age of AI: Scientific Foundations and Computational Applications [Internet]. 2025 Jul 16 [cited 2025 Oct 26]. Available from: https://www.researchgate.net/publication/393680416_Sanskrit_in_the_Age_of_AI_Scientific_Foundations_and_Computational_Applications

[10] SlideShare. Sanskrit in Natural Language Processing [Internet]. [cited 2025 Oct 26]. Available from: https://www.slideshare.net/slideshow/sanskrit-in-natural-language-processing/80573826

[11] Anuva Dini. Global AI Translation Tool [Internet]. [cited 2025 Oct 26]. Available from: https://anuvadini.aicte-india.org/

[12] All Study Journal. Revolutionizing Sanskrit Research: In-depth applications of AI tools in Indological studies [Internet]. 2025 Jul 21 [cited 2025 Oct 26]. Available from: https://www.allstudyjournal.com/article/1577/7-7-22-481.pdf