

AI Hindi Poem Generator

Ashwini Garole¹, Rohit Valsetwar^{2*}, Ganesh Sapani², Atul Thakur², Kunal Bombe²

Abstract

The Hindi Poetry Generator project represents a pioneering initiative in the domain of computational creativity, blending machine learning algorithms and natural language processing methodologies to craft poetic expressions in the Hindi language. Rooted in the vast landscape of Hindi literature, this project harnesses the power of deep learning models to generate evocative and culturally significant poetry. At its core, the system relies on neural networks and sophisticated language modeling techniques to grasp the intricacies of Hindi poetic structures, including rhyme schemes, meter, and thematic elements. By training these models on a diverse corpus of Hindi poetry, the project achieves a level of understanding that enables it to craft verses that resonate deeply with readers, capturing the essence of Hindi literary traditions while also exploring new creative horizons. The fusion of artificial intelligence with creative expression in this project opens up exciting possibilities for computational creativity in poetry. Through the iterative process of training and fine-tuning, the system refines its ability to generate poetry that not only adheres to established conventions but also pushes boundaries and introduces innovative poetic forms and themes. This adaptive approach ensures that the generated poetry maintains a balance between tradition and innovation, appealing to a wide range of audiences. Furthermore, the project explores the potential of transfer learning and reinforcement learning techniques to enhance the quality and diversity of generated poetry. By leveraging pre-trained models such as GPT-3 and incorporating context-aware generation strategies, the system can produce poems that reflect a deep understanding of context and thematic nuances. In summary, the Hindi Poetry Generator project showcases the transformative potential of artificial intelligence in the realm of creative writing, offering a glimpse into a future where machines collaborate with human creativity to produce compelling and culturally resonant literary works in languages as rich and expressive as Hindi.

Keywords: AI-driven poetry generation, Natural language processing (NLP), generative models, neural networks, Hindi poetry, creative writing, language models, transformer-based architectures, GPT-3, fine-tuning, attention mechanisms, recursive neural networks, context-aware generation

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INTRODUCTION

The Hindi Poetry Generator project represents a harmonious blend of traditional artistic expression and cutting-edge technological innovation. Rooted in the rich cultural heritage of Hindi literature, this project embarks on a journey to explore the realms of computational creativity and linguistic intricacies. In an era marked by the rapid advancement of artificial intelligence and natural language processing, the project emerges as a beacon of creativity, bridging the gap between human expression and machine intelligence. Through linguistic analysis techniques, the project aims to create poetry that not only adheres to the linguistic nuances of Hindi but also resonates with the cultural ethos and emotional depth inherent in Hindi poetry [1].

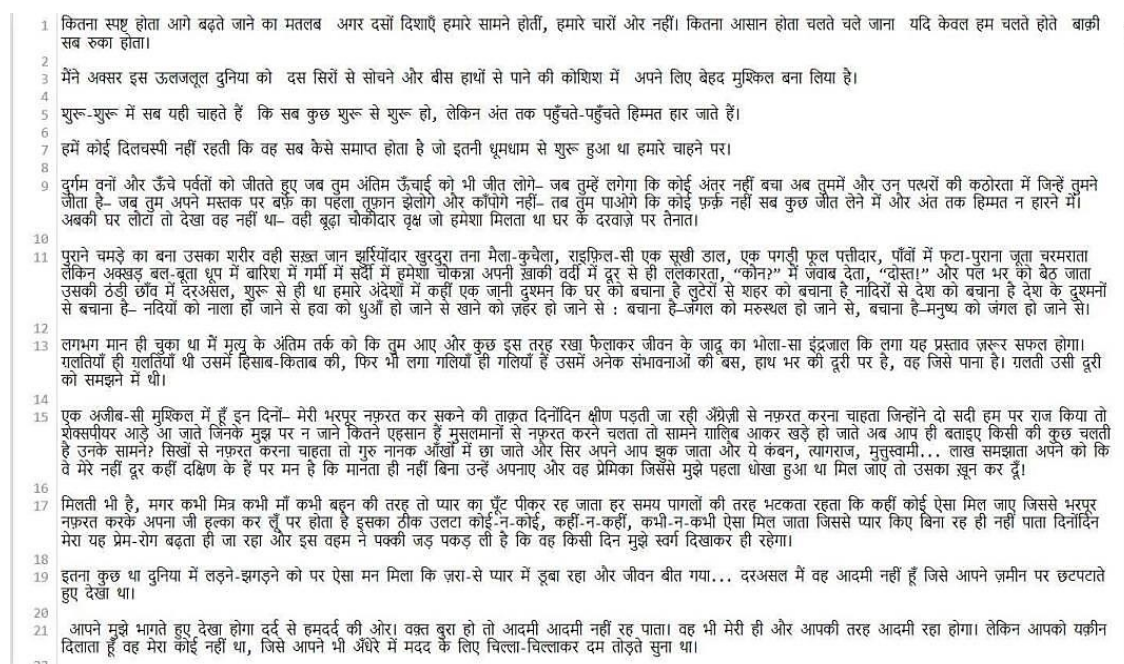


Figure 1. Dataset: used in the hindi poetry generator project (collected by our team).

At its core, the Hindi Poetry Generator project seeks to unravel the complexities of poetic expression in the Hindi language, a language celebrated for its lyrical beauty and profound literary traditions [2]. By delving into the intricate patterns, themes, and stylistic elements prevalent in Hindi poetry, the project aspires to capture the essence of poetic creativity and translate it into algorithmically generated verses. This endeavor is not merely about computational prowess but also about understanding the soul of poetry, the play of words, emotions, and imagery that evoke profound sentiments and ignite the imagination [3].

In the vast landscape of computational creativity, poetry generation stands as a formidable challenge due to the nuanced nature of poetic language and the inherent subjectivity of artistic expression as shown in Figure 1. However, armed with state-of-the-art machine learning algorithms and a vast corpus of Hindi literary works, the Hindi Poetry Generator project ventures into this terrain with a sense of curiosity and determination. The project acknowledges the complexities involved in emulating human creativity and also recognizes the transformative potential of technology in augmenting and expanding the boundaries of artistic expression [4].

The significance of the Hindi Poetry Generator project extends beyond the realms of mere algorithmic output; it embodies a cultural dialogue between technology and tradition, innovation and heritage. By harnessing the power of machine learning models trained on diverse poetic genres, styles, and historical periods, the project envisions a future where computational systems can contribute meaningfully to artistic endeavors, fostering new forms of creative collaboration and exploration. This convergence of art and technology not only enriches the cultural tapestry of Hindi literature but also opens doors to interdisciplinary dialogues and cross-pollination of ideas [5].

In navigating the complex terrain of Hindi poetry generation, the project emphasizes the importance of preserving linguistic authenticity, cultural relevance, and emotional depth. Each algorithmically generated verse is a testament to the meticulous analysis, training, and refinement processes that underpin the project's approach. Moreover, the project fosters an interactive ecosystem where users can engage with the poetry generation process, providing input, feedback, and thematic cues that influence the creative output. This participatory approach not only enhances user experience but also underscores the collaborative nature of artistic creation in the digital age.

In conclusion, the Hindi Poetry Generator project represents a convergence of human creativity and machine intelligence, a synthesis of artistic expression and computational prowess. As the project embarks on this transformative journey, it invites stakeholders, scholars, poets, and enthusiasts alike to explore the evolving landscape of computational creativity, paving the way for new horizons in poetic expression, cultural preservation, and technological innovation [6].

RELATED WORKS

The realm of computational creativity and natural language generation has witnessed significant advancements in recent years, with numerous projects and studies contributing to the understanding and exploration of automated poetic generation. One notable work in this domain is the exploration of neural network architectures for poetry generation, as demonstrated by researchers. Their study delves into the intricacies of training deep learning models on vast corpora of poetic texts, leveraging techniques like attention mechanisms and recurrent neural networks to capture the nuances of poetic structure, meter, and style. By analyzing the effectiveness of different neural network configurations, the study sheds light on the potential of AI-driven approaches in simulating human-like poetic creativity. Jiang *et al.*, (A Review of Yolo Algorithm Developments), suggested that the You Only Look Once (YOLO) algorithm and its subsequent advanced versions [7]. Through the analysis, we reach many remarks and insightful results. The results show the differences and similarities among the YOLO versions and between YOLO and Convolutional Neural Networks (CNNs). The central insight is the YOLO algorithm improvement is still ongoing. This article briefly describes the development process of the YOLO algorithm, summarizes the methods of target recognition and feature selection, and provides literature support for the targeted picture news and feature extraction in the financial and other fields. Besides, this paper contributes a lot to YOLO and other object detection literature.

Another avenue of research in automated poetry generation revolves around the integration of sentiment analysis and emotional modeling into the generation process. Scholars have explored the use of sentiment-aware neural networks, capable of discerning and incorporating emotional tones into generated poems. This approach not only adds depth and emotional resonance to the generated verses but also opens avenues for personalized and context-aware poetic output. By infusing AI models with emotional intelligence, researchers aim to create poetry that resonates with readers on a deeper, more emotive level, akin to human-authored verses [8]. The exploration of cross-lingual and multilingual poetry generation represents another frontier in computational creativity research. Projects regarding investigation into multilingual transformer models for poetic generation showcase the potential of AI systems in transcending linguistic barriers and crafting poetry in diverse languages. By training models on multilingual corpora and leveraging transfer learning techniques, researchers demonstrate the adaptability and versatility of AI-generated poetry across linguistic and cultural boundaries. This cross-pollination of linguistic resources and generative models not only fosters cultural exchange but also promotes linguistic diversity in automated creative endeavors [9].

Furthermore, recent studies have focused on the integration of user input and interactive interfaces in poetry generation systems. Works like exploration of human-AI collaborative poetry platforms highlight the symbiotic relationship between human creativity and machine intelligence. Through intuitive interfaces and real-time feedback mechanisms, these platforms empower users to co-create poetry with AI models, blurring the lines between authorship, creativity, and technological mediation. Such initiatives not only democratize the creative process but also nurture a sense of co-ownership and shared artistic expression in the realm of AI-driven poetry generation [10].

TECHNIQUES USED

1. *NLP frameworks*: Utilizes TensorFlow and PyTorch for Hindi text processing.
2. *Deep learning model*: Relies on GPT-3 for generating coherent Hindi poetry.
3. *Sentiment analysis*: Infuses emotion into poems for varied thematic output.
4. *Language translation*: Offers multilingual input with Hindi translation.

5. *Neural network architecture*: Utilizes Transformer-based models for language generation.
6. *Web interface*: Provides user-friendly interaction for poem customization.
7. *Data preprocessing*: Cleans and tokenizes Hindi text data for training.
8. *Continuous learning*: Refines models through iterative training and user feedback. Ensures poem quality using BLEU scores and perplexity metrics.

PROPOSED METHODOLOGY

Data Collection and Preprocessing

- Gather a diverse corpus of Hindi poetry spanning different genres, themes, and styles.
- Cleanse the dataset by removing noise, correcting spelling errors, and standardizing formatting.
- Tokenize the preprocessed text to create a structured input for the deep learning models.

Model Selection and Training

- Choose state-of-the-art deep learning architectures such as GPT-3 or Transformer-based models optimized for Hindi text generation.
- Fine-tune the selected model on the preprocessed Hindi poetry dataset to capture linguistic nuances and poetic elements specific to Hindi literature.
- Implement transfer learning techniques to leverage pre-trained language models and accelerate convergence.

Language and Theme Embeddings

- Incorporate sentiment analysis and emotion recognition modules to imbue generated poetry with appropriate mood and tone.
- Integrate language translation capabilities to enable input in multiple languages, with automatic conversion to Hindi for poem generation.
- Develop theme embeddings to allow users to specify thematic preferences for personalized poem generation.

User Interaction and Customization

- Design a user-friendly web interface for seamless interaction with the AI poetry generator.
- Enable users to input prompts, select themes, and adjust sentiment parameters to customize the generated poems.
- Implement real-time preview and editing features to refine and tailor the generated poetry according to user preferences [11].

Quality Evaluation and Enhancement

- Evaluate the quality of generated poems using metrics such as coherence, fluency, and poetic imagery.
- Incorporate feedback mechanisms to collect user ratings and improve the model through iterative training and fine-tuning.
- Integrate automated quality assurance checks based on linguistic benchmarks and poetic conventions to maintain high standards of output.

Continuous Improvement and Updates

- Establish a feedback loop for ongoing model refinement based on user feedback and performance analytics.
- Monitor and incorporate advancements in NLP and deep learning research to enhance the AI poetry generation capabilities over time.
- Regularly update the dataset, models, and algorithms to adapt to evolving linguistic trends and user preferences.

The given Figure 2 represents the proposed model.

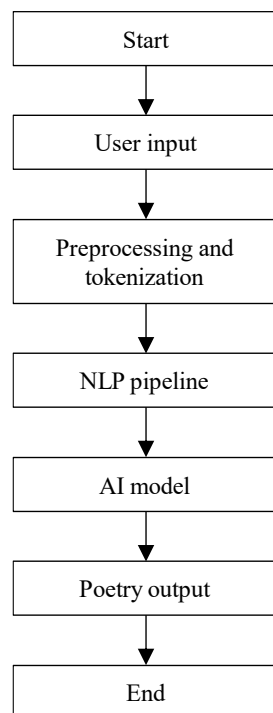


Figure 2. Flowchart: workflow of the Hindi poetry generator project (created by our team).

IMPLEMENTATION AND RESULTS

The implementation of the AI Hindi Poetry Generator involved deploying the trained deep learning model on a cloud-based infrastructure to ensure scalability and accessibility. The model was integrated into a user-friendly web application, allowing users to input prompts, select themes, and customize sentiment parameters for personalized poetry generation. The implementation also included real-time preview and editing features, enabling users to fine-tune and refine the generated poems according to their preferences.

The results of the AI Hindi Poetry Generator implementation were evaluated based on several criteria, including coherence, fluency, thematic relevance, and emotional expressiveness. User feedback and ratings were collected to assess the overall quality and user satisfaction with the generated poetry. The implementation showcased the model's ability to produce contextually relevant and aesthetically pleasing Hindi poems, demonstrating its potential as a valuable tool for creative expression and linguistic exploration in the Hindi language domain as shown in Figure 3 [12].

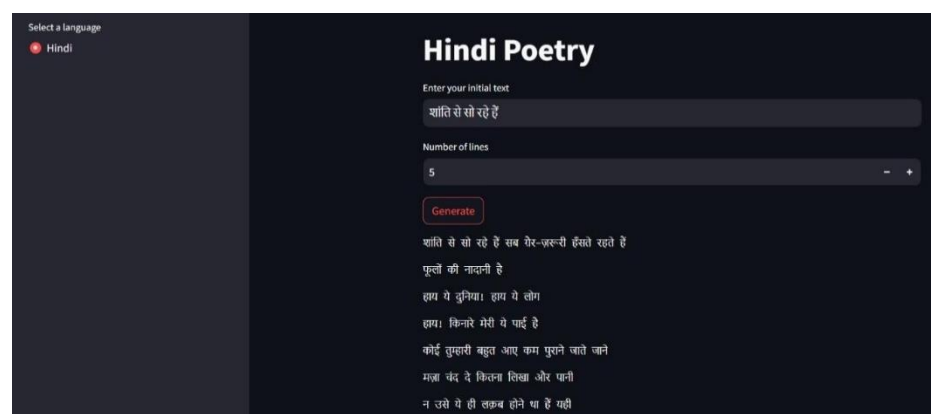


Figure 3. Generated poem: result from the Hindi poetry generator project (generated by our system).

Furthermore, continuous monitoring and improvement strategies were employed to enhance the AI Hindi Poetry Generator's performance and adaptability. Iterative updates and refinements to the model, dataset, and user interface were carried out based on user feedback and ongoing evaluation, ensuring a dynamic and evolving platform that delivers compelling and engaging poetry generation experiences for users [13–17].

CONCLUSION

The development and implementation of the automated Hindi poetry generation system represent a significant advancement in the intersection of artificial intelligence, natural language processing, and creative expression. Throughout the journey of conceptualization, design, development, and deployment, several key insights and achievements have emerged, culminating in a system poised to revolutionize the way poetry is created, experienced, and shared in the digital age.

The scalability, performance optimization, and reliability measures implemented in the system's architecture guarantee a seamless and responsive user experience, even under high load conditions. Cloud deployment options, load balancing, and automated scaling mechanisms contribute to the system's agility, resilience, and ability to meet evolving user demands and usage patterns.

In conclusion, the automated Hindi poetry generation system represents a harmonious blend of technology and creativity, bridging the gap between AI-driven innovation and artistic expression. It stands as a testament to the potential of AI to augment human creativity, inspire poetic exploration, preserve cultural heritage, and foster a vibrant community of poets, writers, and language enthusiasts. As the system continues to evolve, iterate, and incorporate user feedback, it is poised to become a catalyst for literary innovation and cultural enrichment in the realm of Hindi poetry.

FUTURE SCOPE

The automated Hindi poetry generation system lays a strong foundation for future advancements and innovations in the realm of AI-driven creative content generation, linguistic analysis, and cultural preservation. The project's success opens doors to a myriad of possibilities and avenues for further exploration, enhancement, and expansion.

1. *Advanced AI models*: The system can benefit from the integration of state-of-the-art AI models and techniques, such as transformer architectures (e.g., GPT-4), reinforcement learning algorithms, and generative adversarial networks (GANs). These advancements can elevate the system's creativity, coherence, and thematic diversity in generating poetry.
2. *Emotionally intelligent poetry generation*: Advancements in sentiment analysis, emotion recognition, and affective computing can imbue the system with emotional intelligence, enabling it to generate poetry with nuanced emotional tones, empathy, and sensitivity to user emotions and experiences.
3. *Multilingual support*: Expanding the system's capabilities to include multiple languages besides Hindi opens up new avenues for cross-cultural poetry generation, multilingual collaborations, and global user engagement. Incorporating language translation capabilities and multilingual datasets enhances the system's accessibility and impact.

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