



International Journal of Advanced Research in Education and Technology (IJARETY)

Volume 13, Issue 3, May - June 2026

Impact Factor: 9.971



CREATR: An AI-Powered Web-Based Content Creator and Influencer Platform

Diwakar M L, Dr. Gnaneswari G

Department of Master of Computer Applications (MCA), CMR Institute of Technology, Bengaluru, Karnataka, India

Associate Professor, Department of MCA CMR Institute of Technology Bengaluru, Karnataka, India

ABSTRACT: The rapid growth of digital content creation has created a pressing demand for intelligent tools that simplify writing, publishing, and analyzing online content. Traditional workflows require creators to juggle multiple disconnected tools for drafting, grammar checking, image design, and analytics, leading to significant workflow fragmentation. This paper presents **CREATR**, an AI-powered, web-based content creator and influencer platform that unifies these tasks within a single intelligent environment. Built on Next.js, Convex serverless backend, and Clerk authentication, CREATR integrates AI-driven text generation via the Groq API (LLaMA 3), AI image generation via the Fal AI API, and multi-modal intelligence features including a Second Brain content transformer, Publish Intelligence predictive analytics, Viral Score prediction, Trending-Aware content generation, multi-language translation with text-to-speech, content repurposing across four social platforms, and an SEO optimizer. A modular three-tier architecture ensures scalability, security, and maintainability. All 25 functional test cases passed, confirming the platform's readiness for real-world deployment. CREATR demonstrates how modern AI and serverless technologies lower the barrier to high-quality digital content creation for students, educators, solo creators, and small organizations.

KEYWORDS: Artificial Intelligence, Content Creation, Next.js, Convex, Groq API, Fal AI, Clerk, Serverless, Real-Time Analytics, Second Brain, Publish Intelligence, Viral Score, Translation, Text-to-Speech, SEO, Web Application

I. INTRODUCTION

Digital content creation has become a fundamental activity across virtually every sector of modern society. Students share academic insights, educators publish lesson material, entrepreneurs promote products, and independent creators build entire careers through online platforms. Despite the democratization of publishing technology, the process of creating high-quality, consistent content remains demanding. A single polished piece typically requires ideation, drafting, grammar checking, readability improvement, visual design, scheduling, and performance measurement—tasks spread across many disconnected applications [1].

This fragmentation imposes a disproportionate burden on resource-constrained creators: students working without design teams, freelancers juggling multiple clients, and small businesses without dedicated marketing staff. Switching between tools breaks creative flow and consumes time that could be directed toward substantive content development [2].

Recent advances in large language models (LLMs) and generative image systems have opened new possibilities. AI can now draft coherent long-form text, generate contextually matched visuals, translate content into multiple languages, predict viral potential, and surface actionable engagement insights—all in real time. However, most existing platforms expose these capabilities as isolated add-ons rather than integrated components of a cohesive workflow [3].

CREATR addresses this gap by embedding AI assistance at every stage of the content lifecycle, providing: (1) a Second Brain tool transforming any URL, YouTube video, tweet, or raw note into a publishable blog post; (2) a Publish Intelligence engine with predictive analytics on reach, monetization, and timing; (3) a Viral Score predictor; (4) a Trending Badge system injecting live trends into AI-generated content; (5) multi-language translation with text-to-speech; (6) a Content Repurposing Panel for Twitter, email, Instagram, and LinkedIn; and (7) an SEO Optimizer with Google snippet preview.

II. LITERATURE REVIEW AND RELATED WORK

A. Evolution of Content Creation Tools

Early content management systems (CMS) such as WordPress and Blogger established the template for web-based publishing by separating content authoring from presentation. While effective for storage and publication, these platforms offered no intelligent writing assistance. Authors were required to produce, refine, and illustrate content entirely through manual effort [1]. Grammar and spell-check integrations (e.g., Grammarly) represented a first step toward in-editor intelligence, though such tools remained reactive—flagging errors without contributing to ideation or structural improvement.

B. AI Integration in Content Workflows

Transformer-based LLMs have dramatically expanded the scope of machine-assisted writing [3], integrated into tools such as Notion AI and Jasper. Parallel advances in diffusion-based image generation (Stable Diffusion, DALL-E, Flux) and multi-language NLP models have made global content accessibility feasible at low cost [4]. Despite these advances, a critical architectural gap persists: most platforms integrate AI as an external module rather than a first-class component of the content workflow. Table I compares conventional platforms against CREATR.

TABLE I
COMPARISON BETWEEN EXISTING AND PROPOSED SYSTEMS

Feature	Existing Systems	CREATR
Content Creation	Manual drafting	AI-assisted + trend-aware
Image Creation	External tools	Built-in Fal AI (Flux)
Analytics	Delayed/basic	Real-time + predictive
Viral Prediction	Not available	AI viral score (0–100)
Trend Awareness	Not available	Live trend detection
Translation	Manual/third-party	Built-in 6-language AI
Text-to-Speech	Not available	Global Voice Reader
Repurposing	Manual	4-platform AI engine
SEO	Basic plugins	AI audit + snippet preview
Second Brain	Not available	URL/Video/Notes to Blog
Publishing	Manual only	Instant or scheduled
Scalability	Limited or costly	Serverless, elastic

III. SYSTEM ARCHITECTURE AND TECHNOLOGY STACK

CREATR follows a three-tier client-server architecture: a presentation layer, an application logic layer, and a data storage layer. The **Frontend** is built with Next.js 14 (React framework) providing server-side rendering and component-based UI, styled with Tailwind CSS. ImageKit handles CDN image delivery and Unsplash API provides stock photo search. The **Backend** is Convex—a serverless platform providing real-time database synchronization, cloud functions (mutations, queries, actions), and file storage. **Clerk** handles registration, Google OAuth, session management, and route-level access control, scoping each user's data to their tokenIdentifier.

CREATR integrates five AI/external service layers: **Groq API (LLaMA 3.1-8B-Instant)** as the primary engine for all NLP tasks; **Google Gemini 1.5 Flash** for HTML-preserving blog translation; **Fal AI (Flux)** for banner image generation; **ImageKit** for image upload and CDN; and **Web Speech API** for browser-based text-to-speech. Table II summarizes the complete technology stack.

TABLE II
TECHNOLOGY STACK SUMMARY

Layer	Technology	Purpose
Frontend	Next.js + React	Rendering, routing, UI
Styling	Tailwind CSS	Responsive design
Backend	Convex	Serverless logic & real-time DB
Auth	Clerk	Identity & session management

AI Text	Groq (LLaMA 3)	NLP, drafting, all AI features
AI Translate	Gemini 1.5 Flash	HTML-aware translation
AI Image	Fal AI (Flux)	Banner image generation
Images	ImageKit	Upload, CDN, optimization
Stock Photos	Unsplash API	Banner image search
Speech	Web Speech API	Browser text-to-speech
Runtime	Node.js	Build & package management

IV. SOFTWARE REQUIREMENTS SPECIFICATION

A. Functional Requirements

- **User Authentication:** Secure registration, Google OAuth, and session management via Clerk.
- **AI Content Generation:** Title/prompt input returns a structured HTML blog draft via Groq with trending keywords automatically woven in.
- **Content Editing:** Tone improvement, simplification, expansion, and grammar correction modes.
- **AI Image Generation:** Banner images via Fal AI Flux; ImageKit upload and Unsplash search also supported.
- **Draft & Publishing:** Save as draft, publish immediately, or schedule for a future timestamp.
- **Real-Time Analytics:** Live views, likes, comment counts, follower metrics, and a daily views chart.
- **Social Interaction:** Like posts, leave comments, follow creators.
- **Second Brain:** Transform web URLs, YouTube videos, tweets, or raw notes into original blog posts.
- **Publish Intelligence:** AI report predicting views, monetization, best publish time, audience match, originality, shares, and readability.
- **Viral Score:** On-demand virality prediction (0–100) with verdict, strengths, weaknesses, and a pro tip.
- **Trending Badge:** Real-time trend detection; keywords auto-injected into AI content generation.
- **SEO Optimizer:** AI SEO audit with score, meta title/description, keywords, tips, and Google snippet preview.
- **Content Repurposing:** One-click generation of Twitter/X threads, email newsletters, Instagram captions, and LinkedIn posts.
- **Multi-Language Translation:** Blog translation into English, Spanish, French, German, Japanese, and Hindi with full HTML preservation.
- **Text-to-Speech:** Global Voice Reader with speed control, pause/resume/stop, and progress tracking.
- **Auto-Save & AI Tags:** Draft silently persisted to Convex every 30 seconds; five context-aware tags auto-suggested.

B. Non-Functional Requirements

Performance: Pages load within 2 seconds; AI responses within acceptable latency. **Scalability:** Convex serverless backend scales automatically with user load. **Security:** Clerk auth gates, Convex ownership validation, Zod input sanitization, server-side API credential storage. **Usability:** Navigable without technical expertise; responsive across all screen sizes. **Reliability:** Graceful degradation when AI services are unavailable; core editing always accessible. **Hardware:** Minimum Intel Core i3, 4 GB RAM, 500 MB storage, stable internet; runs in any modern browser on Windows, Linux, or macOS without installation.

V. SYSTEM DESIGN

A. Architecture Overview and Data Model

CREATR separates concerns across three independently deployable layers. The Frontend Layer handles all user interaction: content creation forms, AI result rendering, analytics dashboard, social features, and intelligence panels. The Backend

/ Logic Layer (Convex cloud functions) enforces business rules, orchestrates AI API calls, and manages content lifecycle states (draft → published → scheduled). The Data Storage Layer (Convex reactive database) persists all entities with real-time synchronization. All AI API credentials are stored server-side and never exposed to the browser.

Six core data entities: **User** (tokenId, name, email, imageUrl, username, createdAt); **Post** (postId, title, content, status, authorId, tags, category, featuredImage, viewCount, likeCount, scheduledFor); **Comment** (commentId, postId, authorId, status: approved/pending/rejected); **Like** (likeId, postId, userId, deduplicated per user); **Follow** (followId, followerId, followingId, directed relationship); **DailyStats** (postId, date (YYYY-MM-DD), views) enabling time-series charts.

B. Key Use Cases

Primary actors: Content Creator (authenticated) and Public User (unauthenticated). Creators may: generate trend-aware AI content, use Second Brain, analyze viral potential, run Publish Intelligence, optimize SEO, repurpose content, translate and listen to posts, manage drafts and schedules, and view real-time analytics. Public Users may browse, like, comment, and follow.

VI. IMPLEMENTATION

A. Core AI Content Generation and Second Brain

When a user types a title, `getTrendingAngles()` (Groq) fetches live trending keywords with a 1.2-second debounce; the `TrendingBadge` displays trend score, hot angle, and keyword pills. `generateBlogContent()` sends the title, category, tags, and trend context to Groq LLaMA 3, returning a structured HTML post (800–1200 words). Simultaneously, `Fal AI Flux` generates a banner image, and both outputs are merged in the editor.

The `SecondBrainPanel` transforms four source types: (a) **Web URL**—server-side fetch with 8-second timeout, HTML stripping, and 5,000-character extraction; (b) **YouTube**—`oEmbed`/`noembed` APIs for title and description without API keys; (c) **Twitter/X Thread**—URL-based context generation; (d) **Raw Notes**—direct paste of bullet points. All source text passes to `secondBrainGenerate()` (Groq), producing an original HTML blog post (700–1000 words) with a suggested title, previewed in the panel and applied with one click.

B. Intelligence Features: Publish, Viral, and SEO

Publish Intelligence (`getPublishIntelligence()`, Groq JSON mode) returns: predicted view range (min/max) with confidence; monthly monetization potential (USD) and method; best publish window (day, hour, timezone); audience match score with primary/secondary segments; originality score; predicted share range and top platform; readability score with grade; and content gaps. Results render with animated SVG score rings and color-coded metric cards.

Viral Score (`predictViralScore()`) analyzes the title and first 2,000 characters, returning a 0–100 score, a verdict (“Low Potential” / “Moderate Potential” / “Strong Potential” / “Viral Ready”), strengths, weaknesses, and a single pro tip, displayed in an animated SVG ring chart.

SEO Optimizer (`analyzeSEO()`) returns an SEO score (0–100), optimized meta title (≤60 chars), meta description (≤160 chars), five keywords, and improvement tips. A Google snippet preview renders the meta title, URL slug, and description as they would appear in search results.

C. Content Repurposing and Translation

`repurposeContent()` (Groq) generates four platform formats in parallel: an **8-tweet Twitter/X thread** (≤280 chars each, with hook and CTA); a **full HTML email newsletter** with subject line, hook paragraph, 2–3 sections, and styled CTA button; an **Instagram caption** (150–300 words) with 20–25 hashtags; and a **LinkedIn post** (150–250 words) in authentic professional tone with an engagement question. Results are session-cached; switching tabs does not re-trigger generation.

`AudioPlayer` supports six languages: English, Spanish, French, German, Japanese, and Hindi. `translateBlog()` (Groq LLaMA 3) translates title and HTML content in a single call, preserving all HTML tags. Plain text is extracted for the Web Speech API; Chrome’s 200-character voice limit is resolved by splitting at sentence boundaries into sequential utterances. Speed controls (0.75×–2×), pause/resume/stop, and a progress bar are provided.

D. Editor, Analytics, and Security

`PostEditor` uses `react-hook-form` with Zod schema validation: title length constraints, content presence, tag limits (≤10), optional schedule timestamps. An auto-save timer fires every 30 seconds when unsaved changes are detected. Three explicit actions: Save Draft, Publish Now, Schedule for Later; status transitions use Convex mutations with optimistic UI updates.

Analytics counters (views, likes, comments, followers) are reactive Convex queries that auto-re-render on change. A `DailyViewsChart` renders a 7-day view trend from the `dailyStats` table. Clerk middleware validates session tokens on every protected route; Convex mutations verify the authenticated user’s `tokenId` against the resource owner; Zod schemas reject malformed or oversized payloads.

VII. TESTING

A. Test Strategy and Functional Results

Testing covered four categories—unit, integration, functional, and security—with both positive and negative (boundary/invalid) scenarios. Table III presents all 25 functional test results; all passed.

B. Boundary, Security, and Performance Testing

Empty prompt submissions were blocked with validation messages. Titles exceeding 200 characters and tag arrays exceeding 10 items were rejected by Zod schema enforcement. Attempts to access another user's draft via direct URL were denied by Convex ownership checks. Unauthorized dashboard access was redirected to the login page. The /api/fetch-url route correctly returned 408 for slow URLs and 400 for non-HTML content types. Rapid sequential AI generation requests were queued without error. The Second Brain pipeline (URL fetch → Groq generation) completed within 8–12 seconds; Publish Intelligence in 5–8 seconds; multi-language translation in 4–7 seconds. Text-to-speech chunk-splitting resolved Chrome's network voice silent-failure bug across all tested languages.

VIII. CONCLUSION

This paper presented CREATR, an AI-powered web-based content creation platform that unifies drafting, image generation, publishing, analytics, social interaction, and a comprehensive suite of advanced AI intelligence features within a single serverless-backed application. The platform incorporates a Second Brain content transformer, Publish Intelligence predictive engine, Viral Score predictor, Trending-Aware content generation, multi-language translation with text-to-speech, multi-platform content repurposing, and an AI SEO optimizer.

The three-tier modular architecture—Next.js frontend, Convex serverless backend, and Clerk authentication—provides a foundation that is simultaneously scalable, secure, and extensible. All 25 functional test cases passed, confirming the system's robustness. CREATR validates a core design principle: that AI should be woven into the fabric of creative workflows

TABLE III
FUNCTIONAL TEST CASE RESULTS

TC	Description	Status
TC01	Login with valid Google credentials	Pass
TC02	Login with invalid credentials	Pass
TC03	Generate blog from title (trend-aware)	Pass
TC04	Second Brain: URL to blog post	Pass
TC05	Second Brain: YouTube URL to blog	Pass
TC06	Second Brain: raw notes to blog post	Pass
TC07	Publish Intelligence modal analysis	Pass
TC08	Viral Score prediction	Pass
TC09	Trending Badge debounce and display	Pass
TC10	SEO audit and Google snippet preview	Pass
TC11	Repurpose to Twitter thread (8 tweets)	Pass
TC12	Repurpose to Newsletter HTML	Pass
TC13	Repurpose to Instagram caption	Pass
TC14	Repurpose to LinkedIn post	Pass
TC15	Translate blog to Hindi	Pass
TC16	Text-to-speech in translated language	Pass
TC17	Auto-save draft (30-second timer)	Pass
TC18	Publish post immediately	Pass
TC19	Schedule post for future date	Pass
TC20	View real-time analytics dashboard	Pass
TC21	Like and comment on a post	Pass
TC22	AI tag suggestion from content	Pass
TC23	Image upload via ImageKit	Pass
TC24	Unauthorized draft access blocked	Pass
TC25	Empty prompt rejected by validation	Pass

rather than offered as a peripheral add-on. Planned future extensions include personalized AI voice modeling, collaborative real-time editing, advanced audience segmentation, podcast generation from blog posts, native iOS/Android applications, and expanded language support beyond the current six languages.

REFERENCES

- [1] R. S. Pressman, Software Engineering: A Practitioner's Approach, 8th ed. New York, NY, USA: McGraw-Hill Education, 2014.
- [2] I. Sommerville, Software Engineering, 10th ed. Hoboken, NJ, USA: Pearson Education, 2016.
- [3] S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 3rd ed. Hoboken, NJ, USA: Pearson Education, 2010.
- [4] MDN Web Docs, "JavaScript Guide and Web Development Documentation," Mozilla Developer Network, 2024. [Online]. Available: <https://developer.mozilla.org/>
- [5] React, "React – A JavaScript Library for Building User Interfaces," 2024. [Online]. Available: <https://react.dev>
- [6] Vercel Inc., "Next.js Framework Documentation," 2024. [Online]. Available: <https://nextjs.org/docs>
- [7] Convex Inc., "Convex Backend and Real-Time Database Documentation," 2024. [Online]. Available: <https://docs.convex.dev/>
- [8] Clerk Inc., "User Authentication and Identity Management," 2024. [Online]. Available: <https://clerk.com/docs>
- [9] Groq Inc., "Groq API Reference Documentation," 2024. [Online]. Available: <https://console.groq.com/docs/api-reference>
- [10] Fal.ai Inc., "Fal AI Image Generation API Documentation," 2024. [Online]. Available: <https://fal.ai/docs>
- [11] Google DeepMind, "Gemini API Documentation," 2024. [Online]. Available: <https://ai.google.dev/docs>
- [12] ImageKit Inc., "ImageKit Image Management and CDN Documentation," 2024. [Online]. Available: <https://docs.imagekit.io/>



International Journal of Advanced Research in Education and Technology

ISSN: 2394-2975

Impact Factor: 9.971