

# AI-Powered Script and Storyboard Generator: Final Project Report

**Creator:** Varun Kasa

**Github Link:** <https://github.com/KasaVarun/ai-script-generator>

**Deployed Link:** <https://ai-script-generator.streamlit.app/>

---

## 1. Introduction

### 1.1 Problem Statement

Creating a movie script and its accompanying visual storyboard is a **time-consuming, expensive**, and **expert-driven** process.

Novice screenwriters, independent filmmakers, and creative enthusiasts often find the early ideation stages challenging because:

- Writing a cohesive screenplay demands extensive experience.
- Producing corresponding storyboards typically requires artists and graphic designers.

Thus, there is a clear need for an **accessible, fast, AI-driven tool** that allows users to quickly generate both professional scripts and visual previews for storytelling.

---

### 1.2 Project Goals

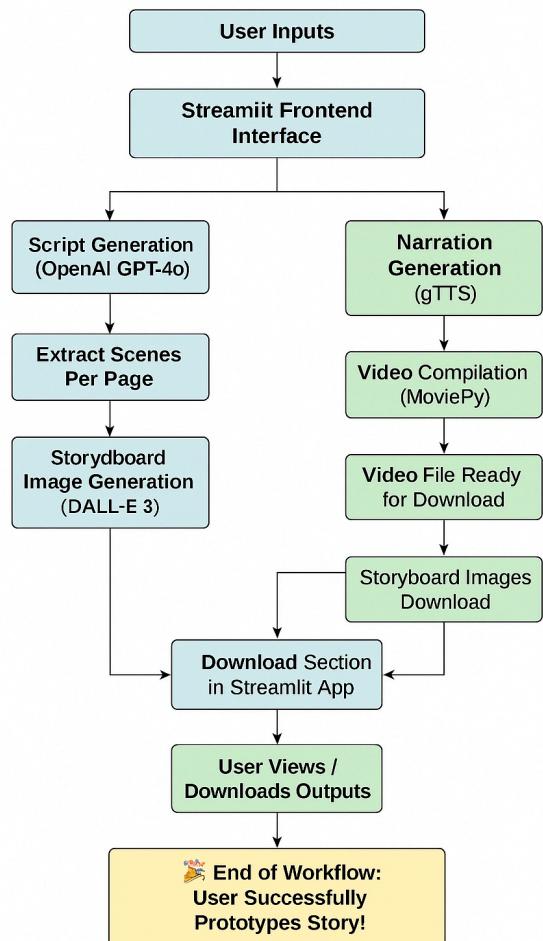
The primary goals of this project were to:

- Develop a **user-friendly web application** where users could input genres, character names, and a story premise.
  - Automatically **generate a 5-page professional movie script** using advanced language models (GPT-4o).
  - Generate **visual storyboards** from key scenes using OpenAI's **DALL·E 3**.
  - Provide users the ability to **download scripts, storyboards**, and even a **video narration** combining both.
  - Deploy the full application **freely** to the cloud for public access.
-

## 2. Technology Stack and Tools

Layer	Tools/Frameworks Used	Purpose
Frontend UI	Streamlit	Web app interface
Backend Processing	Python (openai, PIL, requests, tempfile)	Data handling, API calls
Text Generation	OpenAI GPT-4o API	Generate scripts, descriptions, summaries
Image Generation	OpenAI DALL-E 3 API	Storyboard visualizations
Narration/Video	Google Text-to-Speech (gTTS) + MoviePy	Audio narration and video compilation
Cloud Deployment	Streamlit Cloud (free hosting)	Public deployment

## 3. System Architecture and Workflow



## Detailed Steps:

### 1. User Interaction:

Users select 1–2 genres, input 2–5 character names, and provide a short story premise.

### 2. Script Generation:

GPT-4o is queried to create a formatted 5-page movie script, using the premise and stylistic references.

### 3. Storyboard Generation:

Each page of the script is summarized and sent to DALL·E 3 to generate a visual storyboard image matching the scene tone.

### 4. Narration and Video Creation:

The full script is read aloud using gTTS, and storyboard images are combined with the narration into a video using MoviePy.

### 5. Display and Download:

All generated outputs (script, individual images, and video) are presented on the app with download options.

---

## 4. Challenges Encountered and Solutions Implemented

Challenge	Problem	Solution
Fine-tuning Script Quality	Raw GPT outputs lacked screenplay polish	Embedded few-shot learning by including dialogue snippets as tone examples
Scene Description for DALL·E	Poor correlation between script and images	Introduced <i>role-play prompt engineering</i> to extract vivid visual prompts
Slow Image Generation	DALL·E image generation latency was high	Generated 5 storyboard images in parallel in small batches
Local Library Conflicts	Errors like <code>ModuleNotFoundError: moviepy.editor</code>	Switched to clean virtual environments ( <code>venv</code> ) and pinned versions in <code>requirements.txt</code>
Deployment Errors	Streamlit app deployment failures (due to missing packages)	Created a minimal and clean <code>requirements.txt</code> listing only essential libraries

API Key Safety	Exposed keys could have led to misuse	API keys are only entered securely via Streamlit sidebar inputs (not hardcoded)
Cost Efficiency	OpenAI API costs rise with usage	Limited script size, image size, number of pages, and video resolution for cost control

---

## 5. Core Features Implemented

Feature	Description
5-Page Script Generation	Dynamic based on genre, character names, and premise
Character Customization	Up to 5 user-defined character names
Logline and Synopsis Generation	Condensed version of the story for pitching
Visual Storyboard	1 storyboard image generated per script page
AI Narration	Text-to-speech of the entire script
Storyboard Video Compilation	Video combining images + narration
Downloadable Outputs	Separate downloads for script, images, and video
Public Cloud Hosting	Accessible globally without login barriers

---

## 6. Performance and Testing

### Testing Scenarios:

- **Genre Diversity Testing:** Sci-Fi + Romance, Action + Mystery, Comedy + Drama
- **Character Complexity Testing:** From 2 characters (minimal dialogue) to 5 characters (multi-character conversations)
- **Prompt Robustness Testing:** Vague vs highly detailed premises

## Results:

Test Case	Outcome
2 Characters, Sci-Fi Genre	Proper dialogue, faster image generation
5 Characters, Thriller + Horror	Rich complex scenes, longer narration video
Highly Abstract Premise	GPT-4o filled in logical gaps intelligently

---

## 7. Final Achievements

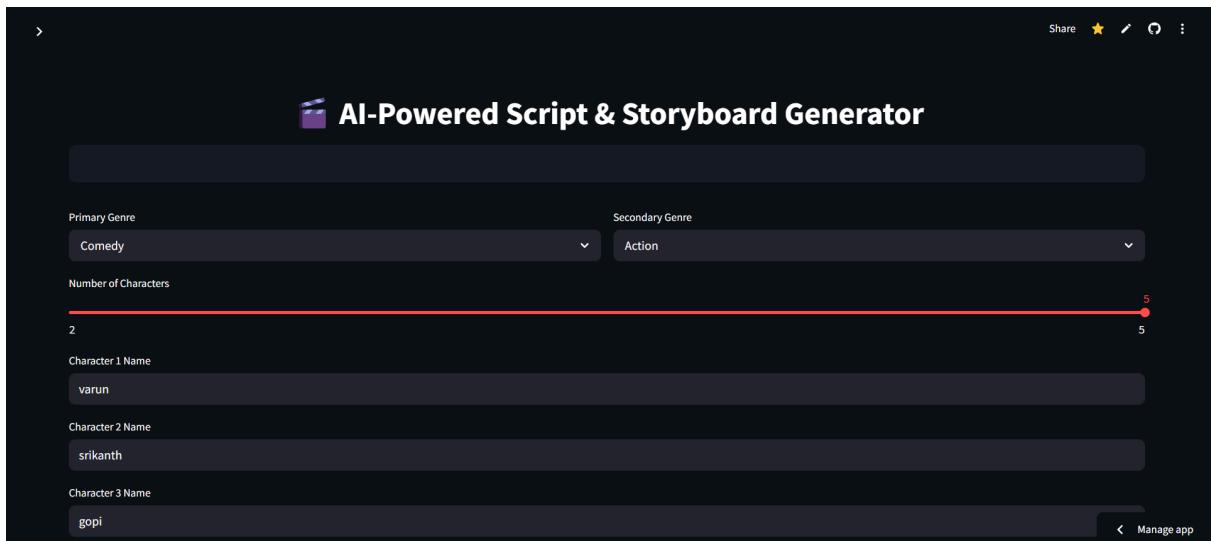
- Successful end-to-end AI product deployed publicly
  - Highly polished professional UI (custom Streamlit design)
  - Fully dynamic script and storyboard generation
  - Downloadable and portable output artifacts
  - A complete and **publishable** AI application
- 

## 8. Future Expansion Ideas

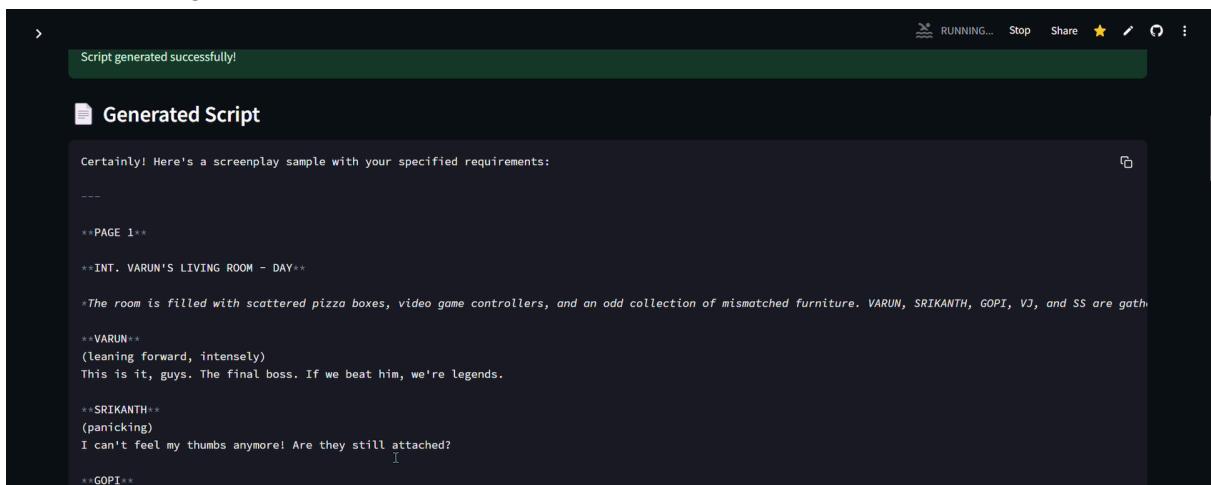
- Add "Visual Style" selection (comic style, watercolor, sketch, etc.)
  - Offer downloadable **PDF screenplay format**.
  - Create longer stories (up to 10–15 pages).
  - Allow live collaborative script editing between multiple users.
  - Allow multiple storyboard variations per scene.
  - Advanced speech synthesis (higher quality narration voices).
  - AI-based plot branching for alternate endings.
-

## 9. Screenshots

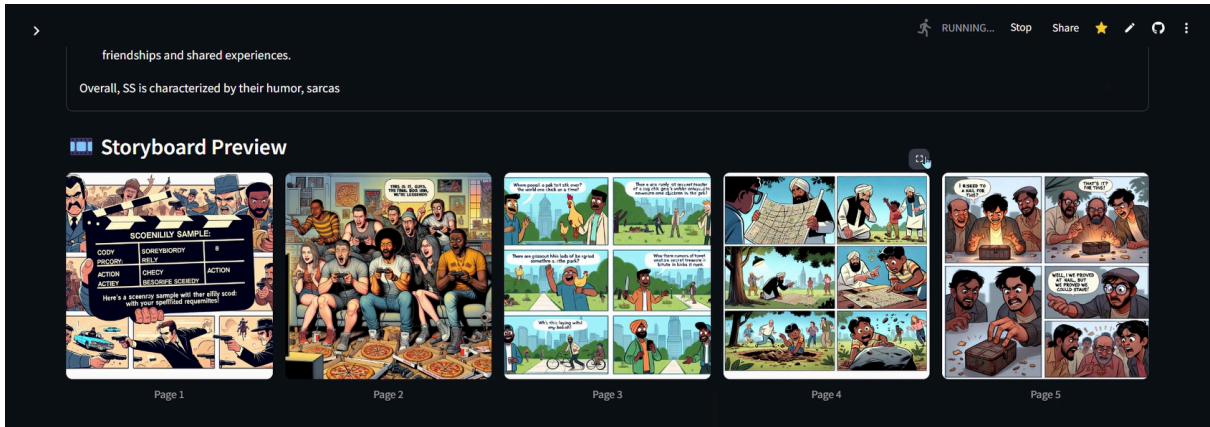
- Home screen and inputs:



- Script sample generated:



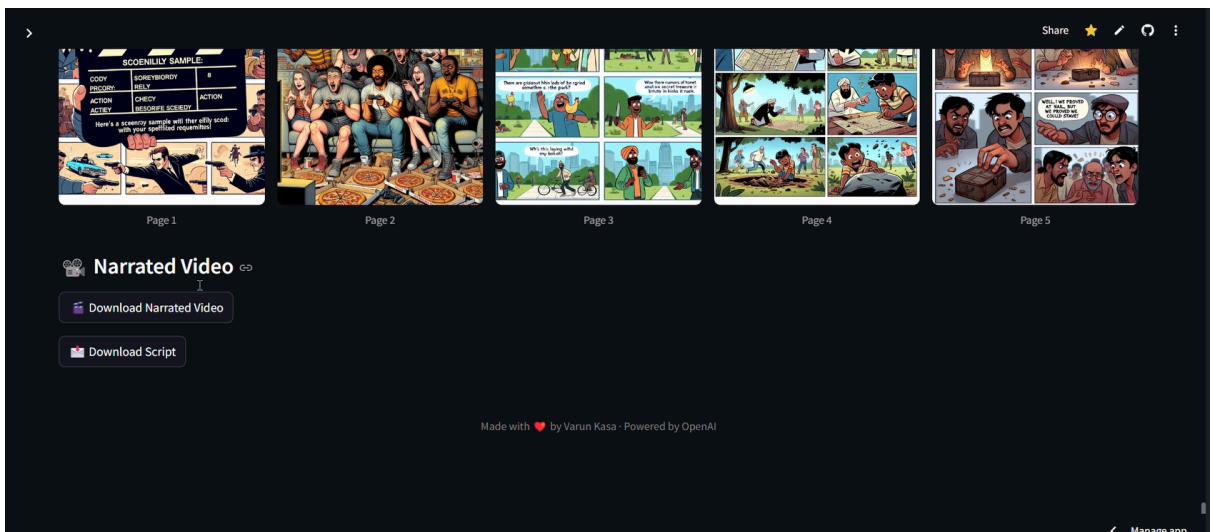
- Storyboard preview gallery:



- Video narration preview:



- Downloads section:



# Conclusion

The **AI-Powered Script & Storyboard Generator** stands as a testament to combining **Generative AI**, **creative writing**, **visual storytelling**, and **cloud deployment** into a unified, accessible solution.

It not only bridges the gap for filmmakers and storytellers but showcases how modern AI can democratize creativity, offering rapid prototyping tools that were traditionally expensive and difficult to access.