# Project Documentation

ComicCrafter AI is a generative AI based comic generator running locally on edge devices that generates a comic style story based on the input prompts given by the user.

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# Team Name: COMIC-BUILDER

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# 1. Overview

Comic Builders is a cutting-edge web-based application designed to automatically generate comic strips from textual narratives. Users can input four key components of a short story — Introduction, Storyline, Climax, and Moral — and the application uses LLaMA, an advanced language model, for story generation. Stable Diffusion is then employed to convert these generated stories into corresponding comic panels. These panels are packaged into a downloadable ZIP file, providing an easy way for users to download and share their personalized comic strips.

This application aims to streamline the comic creation process, making it accessible to individuals and organizations without requiring artistic or technical expertise.

# 2. Objectives

The Comic Builders project aims to democratize comic strip creation using cutting-edge artificial intelligence. Traditionally, creating a comic requires both writing and artistic skills, but Comic Builders removes these barriers by combining the capabilities of LLaMA for story generation and Stable Diffusion for image creation.

The core objectives of the project include:

1. Simplification: Allowing users to generate comic strips quickly and easily from text.
2. Accessibility: Enabling non-artists to create high-quality comic strips based on their creative writing.
3. Creativity: Encouraging users to express their narratives through both written text and visual comics.
4. Scalability: Ensuring that the platform can handle a large number of users simultaneously without performance degradation.

# 3. Technologies Used

5. Streamlit (Version: 1.44.1): For developing the web-based interface.
6. Llama (llama-cpp-python, Version: 0.3.8): For generating story elements.
7. Stable Diffusion XL (Version: 2.1): For generating comic-style images.
8. Python (Version: 3.11): The primary programming language for backend logic.
9. Pyngrok (Version: 7.2.3): For exposing the local Streamlit app to the internet.
10. Torch (Version: 2.6.0+cu124): For deep learning and AI model processing.
11. Transformers (Version: 4.50.2): For NLP-based tasks in text generation.
12. Diffusers (Version: 0.32.2): For working with diffusion models like Stable Diffusion.

13. OpenCV (Version: 4.11.0.86): For image processing and manipulation.

14. NumPy (Version: 2.0.2): For numerical computations.

15. Pandas (Version: 2.2.2): For handling structured data.

# 4. System Workflow

The Comic Builders application follows a streamlined workflow that combines story generation and image creation to provide users with a comprehensive solution for comic strip production.

## 4.1 User Input

Users are prompted to input four key sections of their story:

- Introduction: Establishes the scene and introduces characters.
- Storyline: Describes the main events of the narrative.
- Climax: Highlights the turning point or dramatic moment.
- Moral: Concludes the story with a key takeaway or lesson.

## 4.2 Image Generation with Stable Diffusion

After the story is generated, each section is converted into a text prompt and sent to Stable Diffusion. The model processes these prompts to generate a series of comic panels:
Panel 1: Represents the Introduction.
Panel 2: Depicts the Storyline.
Panel 3: Illustrates the Climax.
Panel 4: Concludes with the Moral of the story.

## 4.3 Display and Interaction

The generated comic panels are displayed on the user interface, allowing users to view their story in visual form. Each panel corresponds to one part of the story, ensuring clarity and ease of navigation.

## 4.4 Download and Export

Once the comic panels are generated, they are packaged into a ZIP file using Python's Zipfile library. This makes it convenient for users to download all comic panels at once.

# 5. Project Roles and Responsibilities

The development of Comic Builders was a collaborative effort, and the roles for key team members are outlined below:

- **Image Generation (Pritam Mandal):** Responsible for integrating and fine-tuning Stable Diffusion to generate high-quality comic panels from the story content provided by users.

- **Story Generation (Madhusudan):** Handled the integration of LLaMA for generating structured and creative stories based on user inputs.

- **Streamlit Development and Testing (Md Usman Ansari):** Developed the interactive user interface using Streamlit, ensured ease of use, and performed extensive testing for system functionality.

**6. LLM-Based Story Generation Challenges**

- **Consistency in Story Flow**: Ensuring logical progression of events in multi-panel comics.
- **Character Continuity**: Keeping character personalities and dialogues consistent across panels.
- **Short Context Window**: LLMs may forget earlier details, affecting long-form story generation.

**2. AI Image Generation Challenges (Stable Diffusion)**

- **Manga/Comic Style Adaptation**: Fine-tuning Stable Diffusion with LoRA to generate high-quality, stylistically consistent images.
- **Character Re-identification**: Ensuring the same character design across multiple panels without drift.
- **Panel Composition**: Arranging images properly to fit comic-style panels.

**5. Integration of Story & Images into a Web App**

- **Streamlit UI Optimization**: Creating an interactive and user-friendly interface.
- **Efficient Workflow**: Seamlessly integrating text generation, image synthesis, and layout design in real-time.

**6. Training & Fine-Tuning Models**

- **Dataset Curation**: Gathering high-quality comic datasets for fine-tuning manga styles.
- **Computational Cost**: Training LoRA models requires GPU power, which can be resource-intensive.

## 6. Results

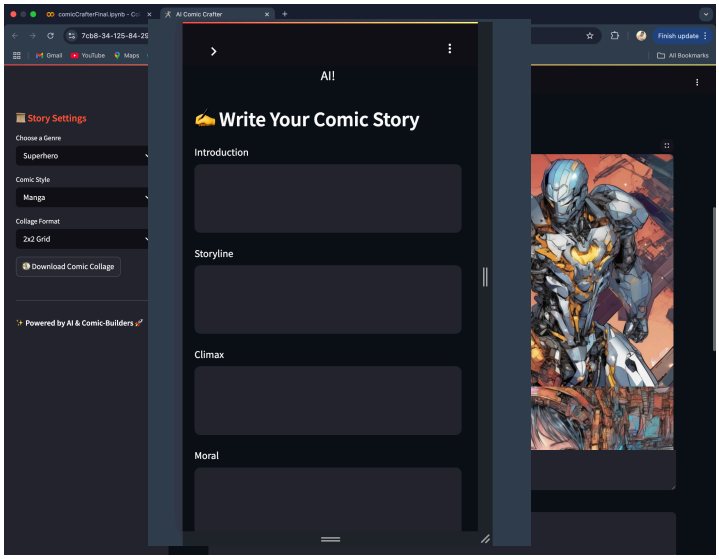
The Comic Builders application has successfully automated the comic creation process. By combining LLaMA for story generation and Stable Diffusion for image generation, the platform provides an efficient and effective tool for transforming written stories into visually appealing comic strips.

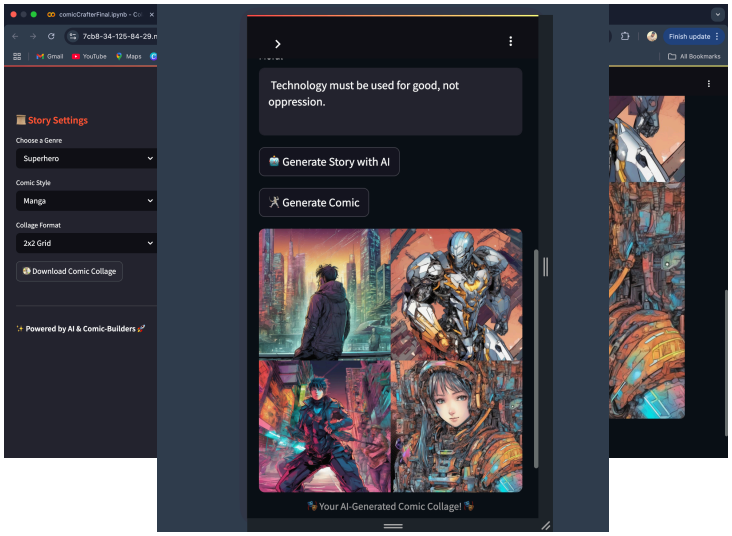
## 7. Conclusion

Comic Builders exemplifies the power of combining LLaMA for natural language processing and Stable Diffusion for image generation. The platform empowers users to transform their written

stories into visual narratives, democratizing the comic creation process and making it available to a broader audience. Comic Builders offers an innovative tool for content creators, educators, and anyone interested in merging storytelling with visual art.

# Outputs :


AI Comic Crafter
Finish update
All Bookmarks
Story Settings
Choose a Genre
Superhero
Comic Style
Manga
Collage Format
2x2 Grid
Download Comic Collage
Powered by AI & Comic-Builders
AI!
Write Your Comic Story
Introduction
Storyline
Climax
Moral


Finish update
All Bookmarks
Story Settings
Choose a Genre
Superhero
Comic Style
Manga
Collage Format
2x2 Grid
Download Comic Collage
Powered by AI & Comic-Builders
Technology must be used for good, not oppression.
Generate Story with AI
Generate Comic
Your AI-Generated Comic Collage!