

**Capstone Project:**

**Addressing Writer's Block for  
Manga Writers**

Gautam Raman

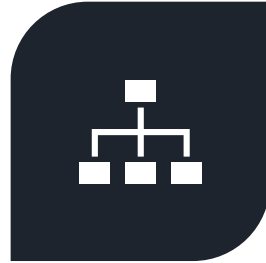


# What is Writer's Block?

- Defined as “the inability to begin or continue writing for reasons other than a lack of basic skill or commitment.”
- Personal Experience: Can be very frustrating, caused me sleepless nights
- Can also happen to artists



# Storyboarding, and how writer's block has a negative effect



CRUCIAL STEP WHERE  
CREATORS PLAN THE  
VISUAL FLOW OF THE  
STORY, DEPICTING SCENES  
AND PANEL LAYOUTS.



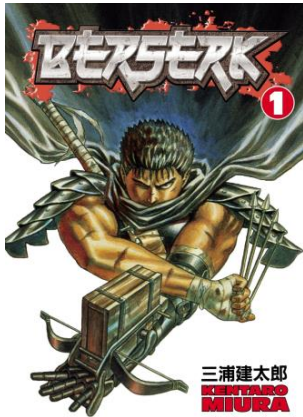
STORYBOARDING IS THE  
BRIDGE BETWEEN A  
WRITTEN SCRIPT AND THE  
FINAL ARTWORK.



WRITER'S BLOCK CAN  
EXTEND TO  
STORYBOARDING, WHERE  
CREATORS STRUGGLE TO  
VISUALIZE THE SCENES AND  
TRANSITIONS

# Writer's Block is prevalent in the manga industry

## Berserk



Kentaro Miura was known for taking hiatuses due to creative challenges leading to long waits.

## Evangelion



Yoshiyuki Sadamoto took multiple hiatuses which were attributed to creative challenges.

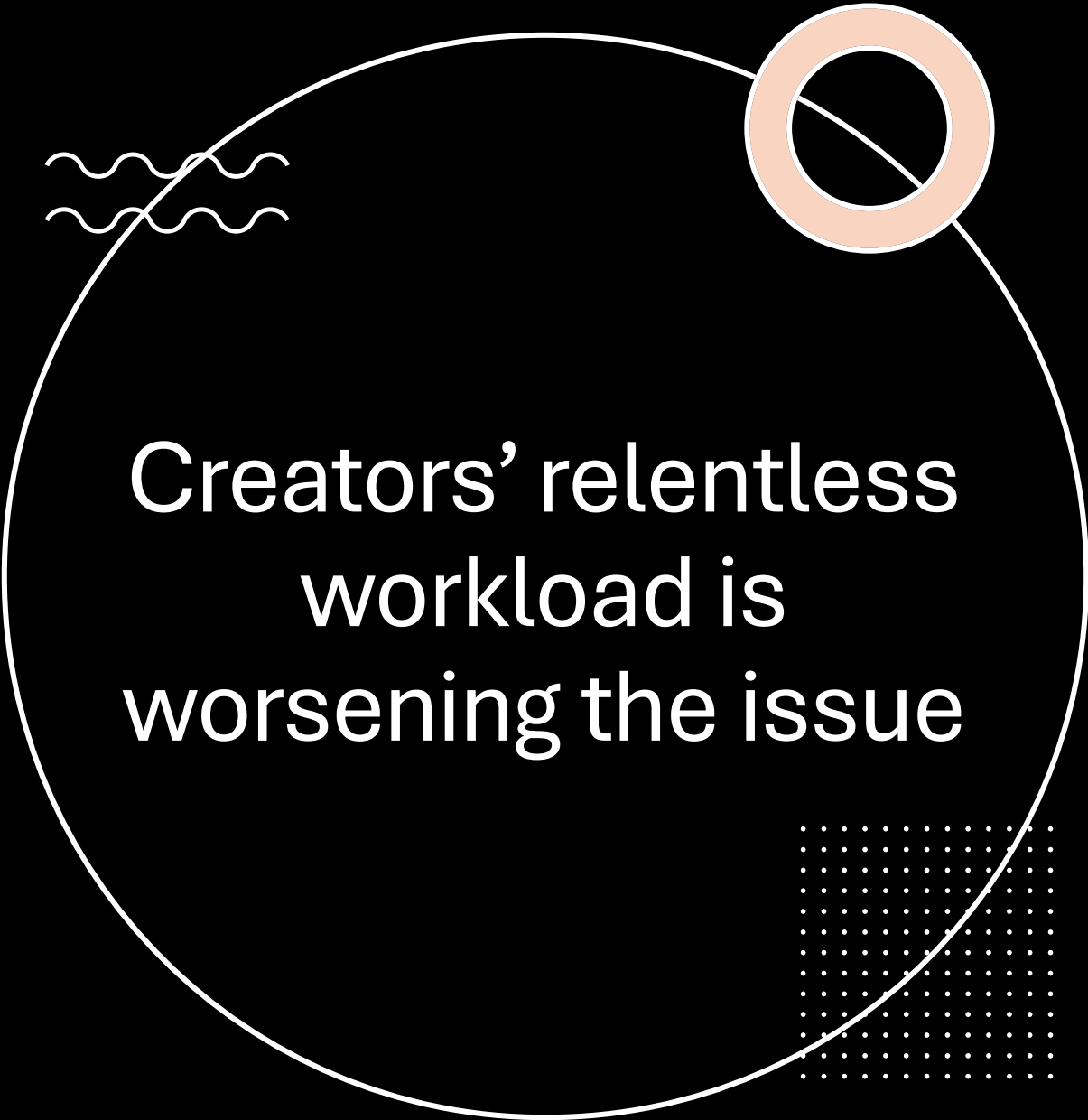
## Hunter X Hunter



Yoshihiro Togashi, experienced writer's block, leading to year-long hiatuses.

### Sources:

- <https://screenrant.com/hunter-x-hunter-togashi-confirms-series-return-401/>
- <https://www.cbr.com/berserk-manga-changes-over-364-chapters/#berserk-became-one-of-the-most-influential-amp-successful-manga-in-history>
- [https://en.wikipedia.org/wiki/Neon\\_Genesis\\_Evangelion\\_\(manga\)](https://en.wikipedia.org/wiki/Neon_Genesis_Evangelion_(manga))



# Creators' relentless workload is worsening the issue

Many manga creators who end up suffering from their work

Creators work long hours affecting physical or mental health or suffer direct abuse from the system.

Leads to a loss of motivation, inability to produce new ideas, and worsens the problem of writer's block.

# AI is helping Manga writers

ChatGPT is helping to write next instalment of manga hit One Piece as author runs into writer's block.



“Cyberpunk: Peach John” is the world’s first complete AI manga work.





## Problem Statement:

“Can we build **AI Models** that address the problem of writer’s block in the manga industry by helping with **ideation** and **storyboarding?**”

# Workflow



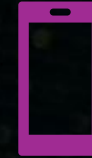
Data Collection



Analysing Trends



Building models



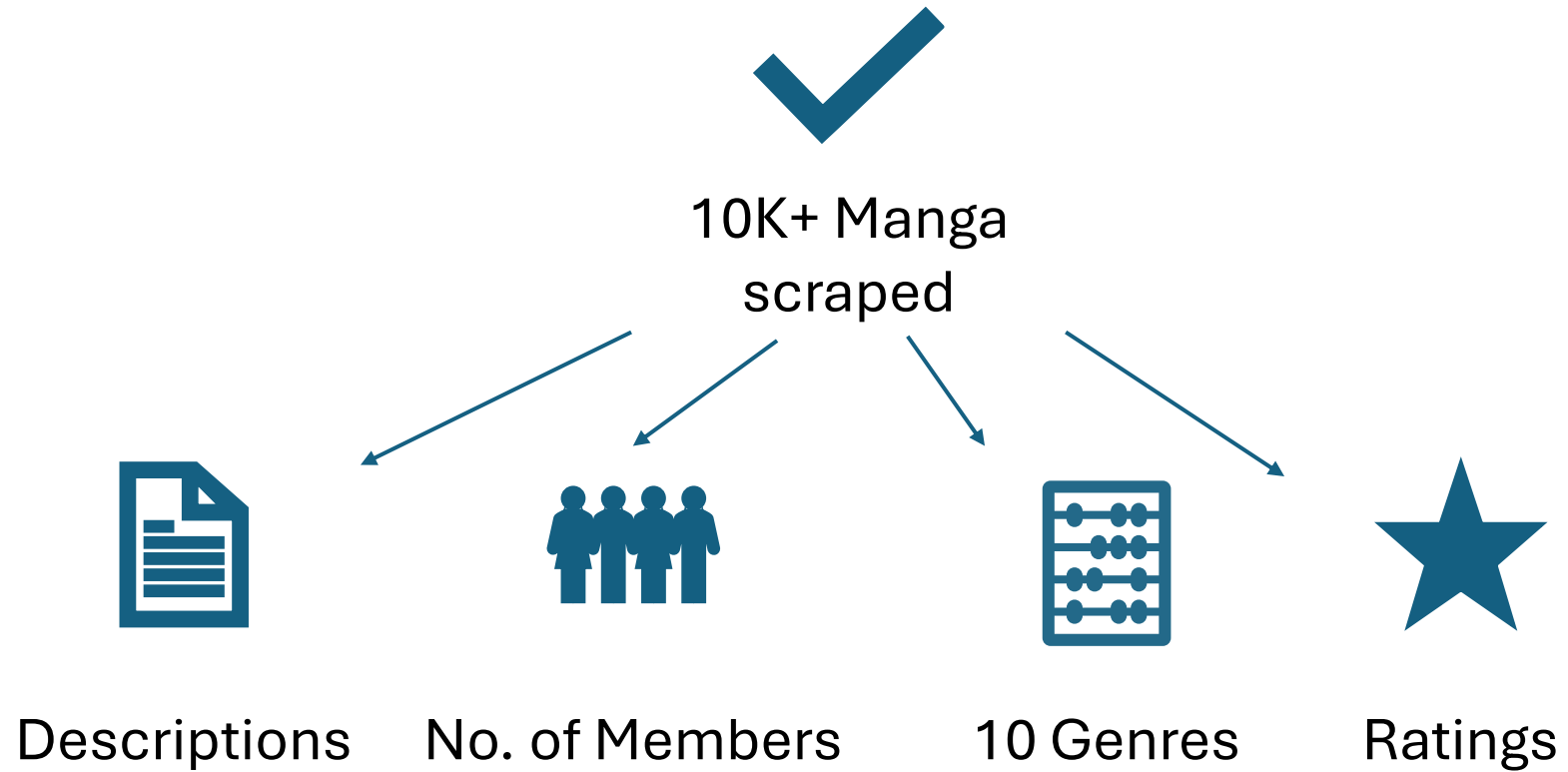
Prototyping



Conclusions



# Data collection



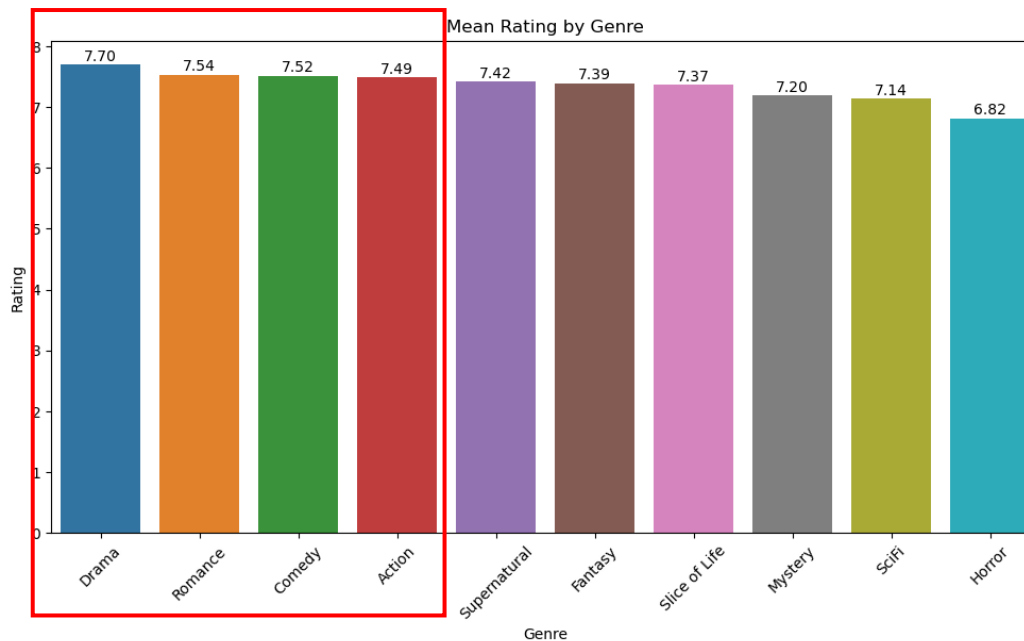
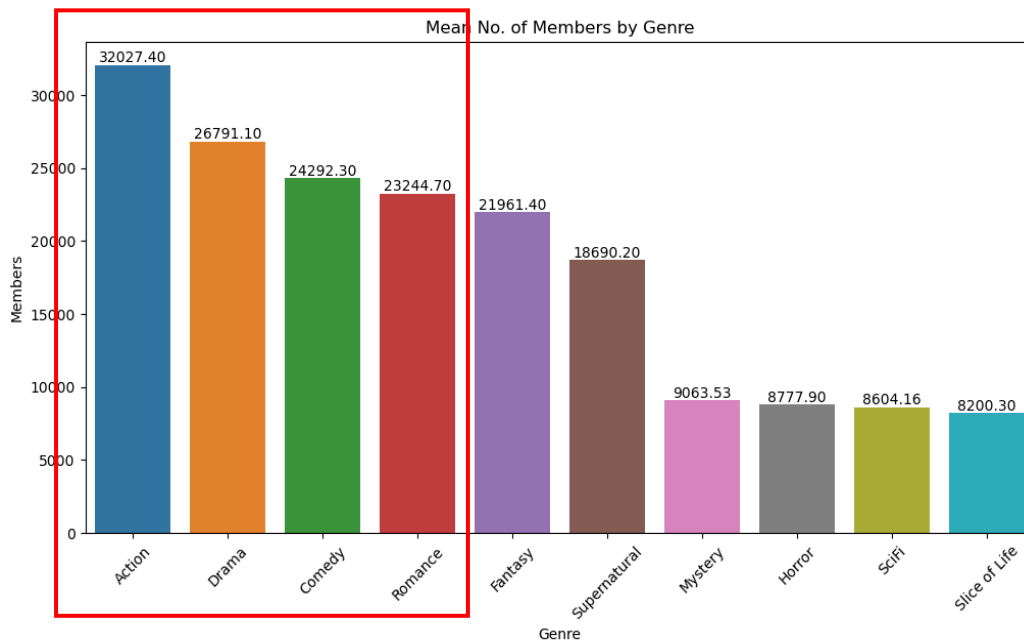
# EDA: Exploring the data for insights

- Focus: This EDA will focus on more of a business/commercial angle to provide a holistic view and recommendation.
- From a commercial perspective, manga writers will want to know one key thing. 'What is popular with the crowd?'
- The EDA will also explore keywords and themes used in descriptions for the most popular genres.
- Will conclude with some action points for manga writers.



## Action, Drama, Comedy, and Romance are the most popular and highly reviewed genres

- These 4 genres also account for ~60% of all total members.
- The average ratings across the genres do not vary much.
- Writers should focus on the above four genres if they want to make an impact.
- Also helps select features: only these 4 genres will be used to train the model.

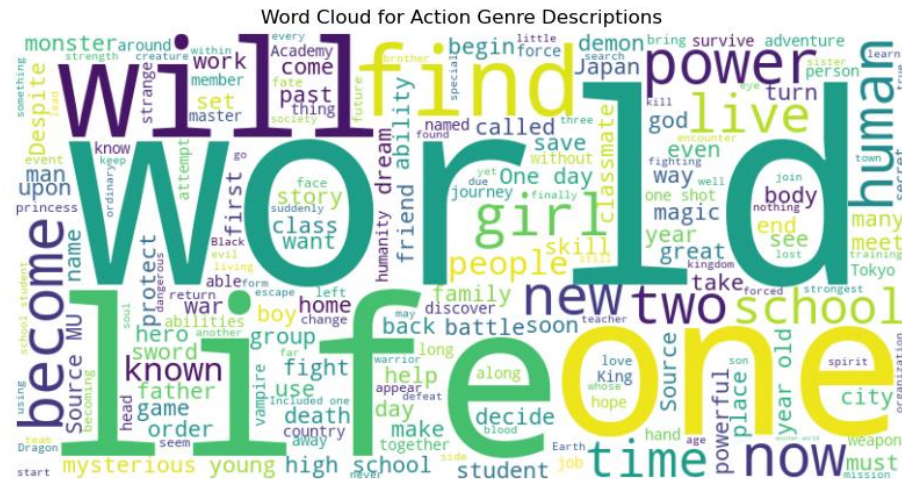




# Top keywords and themes: Action genre

### Top Themes:

- **Dynamic Adventures:** Action manga often feature young protagonists in thrilling battles, emphasizing themes of empowerment and personal growth.
- **Fantasy and Conflict:** Supernatural elements, complex worlds, and overarching conflicts between good and evil are central to the action manga genre's appeal.



### Top Keywords:

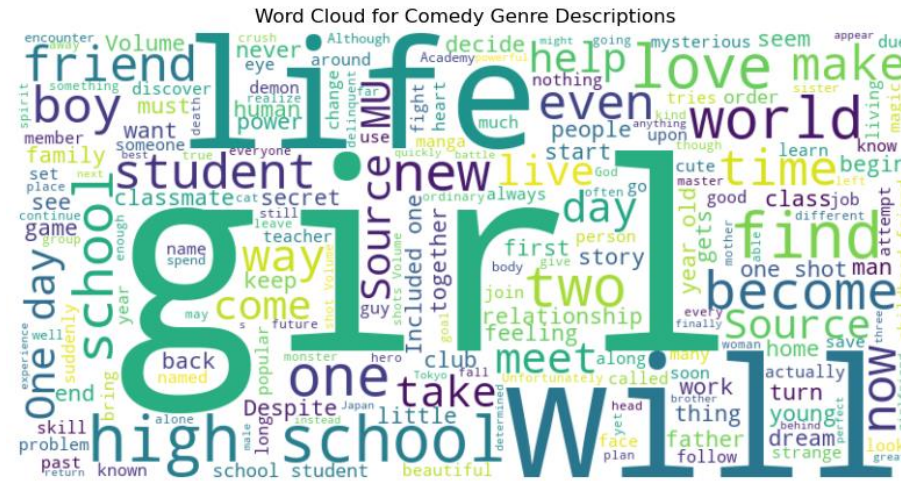
- power
- battle
- monster
- fight
- human
- girl
- boy
- student
- become
- powerful
- magic
- demon



# Top keywords and themes: Comedy genre

### Top Themes:

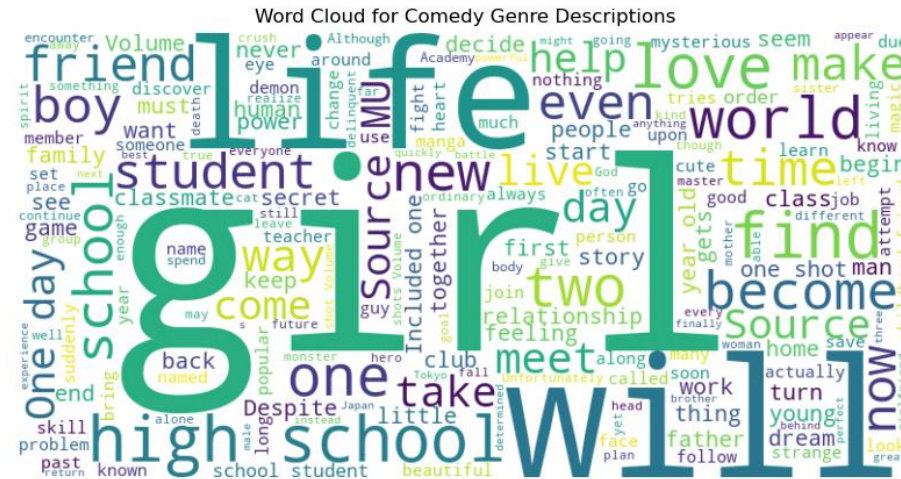
- **School Life and Relationships:** Comedy manga often humorously depict the daily lives and interactions of students in school, along with themes of love and family.
- **Friendship and Aspirations:** The genre highlights the importance of friendship, camaraderie, and characters' aspirations, often leading to comical and relatable situations.



### Top Keywords:

- girl
- high school
- boy
- student
- school
- love
- relationship
- family
- friend
- meet
- help
- dream

- **Emotional Exploration:** Drama manga delves into the emotional and interpersonal aspects of characters' lives, exploring themes of love, family, and relationships.
- **Personal Growth and Transformative Moments:** The genre focuses on characters' personal journeys, self-discovery, and critical turning points, often set against the backdrop of high school life.

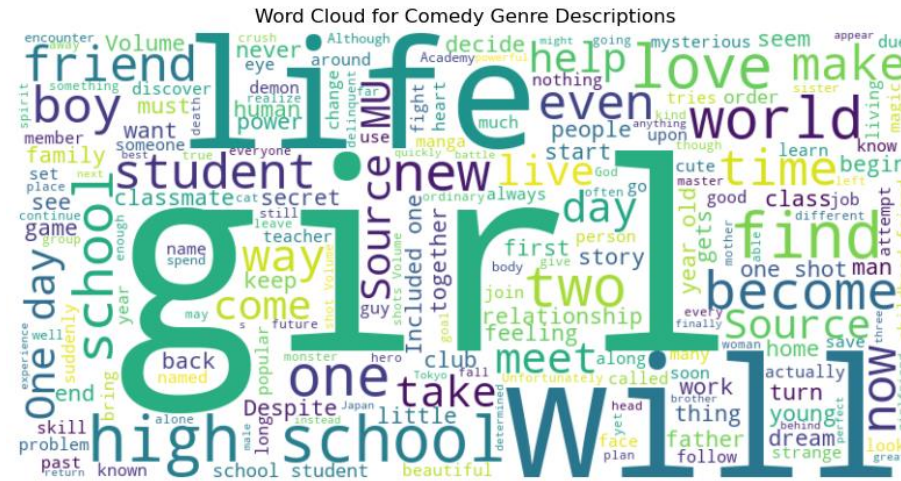


- **Life**
- **Love**
- **Family**
- **Relationship**
- **High school**
- **Student**
- **Find**
- **Begin**
- **One day**
- **Death**
- **Mysterious**
- **Secret**
- **Power**

# Top keywords and themes: Romance genre

### Top Themes:

- **Love and Relationship Focus:** Romance manga centers around themes of love, relationships, and personal journeys, often within a high school setting.
- **Emotional Depth and Complexity:** The genre explores the intricacies of interpersonal connections, serendipitous moments, and emotional depth, creating emotionally charged and heartfelt stories.



### Top Keywords:

- Love
- Relationship
- Girl
- Life
- High school
- School
- Friend
- Begin
- One day
- Family
- Secret
- Feeling

# Action Points from the EDA

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- **Genre Selection:** Aspiring manga writers looking to break into the industry should consider focusing on genres like "**Action**," "**Drama**," "**Comedy**," and "**Romance**" due to their **high popularity** and average ratings. These genres have a **broader audience base** and the **potential to attract a dedicated readership**.
- **Leverage Emotional Storytelling:** Genres that focus on **personal growth, interpersonal relationships, and emotional journeys**, such as "Drama" and "Romance," are **well-received**. Writers should focus on creating **relatable** and **emotionally resonant characters** and stories.
- **Engage in World-Building:** Popular genres like "Action" often incorporate **elements of fantasy, magic, and supernatural themes**. Writers should **invest in world-building** and **creative storytelling** to transport readers to **captivating and imaginative worlds**.
- **Exploring Multiple Genres:** Don't be afraid to **experiment** with multiple genres or hybrid genres. Some of the most **innovative** and **exciting** manga emerge from **creative genre combinations**.





# Modelling



# What is required to execute the project?

2 different generative models required to solve the problem.

One for generating manga descriptions (ideation automation).

- This model has to generate **unique** descriptions that are different from the data it is trained on.

One model for generating a panel based on a description (storyboard automation).

Great! But how do we build these?

# Challenges



Building both generators was extremely challenging, lack of prior knowledge in the field.



Various models and approaches tried.



A tsunami of errors at each stage, extensive debugging required.



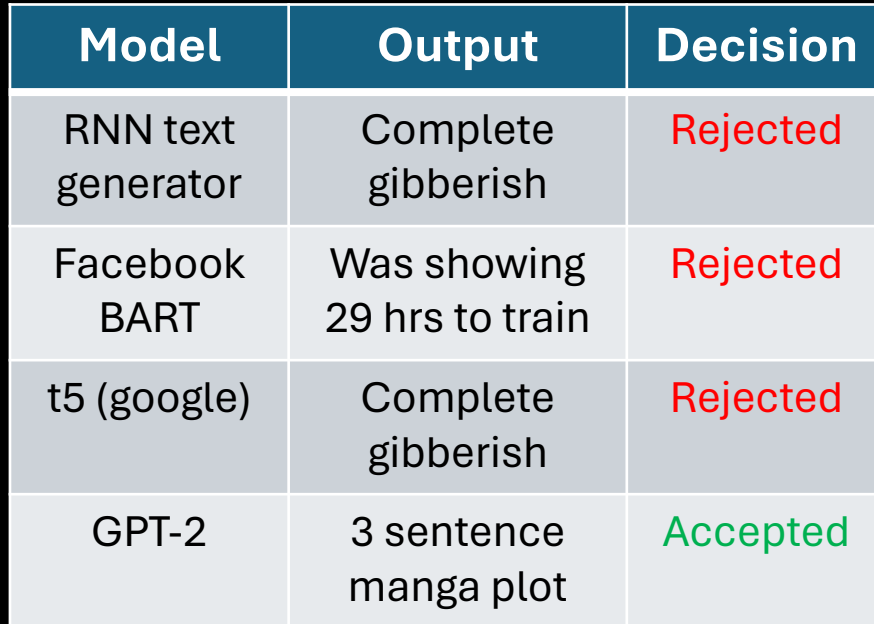
Every model took multiple hours to train, iterating through and evaluating different models was a slow process.




The 2-week timeline was very tight.



# Model Selection: Text Generator



Model	Output	Decision
RNN text generator	Complete gibberish	Rejected
Facebook BART	Was showing 29 hrs to train	Rejected
t5 (google)	Complete gibberish	Rejected
GPT-2	3 sentence manga plot	Accepted





# GPT-2: Overview



A powerful language model that can understand and generate human-quality text.



Versatile in generating text across multiple languages and styles.

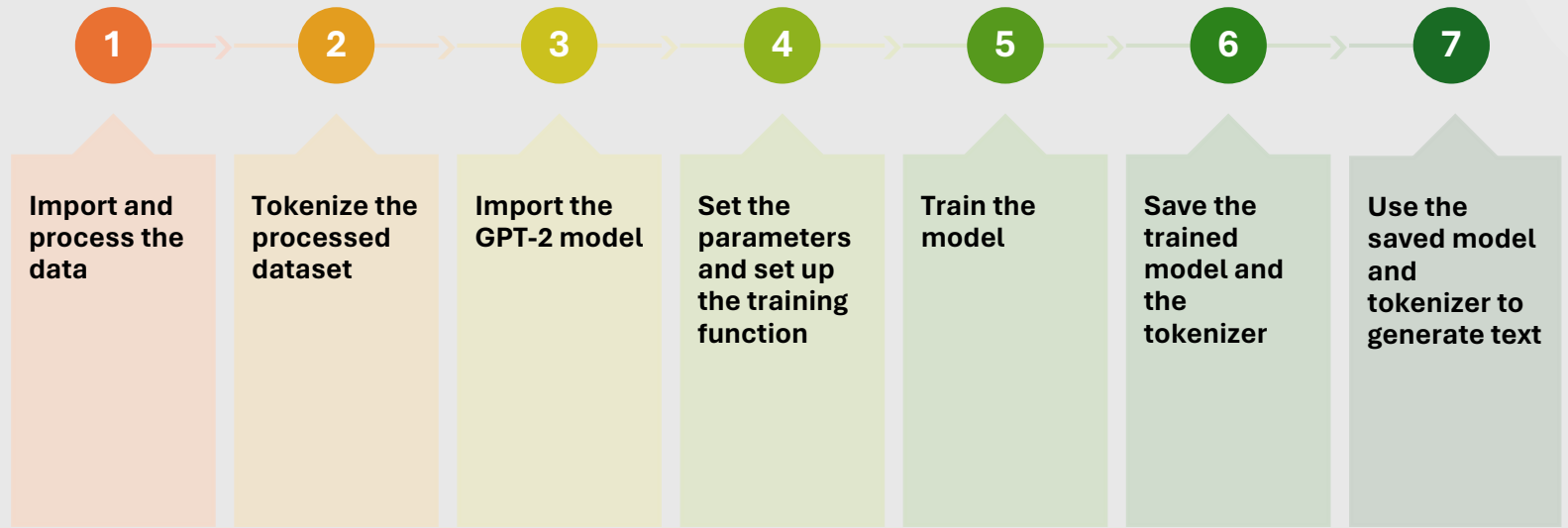


Gives coherent and readable outputs.



Can be trained on a supervised set of training data.

# Training Process



# Numerical Evaluation: Text Generator

Goal: To measure uniqueness of generated text.

No direct way to measure uniqueness, but a measure does exist that measures similarity of the generated text.

**BLEU (Blue) Score:** Ranges from 0-1. This value indicates how similar the candidate text is to the reference texts, with values closer to 1 representing more similar texts.

Thus, uniqueness = 1-BLEU Score

The BLEU Score for the model was measured at 0.17.

$$\text{Uniqueness} = 1 - 0.17 = 0.83$$

# Subjective evaluation: Text generator



- While there are numerical metrics to evaluate the generator, biggest factor is if the generated description makes sense.
- After analysing the generated description for each genre, we can evaluate the model as such:

Genre	Output
Action	Needs improvement
Comedy	Needs improvement
Drama	A coherent, 3-line description
Romance	A coherent, 3-line description



# Image Generator: A combo of Stable Diffusion and GPT 3.5 Turbo

## Stable Diffusion by Stability AI

- **Cutting-Edge AI Framework:** Stable Diffusion is an advanced AI framework for generating high-quality and stable samples from complex data distributions.
- **Versatile Applications:** It finds use across multiple industries, including computer vision, natural language processing, and healthcare, for tasks like image and text generation.
- **Realism and Reliability:** Stable Diffusion enhances AI model performance by addressing instability issues, resulting in more realistic and robust AI-generated content.

## GPT 3.5 Turbo

- **Cutting-Edge Language Model:** GPT-3.5 Turbo is a cutting-edge language model developed by OpenAI.
- **Versatile AI Tool:** It can be used for various language-related tasks, including text generation, translation, and summarization.
- **Natural Language Proficiency:** GPT-3.5 Turbo excels in understanding and generating human-like text, making it a valuable tool for content creation and applications.

# Numerical Evaluation: Image Generator

- **Structural Similarity Index (-1,1):** assesses the structural similarity between two images.
- **Peak Signal-to-Noise Ratio (decibels):** calculates the ratio of the peak signal (the highest possible pixel value) to the RMSE between the 2 images. Higher value is better.
- Both metrics do not need a reference dataset, can be used to compare 2 generated images.

	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5	Panel 6
SSIM	0.50	0.49	0.48	0.51	0.49	0.60
PSNR	10.36	10.22	9.75	10.82	10.20	10.44

## Interpretation:

- Overall, the SSIM and PSNR scores show that there is a diversity in the quality and structural similarity of the generated panels.
- . Some panels exhibit stronger structural similarity and higher image quality, while others have lower scores, indicating differences in visual patterns and image quality.

# Live Evaluation: Let's play a game!

- To evaluate the image generator, a game has been devised which requires **you** to take part!

Real or Generated?

Rules:

1. There are 8 manga images that will be shown in the upcoming slides. You have to decide if the image is from a real manga, or is it generated from the image generator.
2. **Kishan** is the captain of your team
3. You will have **20 seconds** per image.
4. The class must reach a consensus. **Kishan will have the final say**, and his answer will be final.
5. How you communicate is up to you. A simple way to do this is just a show of hands for real vs fake and Kishan can count the majority vote. **Each person has equal say, including Kishan.**
6. There may not be an even split of real and generated images (meaning that there might be more real ones, or vice versa), and the images are in a random order.
7. Finally, **if you recognize the manga/the character in the image, keep it to yourself.** There might be others who don't know the answer, so don't spoil their fun. Feel free to still vote though

**LET THE GAMES BEGIN!**

## Round 1: Real or Generated?



# Round 1: Answer

**The panel is REAL!**  
Manga: Jujutsu Kaisen





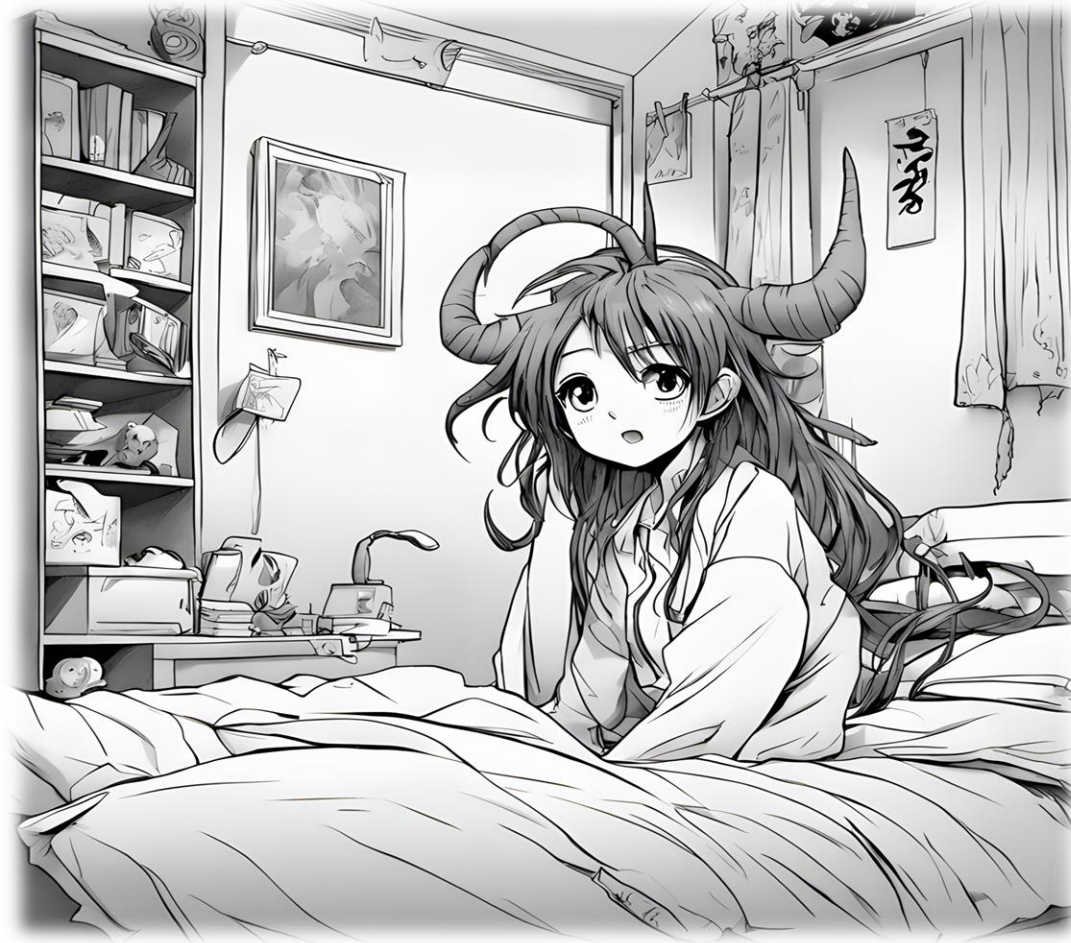
## Round 2: Real or Generated?



## Round 2: Answer

**The panel is GENERATED!!**

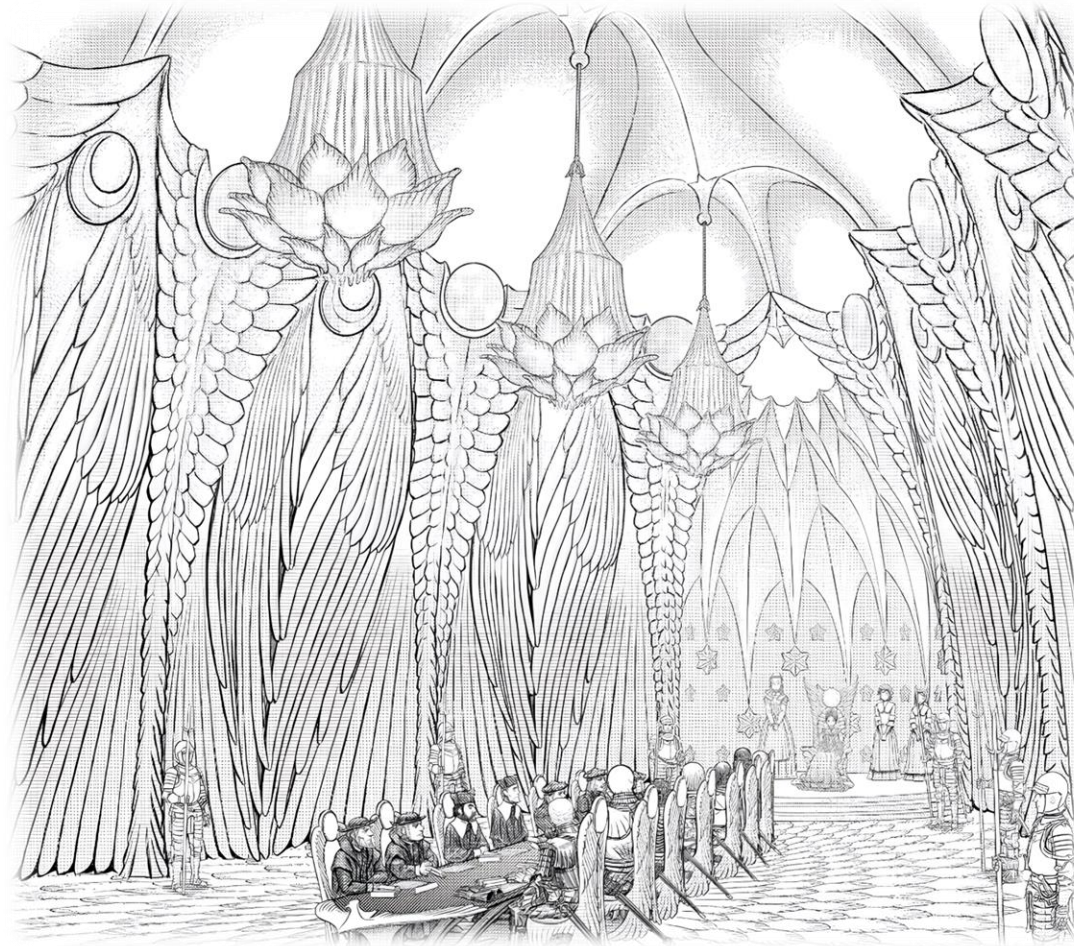
## Round 3: Real or Generated?



## Round 3: Answer

**The panel is GENERATED!!**

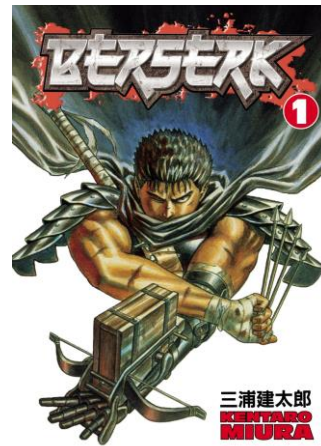
## Round 4: Real or Generated?





## Round 4: Answer

The panel is REAL!  
Manga: Berserk



## Round 5: Real or Generated?



## Round 5: Answer

**The panel is GENERATED!!**

## Round 6: Real or Generated?



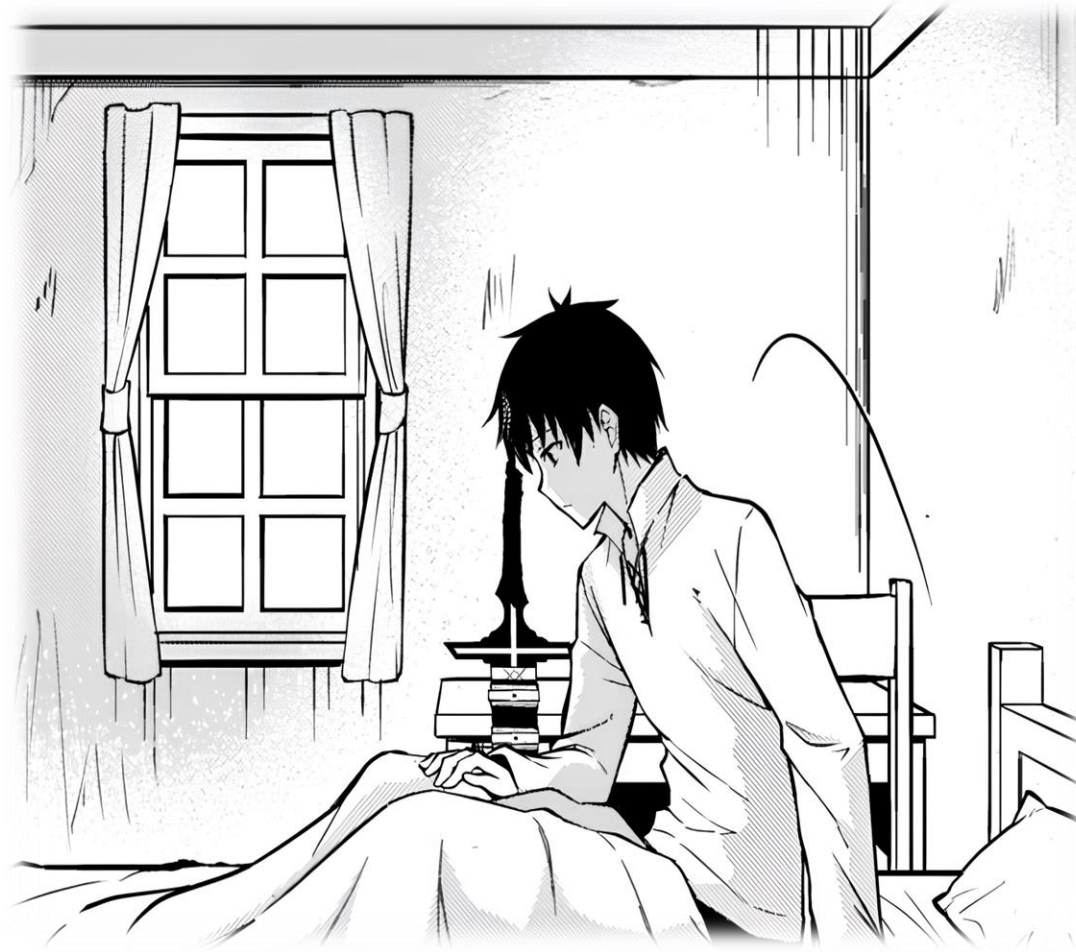
## Round 6: Answer

**The panel is REAL!**  
Manga: Machikado Mazoku



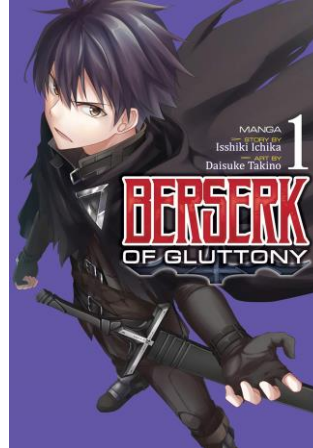


## Round 7: Real or Generated?



## Round 7: Answer

**The panel is REAL!**  
Manga: Berserk of Gluttony



## Round 8: Real or Generated?



## **Round 8: Answer**

**The panel is GENERATED!!**

# Demonstration







# Addressing the Problem

- Created a way to automated ideation and storyboarding using generative AI tools.
  - These tools can provide several benefits to manga writers:
    1. **Creativity Boost:** The tool sparks fresh ideas, inspiring manga writers and overcoming creative blocks.
    2. **Writer's Block Solution:** Breaks writer's block by providing a starting point for narrative vision.
    3. **Stress Reduction:** Relieves stress by handling ideation, reducing pressure on consistent idea generation.
    4. **Collaboration:** Aids collaboration between writers and artists, enabling writers to share generated concepts for visualization.
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# Future Work



Improve the text generation model, train it to generate multiple scenarios.



Work on training an image generator on a custom dataset, and not rely on a pre-trained model.