



# **AUTOMATIC GENERATION OF ILLUSTRATIONS FOR CHILDREN'S FAIRY TALES FROM TEXT: AI-POWERED APP BASED ON DALL-E 3**

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**Irina Kogai**, MSc Computer Science, is a software engineer, engineering manager, and researcher. Presently, Irina is at the forefront of technological innovation in mental health care. She is the driving force behind the development team at YouTalk, which is building an innovative platform designed to revolutionize how we approach mental health support.

# INTRODUCTION

The development of AI models like DALL-E 3 by OpenAI signifies a breakthrough in our ability to generate detailed, context-specific images from textual descriptions. This technology harbors the potential to revolutionize the way illustrations are produced for children's fairy tales, making it possible to automate the creation of artwork that resonates with the narratives and characters of these stories. The implications for storytelling, publishing, and educational content are profound, offering new avenues for engagement and creativity.

# RELATED WORKS

The domain of automatic generation of illustrations for children's fairy tales from text represent a fascinating intersection of:

- Natural Language Processing (NLP)
- computer vision
- creative AI technologies

# **METHOD: STORY CREATION**

The process involves GPT-4 to generate stories and DALL-E 3 to create corresponding illustrations. These technologies work together to create illustrated fairy tales from start to finish, including both textual content creation and visual representation.

To begin, the methodology prompts the user with questions such as the gender and name of the protagonist, the genre, and any additional details for the story. Using this information, GPT-4 generates the textual content of the fairy tale.

The model generates a story based on this prompt, ensuring originality and thematic relevance. The generated stories are structured to include clear narrative elements, making them suitable for children's literature.

# **METHOD: ILLUSTRATION CREATION**

Following the creation of the textual content, DALL-E 3 generates illustrations corresponding to specific parts of the fairy tales. DALL-E 3, a text-to-image generation model developed by OpenAI, can create detailed and contextually relevant images from textual descriptions. This capability is leveraged to translate selected excerpts of the generated fairy tales into visual illustrations.

# IMPLEMENTATION

The application architecture is divided into two main components: the frontend and the backend. The frontend serves as the user interface, allowing users to input initial prompts for the story generation and interaction with the generated content.

The core functionality of the application relies on the integration with OpenAI's GPT-4 and DALL-E 3 APIs. The process begins with the backend server receiving a prompt from the frontend, which it forwards to the GPT-4 API to generate the fairy tale text.

Then, GPT-4 API is called with a specific prompt to control the length, style, and thematic elements of the generated story, ensuring it aligns with the user's input and suits a children's fairy tale.

```
const COMPLETION = await openai.chat.completions.create({
  messages: [{ role: "system", content: NEWPROMPT }],
  model: "gpt-4-1106-preview",
  response_format: { type: "json_object" },
});
```

The App source code is published on GitHub: <https://github.com/Kogailrina/weave-tale>

# WELCOME SCREEN

Pick a genre of your fairytale

Adventure

Pick a gender of the main character

Boy

Enter the name of the main character

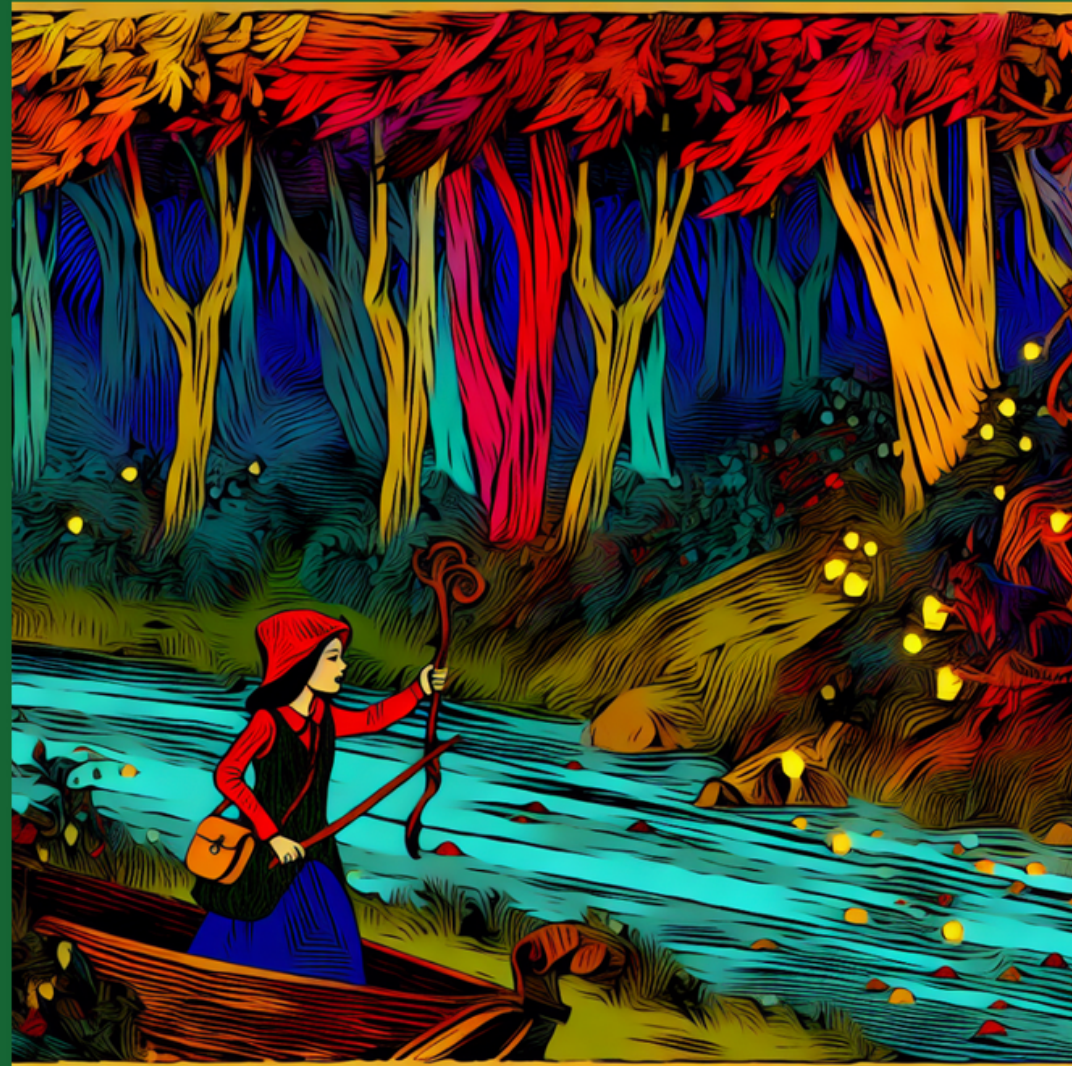
Enter additional details

Create



# STORY SCREEN

*In the forest, Sofia encountered a talking squirrel, who warned her of the perilous challenges ahead. The squirrel, with bright, intelligent eyes, offered to guide her to the central glade where the darkness was the strongest. Together, they traveled through the woods, overcoming tricky riddles and magical traps laid by the mischievous forest spirits. Sofia's wit and bravery grew with each challenge she faced. As they approached the heart of the forest, Sofia saw a light glimmering faintly ahead. She pushed forward, her heart racing with determination and hope to find the source of the menacing darkness.*



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# PERFORMANCE: MODEL COMPARISON

To evaluate the performance and relevance of the AI-generated illustrations to the specific excerpts of fairy tales, an extensive evaluation was conducted using Toloka.ai, a crowdsourcing platform known for its diverse pool of evaluators.

Involving 134 evaluators, the study covered 473 distinct evaluations, offering a broad perspective effectiveness of AI in producing contextually appropriate visuals. According to the collected data, 295 evaluations deemed the illustrations relevant, indicating a successful match between the the narrative content of the fairy tale excerpt. Conversely, 178 evaluations found the illustrations pointing to a discrepancy between the visual representation and the story segment.

ALL	IRRELEVANT	RELEVANT
473	178	295

# FUTURE PLANS

- to explore innovative methods that allow the selection of the text excerpts to create illustrations autonomously;
- to incorporate additional quality metrics into our evaluation process, including visual appeal and emotional resonance;
- to compare solutions such as Midjourney and DreamStudio for generating illustrated children's fairy tales.

# CONCLUSION

This paper presented an innovative approach to enriching children's fairy tales with AI-generated illustrations, leveraging the capabilities of GPT-4 for text generation and DALL-E 3 for visual content creation.

With a relevance rate of **62.3%** between illustrations and their corresponding fairy tale excerpts, these findings illuminate the capability of AI in generating visually engaging and contextually fitting illustrations for literary compositions.

However, this evaluation also spotlighted areas necessitating enhancement, particularly the need to improve the AI's interpretation of complex narrative nuances aimed at diminishing the occurrence of irrelevant illustrations.



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