LLMS BEHIND THE SCENES: ENABLING NARRATIVE SCENE ILLUSTRATION

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OVERVIEW

- Transforming a story from one modality to another can enhance its appeal
- New text-to-image models suggest the potential to automatically generate visual illustrations for text-based stories
- But what is the best approach for doing this? The story text itself might not be an optimal prompt for a text-to-image model

NARRATIVE SCENE ILLUSTRATION

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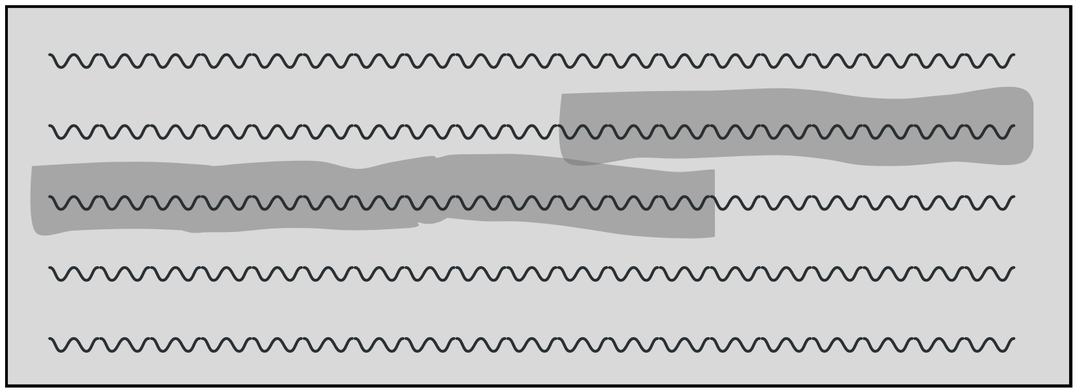
FRAGMENT: a unit of story text that aligns to a scene



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SCENE ILLUSTRATION: an image depicting a fragment

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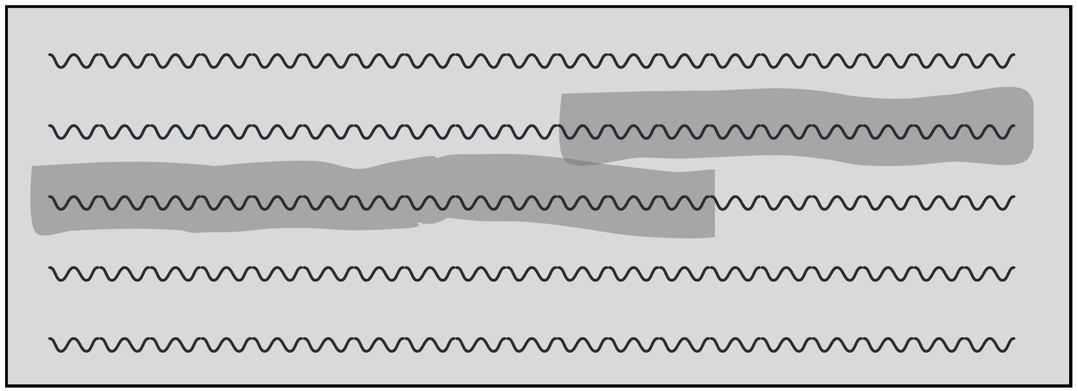

NARRATIVE SCENE ILLUSTRATION

FRAGMENT

Alice was getting married in a few weeks. One night, her mother called and she forgot to call her back. Her mother left an angry message on her phone. She threatened not to come to the wedding. Alice called her mother and apologized profusely.

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IMAGE GENERATOR:
a text-to-image model

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LLM: scene captioner

LLM PROMPT

"Imagine an AI system will be used to generate illustrations for story fragments. This AI illustrator generates a single image given a caption describing what is contained in the image. Your task is to read a story fragment along with its story context and write a caption ..."

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LLMs can articulate visual scene knowledge implicitly evoked by story text.

This capability is impactful for facilitating the scene illustration task.

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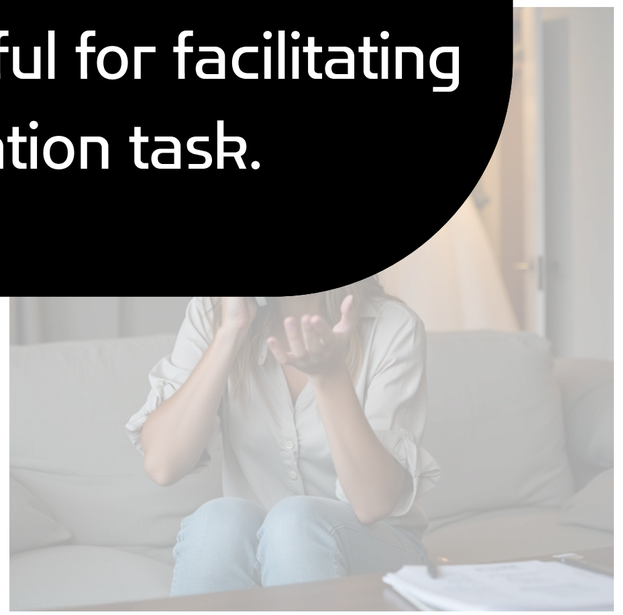
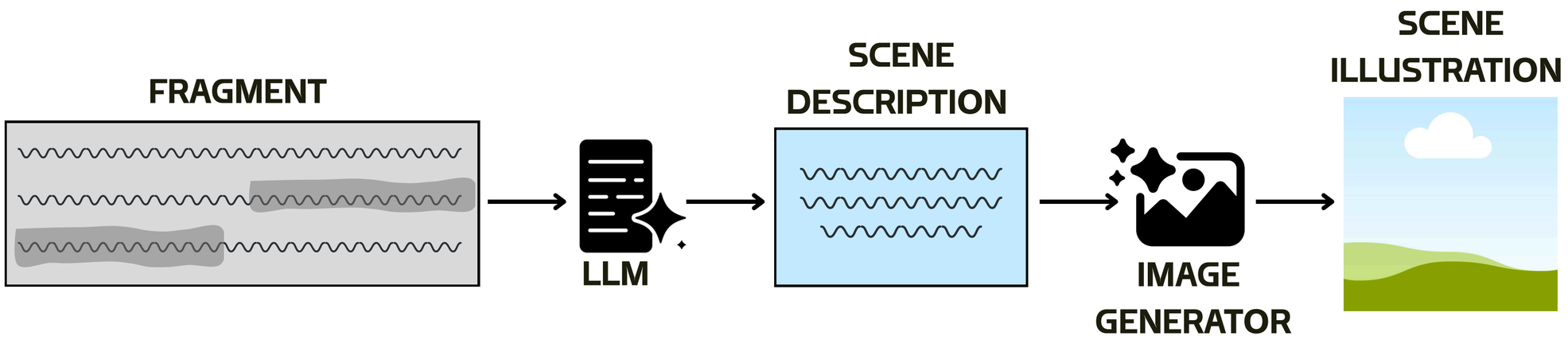


SCENE ILLUSTRATION PIPELINE



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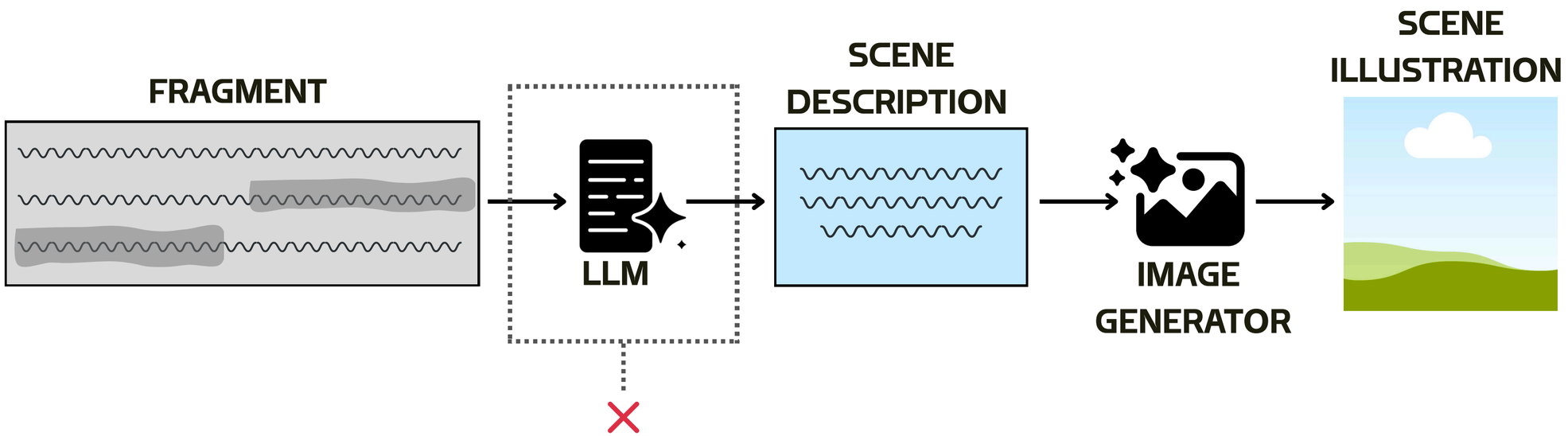

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  - Ablate the LLM scene captioner

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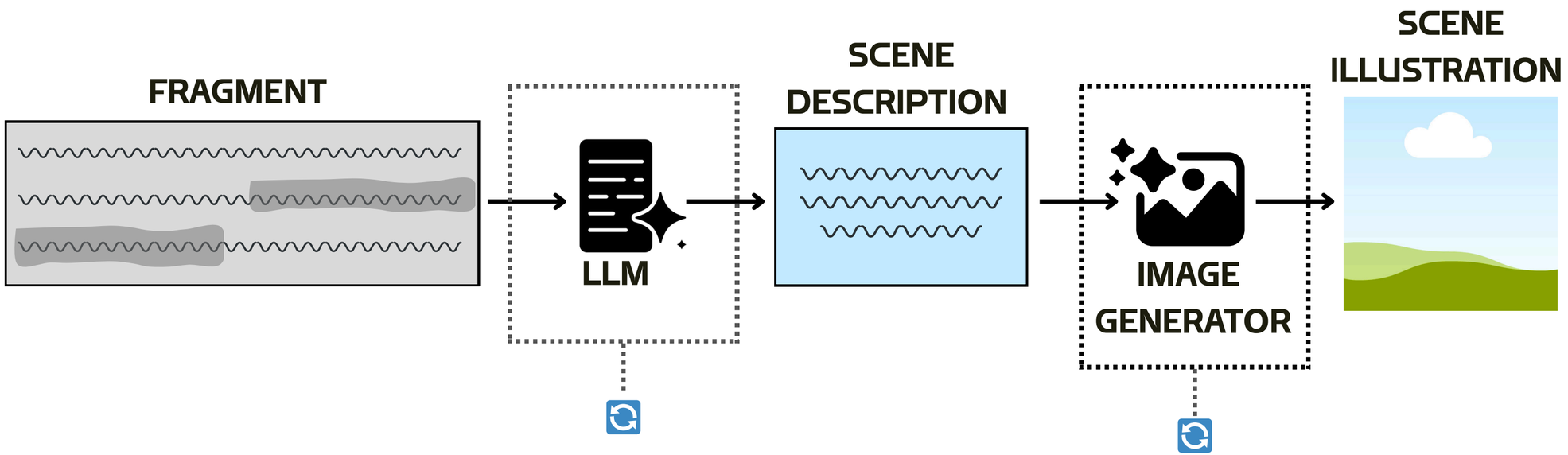

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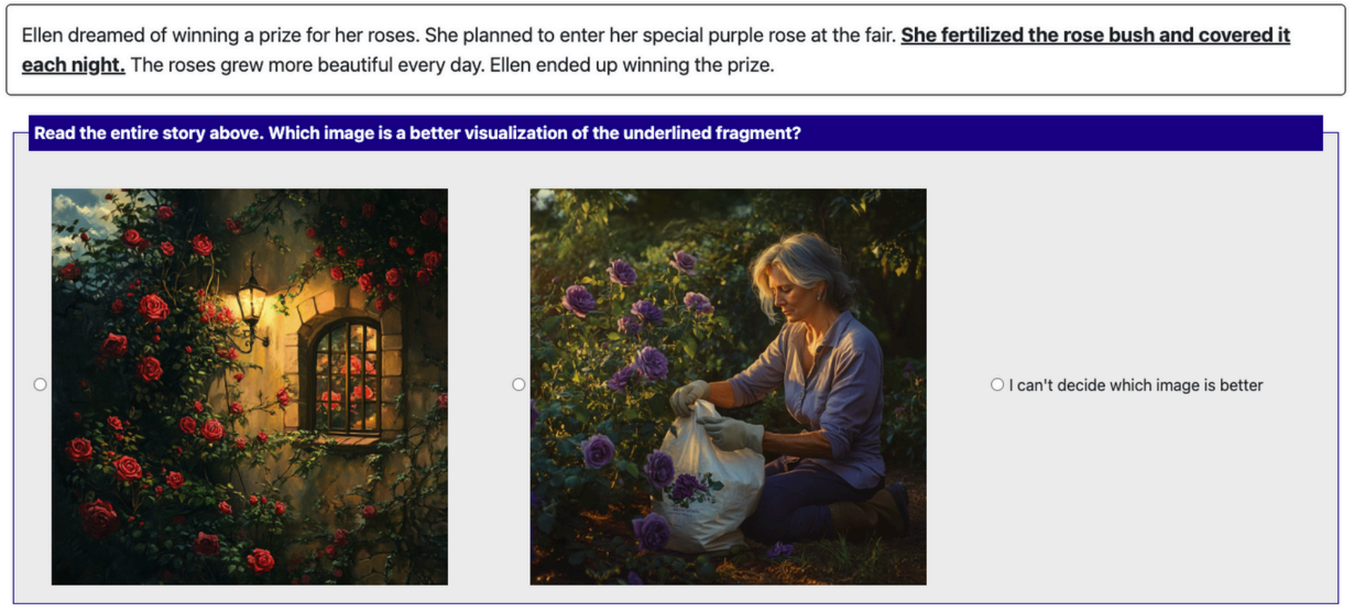
- When doing so, we systematically vary components of the pipeline:
  - Ablate the LLM scene captioner
  - Alternate which particular models are used for the LLM scene captioner and image generator

SCENE ILLUSTRATIONS DATASET

- ~3000 items, where each item consists of:
  - A fragment (with story context)
  - 2 illustrations depicting the fragment
    - which vary based on their scene description and/or the image generator
  - Annotator judgments of which of the 2 illustrations is better (from 2 annotators)



COMPARING SCENE DESCRIPTIONS

FRAGMENT (within story context)

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- Compared baselines against:
  - **CAPTION**: LLM-generated scene description → "A young woman with a worried expression sits on a couch, holding a phone to her ear. She's gesticulating with her free hand, appearing to speak emphatically. In the background, a wedding dress can be seen hanging on a closet door. The room is dimly lit, suggesting it's evening, and there's a notepad with wedding plans visible on a nearby coffee table."

LLM-GENERATED SCENE DESCRIPTIONS YIELD BETTER ILLUSTRATIONS

- Among dataset items where one illustration used CAPTION* and the other used a baseline scene description, annotators selected the CAPTION illustration as better a significant majority of the time

Scene Description Pair	Win Rate for CAPTION (%)
CAPTION vs. NO-CONTEXT	78.1
CAPTION vs. VERBOSE-CONTEXT	74.7
CAPTION vs. SUCCINCT-CONTEXT	72.5

*using claude-3.5-sonnet as the LLM to generate CAPTION

LLM-GENERATED SCENE CRITERIA

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LLM-GENERATED CRITERIA	ILLUSTRATION 1 	ILLUSTRATION 2 
The image shows a female figure (Alice).	✓	✓
Alice is holding a phone to her ear.	✓	✗
There are no other people visible near Alice.	✓	✗
Alice’s facial expression conveys regret or apology.	?	?
	= 3.5	= 1.5

LLM-GENERATED SCENE CRITERIA PREDICT ILLUSTRATION QUALITY

- Task is to predict which illustration is better, among dataset items where annotators agreed in their selection
- Prediction accuracy is higher when using LLM-generated criteria to judge illustration quality, compared to equivalent approach that doesn't use criteria

LLM Criteria Writer	Accuracy w/ Criteria (%)	Baseline Accuracy w/o Criteria (%)
CLAUDE-3.5	71.7	60.6
GPT-4O	70.1	60.2
LLAMA-3.1	68.4	59.7

*using claude-3.5-sonnet as the criteria rater VLM

SUMMARY

- LLMs can articulate visual scenes implicitly evoked by story text
- This makes them an effective interface between story text and text-to-image models in generating scene illustrations
- We release the SceneIllustrations dataset to support future work on cross-modal narrative transformation

huggingface.co/datasets/roemmele/SceneIllustrations