UNC | COLLEGE OF ARTS AND SCIENCES Computer Science

NAACL 2024

Returning to the Start

Generating Narratives with Related Endpoints

https://arxiv.org/pdf/2404.00829

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Automatic Narrative Generation

Narratives play a critical role in natural language

- Informative of the everyday world
- Informative across cultures
- Applicable across domains

Narrative generation is challenging

- Writing narratives is difficult for human writers
- Difficult to achieve properties of “good writing”
    - Overall coherency, satisfiability, narrative closure

Bookending

Our work focuses on 1 principle of narratology:

Focus on *story closure* via bookending by relating the last sentence back to the first sentence.

→ Improves ending satisfiability, and coherence

Terms:

Start	First sentence of the narrative
Stop	Last sentence of the narrative
Endpoints	First/last sentences pair

Julian ascended the staircase. She went to the library and switched on the light. There was a multitude of books strewn across the floor. She looked through them. She could not find the one she was looking for. Finally she found it. Triumphant, Julian descended the staircase with her book.

What Is a Story with Related Endpoints?

Vivienne wanted to move from France to America. She decided to take a job in New York City. Vivienne worked very hard at her new job. After a few months, she got a call from her boss. Her boss told her that she was fired.

☹️

Not related
Few semantic similarities
Introduces new questions at end

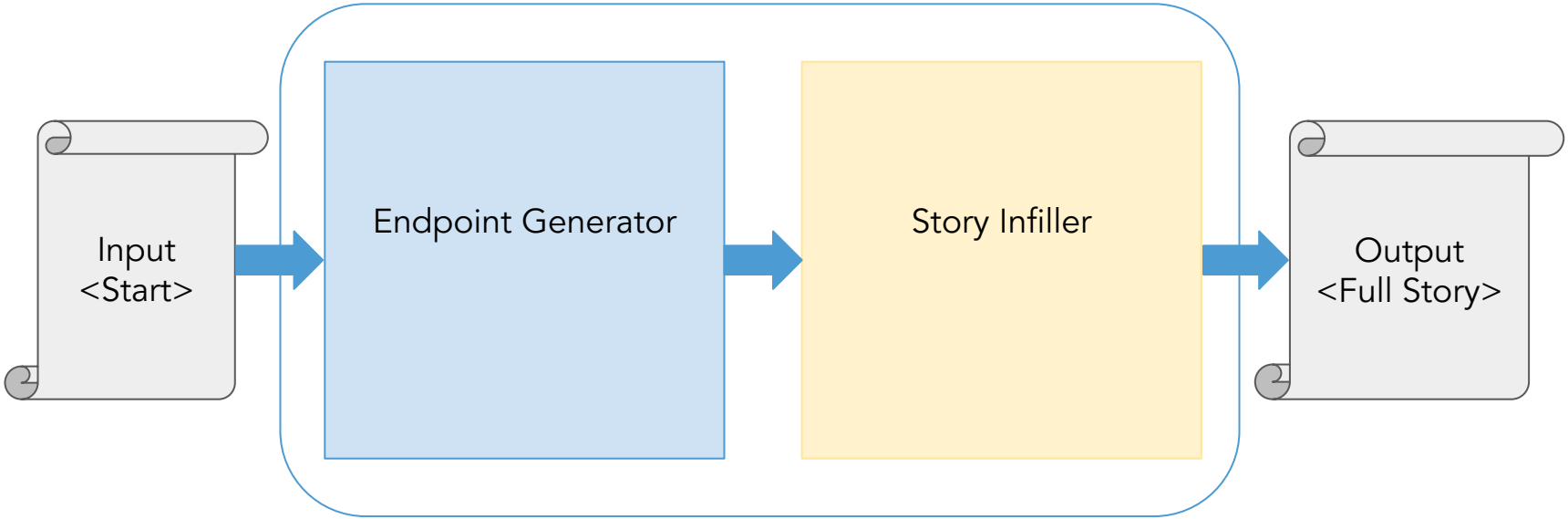
Vivienne wanted to move from France to America. She decided to apply for a job. She applied for a job in New York City. She was hired. Vivienne was happy to have moved to the USA.

😊

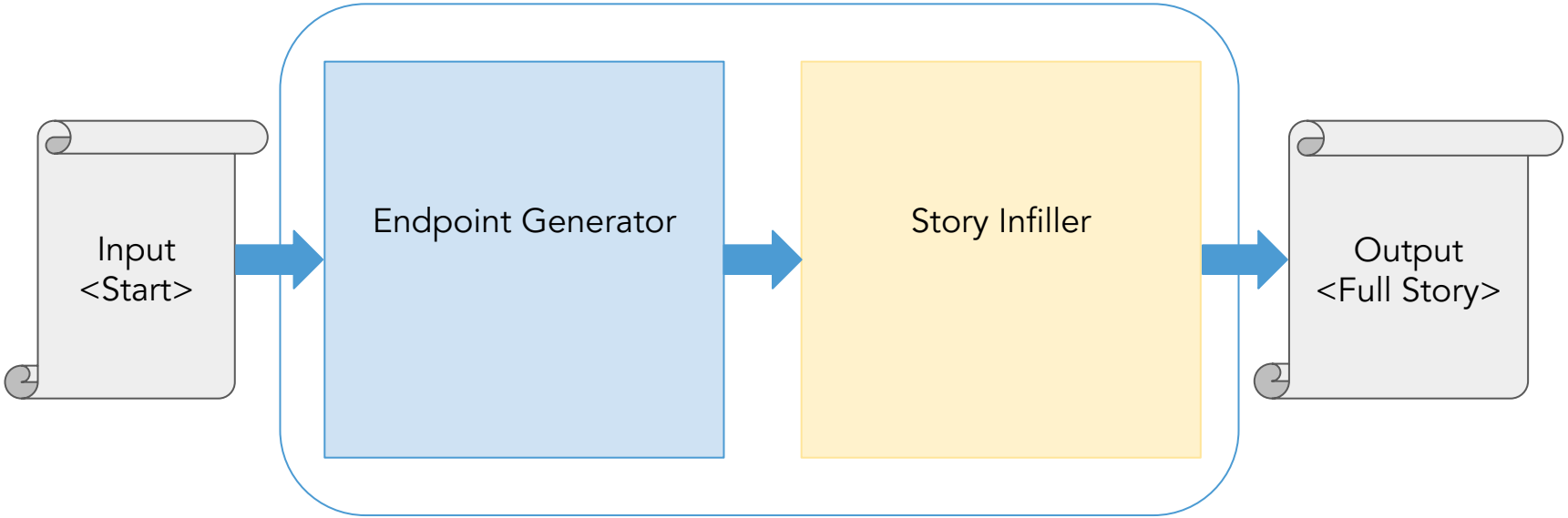
Related
Ending completes themes introduced in start

Story closure ✓
Ending satisfiability ✓
Coherence ✓

RENarGen

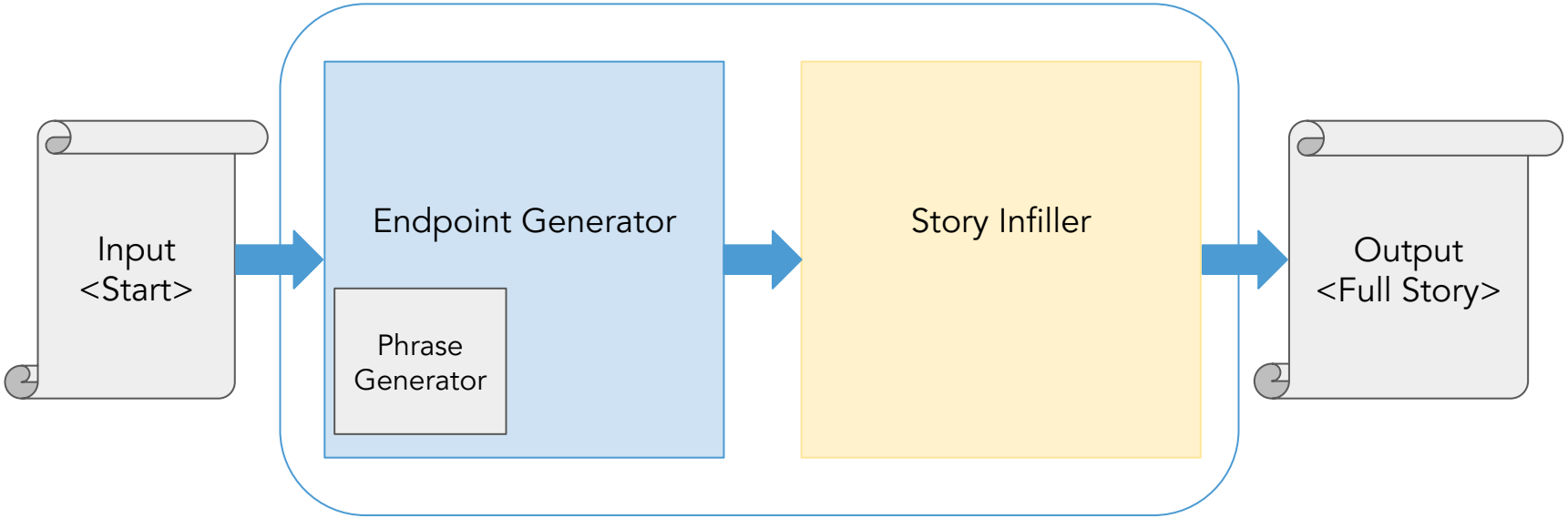

Input
<Start>
Endpoint Generator
Story Infiller
Output
<Full Story>

RENarGen for LMs



Sarah had been dreaming of visiting Europe for years.

RENarGen for LMs



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[Sarah, visited, Europe]

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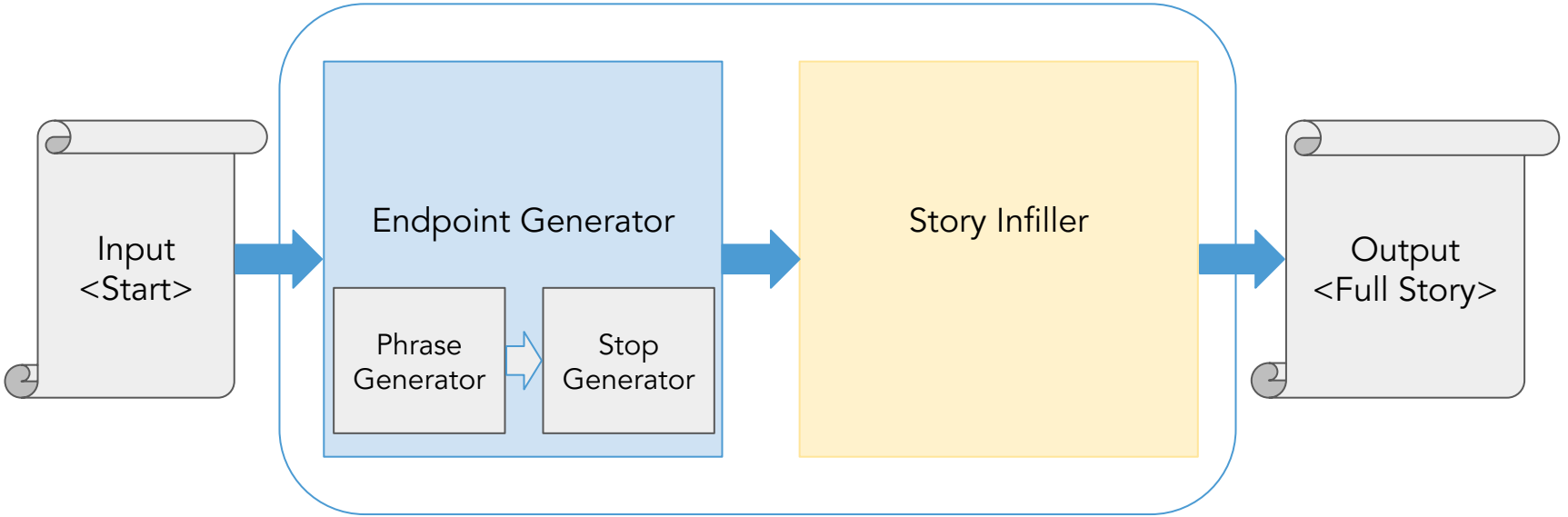

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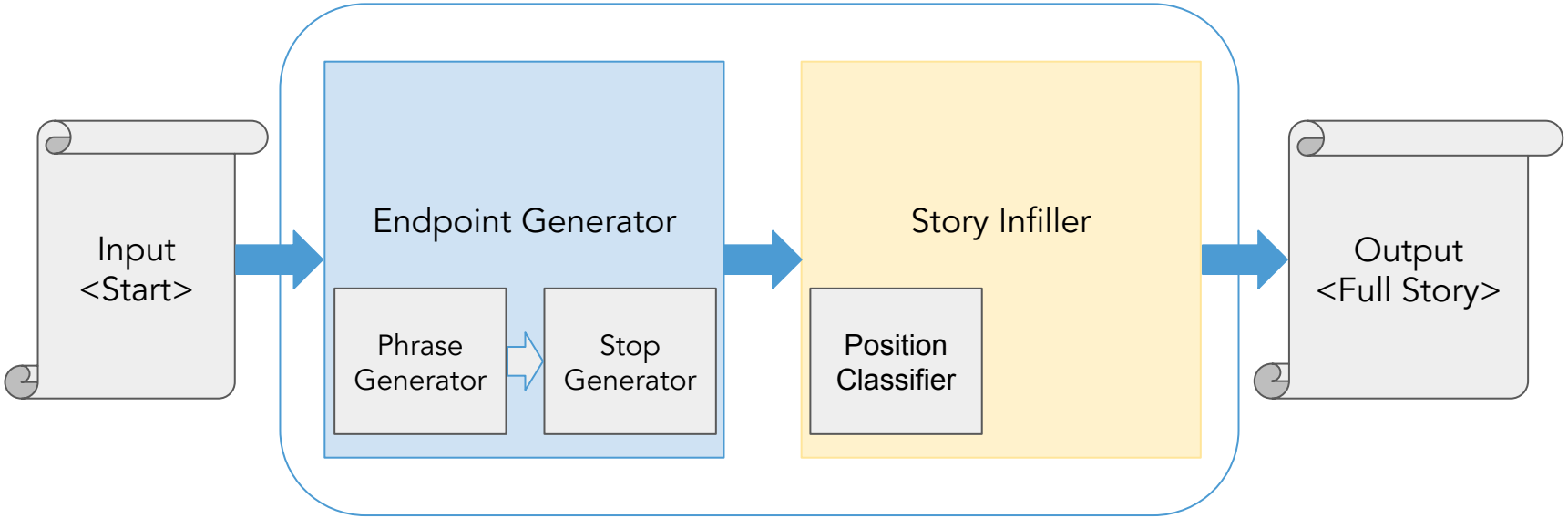

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index=1

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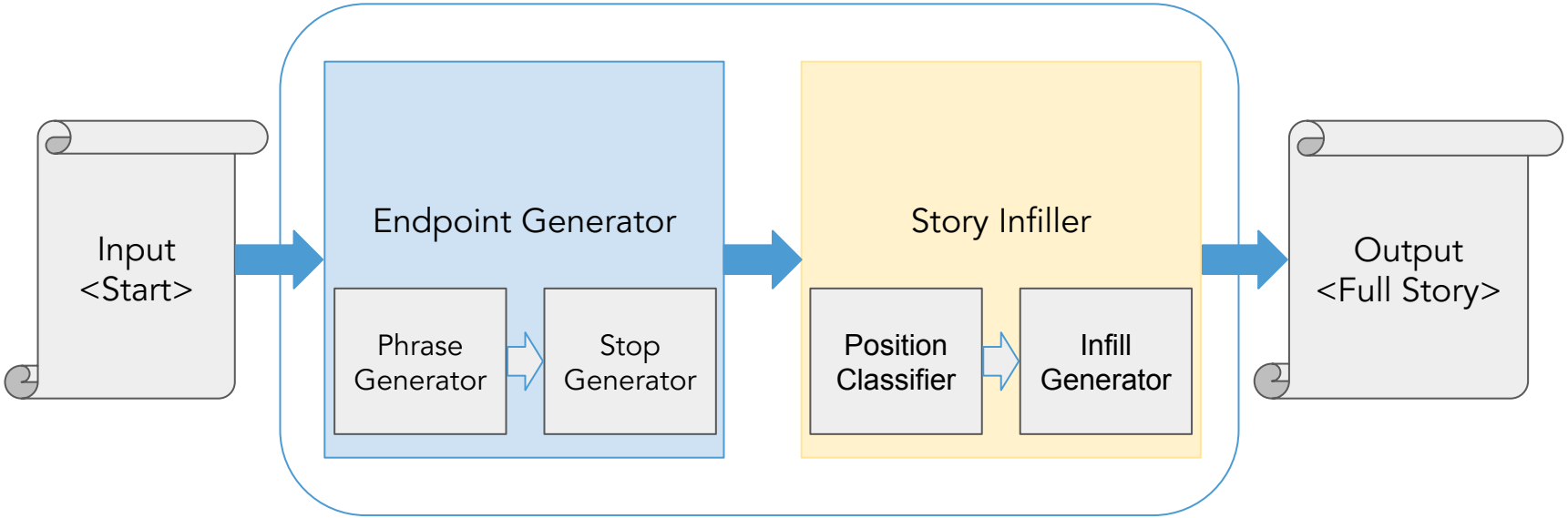

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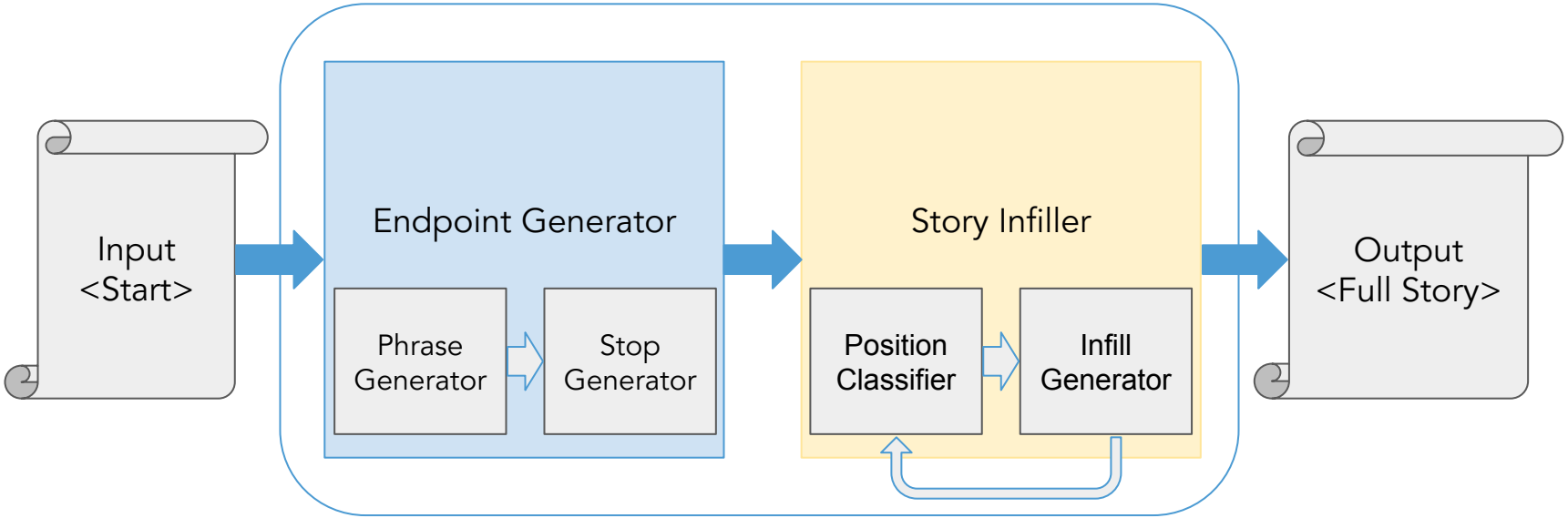
Finally, Sarah decided to go to France.

RENarGen for LMs



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Finally, Sarah decided to go to France.

LM Story Infiller

Iteration 0

Sarah had been dreaming of visiting Europe for years.

Sarah was happy that she finally visited Europe.

LM Story Infiller

Iteration 0

Sarah had been dreaming of visiting Europe for years.

Sarah was happy that she finally visited Europe.

LM Story Infiller

Iteration 1

Sarah had been dreaming of visiting Europe for years.

<Finally Sarah decided to go to France.>

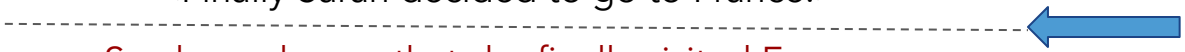
Sarah was happy that she finally visited Europe.

LM Story Infiller

Iteration 1

Sarah had been dreaming of visiting Europe for years.

<Finally Sarah decided to go to France.>



Sarah was happy that she finally visited Europe.

LM Story Infiller

Iteration 2

Sarah had been dreaming of visiting Europe for years.

Finally Sarah decided to go to France.

<Sarah loved the sights and sounds of Paris.>

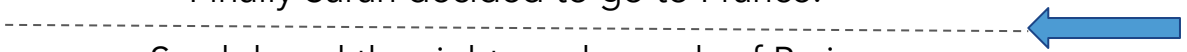
Sarah was happy that she finally visited Europe.

LM Story Infiller

Iteration 2

Sarah had been dreaming of visiting Europe for years.

Finally Sarah decided to go to France.



<Sarah loved the sights and sounds of Paris.>

Sarah was happy that she finally visited Europe.

LM Story Infiller

Iteration 3

Sarah had been dreaming of visiting Europe for years.

Finally Sarah decided to go to France.

<Sarah took a train to Paris.>

Sarah loved the sights and sounds of Paris.

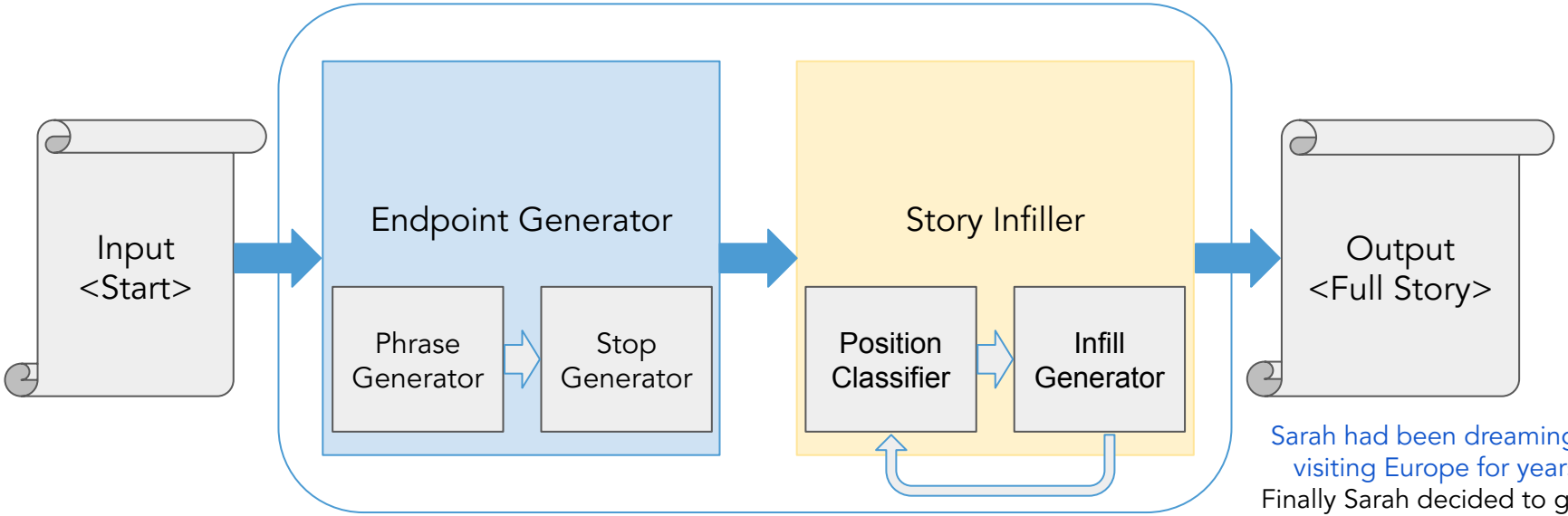
Sarah was happy that she finally visited Europe.

LM Story Infiller Overview

Infilling Strategy

- Infill does not depend on specific location
- Considers both left & right contexts
- Considers all sentences in context
- Capable of producing *n*-sentence stories

RENarGen for LMs



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Finally, Sarah decided to go to France.

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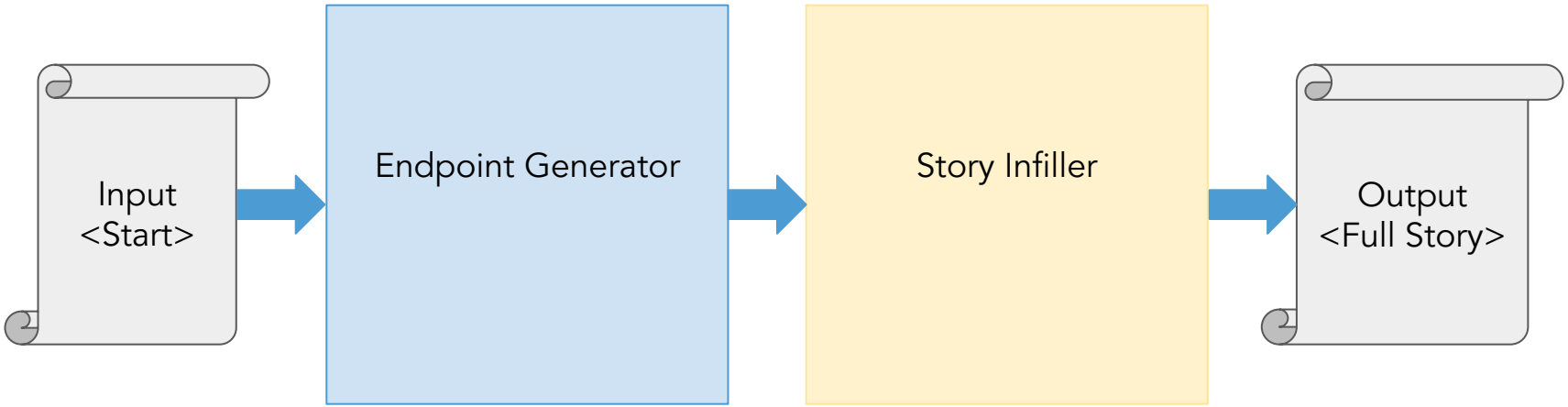
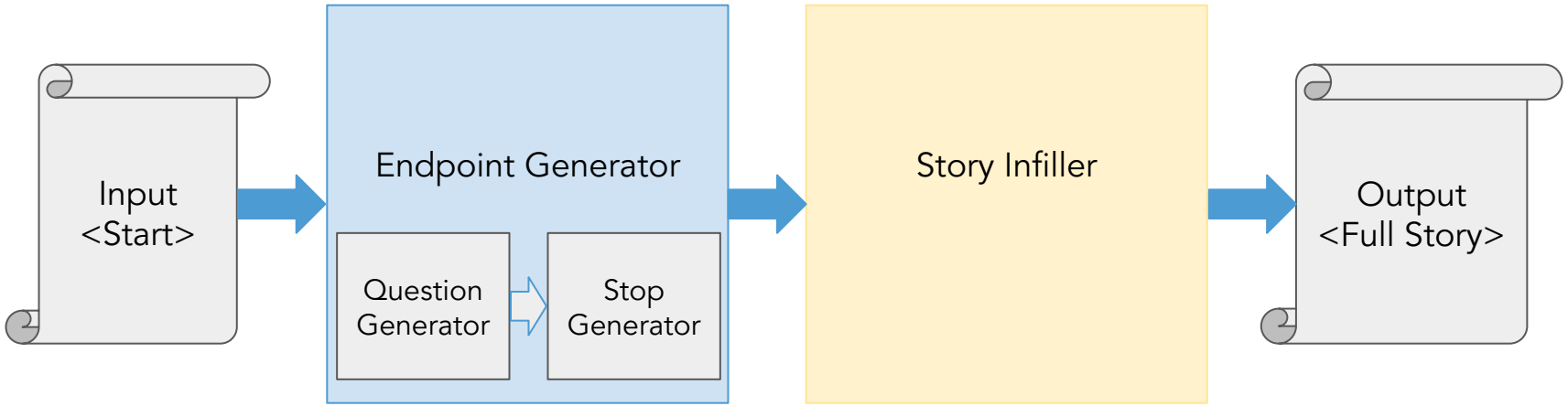
RENarGen for LLMs



6 Methods for Endpoint Generator

1. Use phrase list *p*
   - "...What are the most salient words or phrases?... Using this first sentence and the list of salient words/phrases give one related closing sentence."
2. Use pre-trained knowledge of "related"
   - "...Give me a closing sentence which is related to the first sentence."
3. "Erotetic" definition
   - "...What is the most salient question to propel the narrative forward?... Give me ONE closing sentence that answers the most salient question without introducing new questions."
4. "Matching ending" definition
   - "...Give me a closing sentence that has the same character and/or related action and/or location."
5. Entailment 1
   - "...Give me a closing sentence that entails the first sentence."
6. Entailment 2
   - "...Give me a closing sentence that is the entailment of the first sentence."

RENarGen for LLMs



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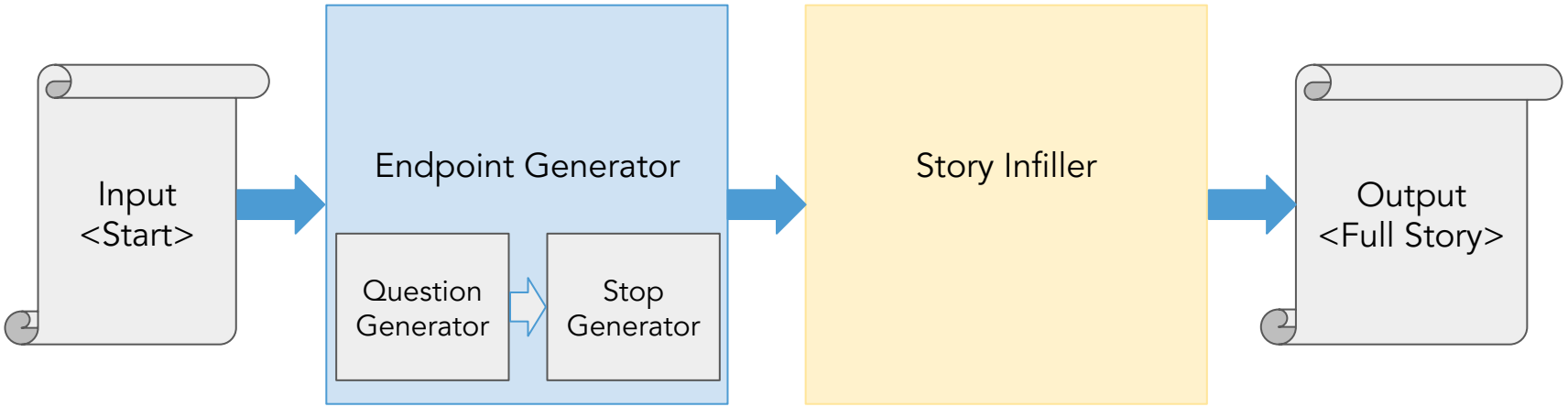

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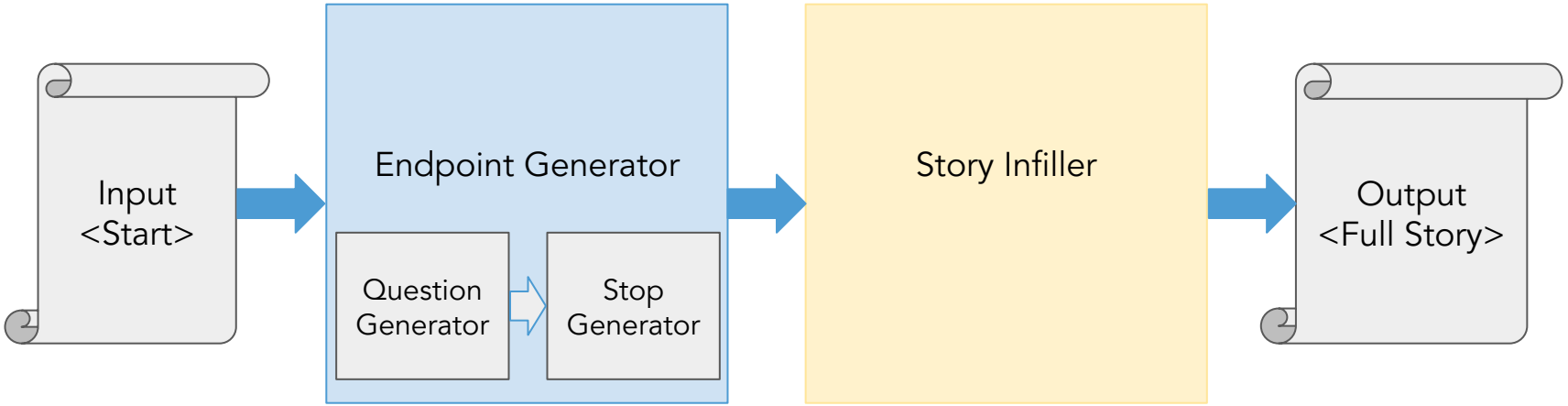
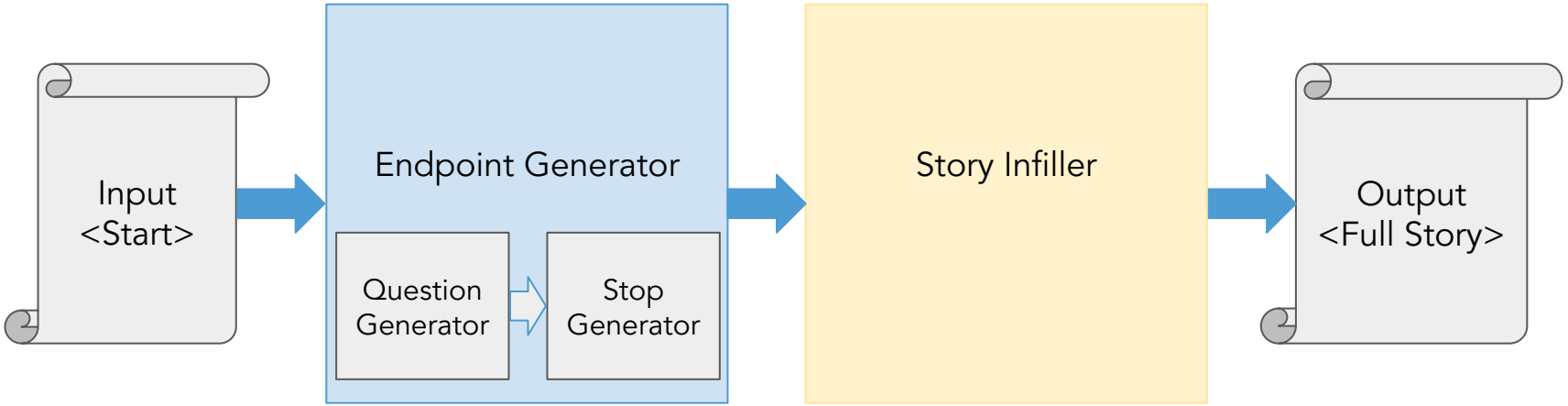


Sarah had been dreaming of visiting Europe for years.

How was Sarah able to visit Europe after dreaming about it for years?

After saving up for three years and finally paying off her student loans, Sarah booked a one-way ticket to Paris.

RENarGen for LLMs



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How was Sarah able to visit Europe after dreaming about it for years?

After saving up for three years and finally paying off her student loans, Sarah booked a one-way ticket to Paris.

1. She had tried to make it…
2. So she created a strict budget…
3. As the months ticked by…

Example Output

Sarah had been dreaming of visiting Europe for years. She had tried to make it happen sooner, but her college debt and entry-level salary had kept her dream perpetually out of reach. So she created a strict budget, cutting back on unnecessary expenses and pouring every spare penny into a dedicated "Europe fund". As the months ticked by, Sarah's savings grew, and with them, her determination to make her dream a reality. After saving up for three years and finally paying off her student loans, Sarah booked a one-way ticket to Paris.

Story closure ✓
Ending satisfiability ✓
Coherence ✓

Experiments

Dataset:	ROCStories Corpus
RENarGen-LM:	GPT-2 (generation), BERT (position classifier)
RENarGen-LLM:	Llama-2-7b, Llama-2-70b

Human Evaluation

Are properties of "good writing" strengthened?

		Relatedness	Closure	Coherency	Preference
GPT-2	RENarGen-LM	**0.63**	**0.47**	**0.62**	**0.66**
	Baseline	0.20	0.18	0.21	0.21
	Tie	0.17	0.35	0.17	0.13
Llama-7b	RENarGen-LLM	**0.58**	**0.56**	**0.55**	**0.56**
	Baseline	0.39	0.43	0.41	0.43
	Tie	0.03	0.01	0.04	0.01
Llama-70b	RENarGen-LLM	**0.80**	**0.56**	**0.56**	**0.56**
	Baseline	0.20	0.44	0.44	0.44
	Tie	0.0	0.0	0.0	0.0

Higher value is better

Conclusions

- 1st study how related endpoints and bookending affect narrative generation
  - Early outlook on “good writing practice”
- RENarGen paradigm
  - Adaptable to LMs & LLMs
  - Produces narratives with related endpoints
  - Novel infilling strategy
- Automatic/human evaluations show improved narrative closure, ending satisfiability, coherence