



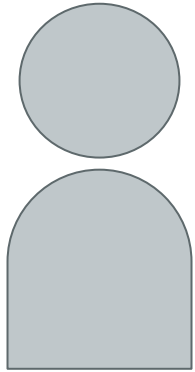
Creative Writing with a Machine in the Loop

*Case Studies on
Stories and Slogans*

Elizabeth Clark • Anne Spencer Ross • Chenhao Tan • Yangfeng Ji • Noah A. Smith

Collaborative writing

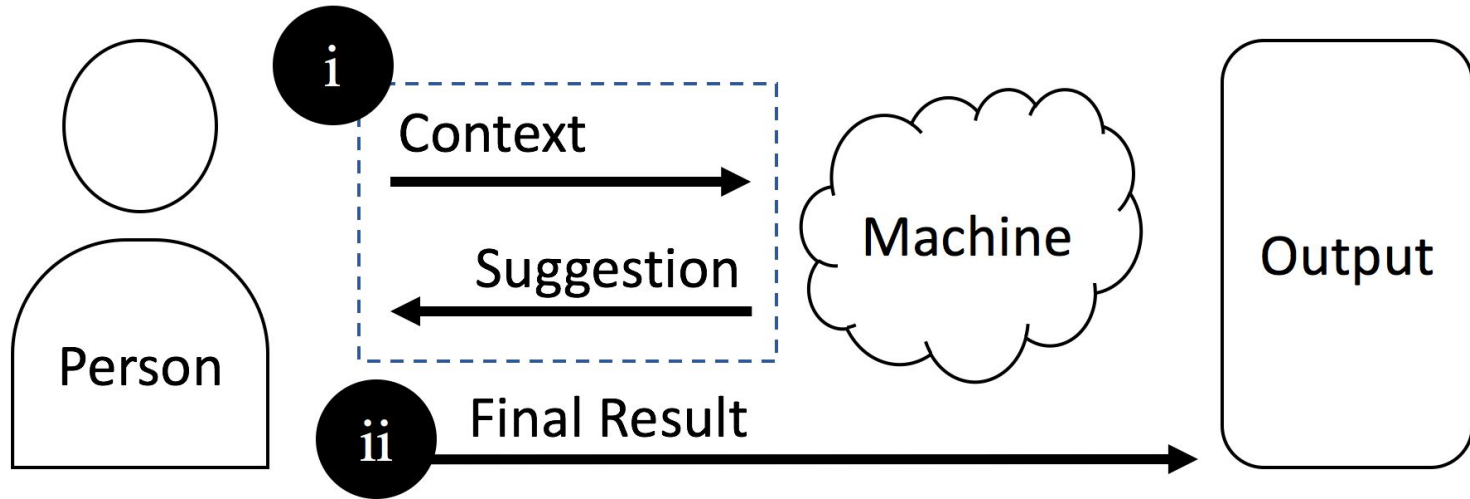
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Collaborative writing

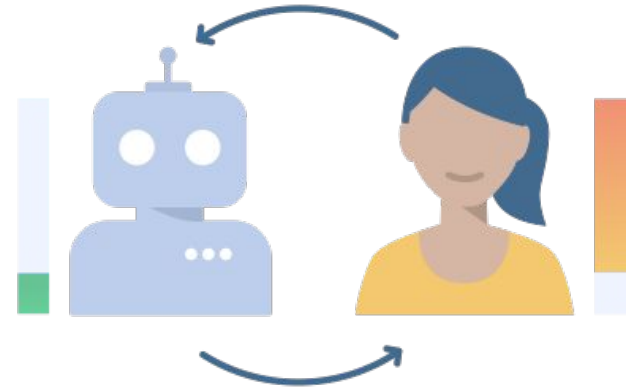


Writing with a machine in the loop



Research contributions

- Explored 2 possible machine-in-the loop creative writing systems
- Found most participants enjoyed writing with the systems and would use them again
- Identified areas to improve machine-in-the-loop systems (particularly in the suggestions)



What is a *machine-in-the-loop*
creative writing system?

Machine-in-the-loop characteristics

Interaction characteristics

Initiation

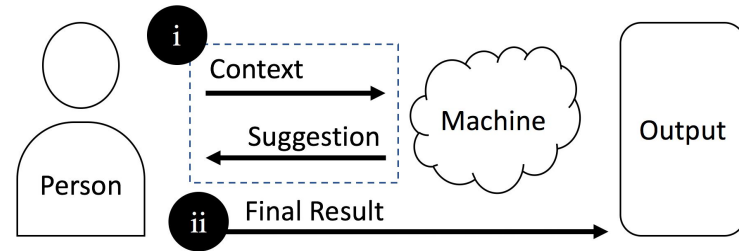
How to initiate the context-suggestion loop?

Intrusiveness

How intrusive are the suggestions?

Structure

How often do you repeat the loop before submitting the result?



Story writing with a machine in the loop

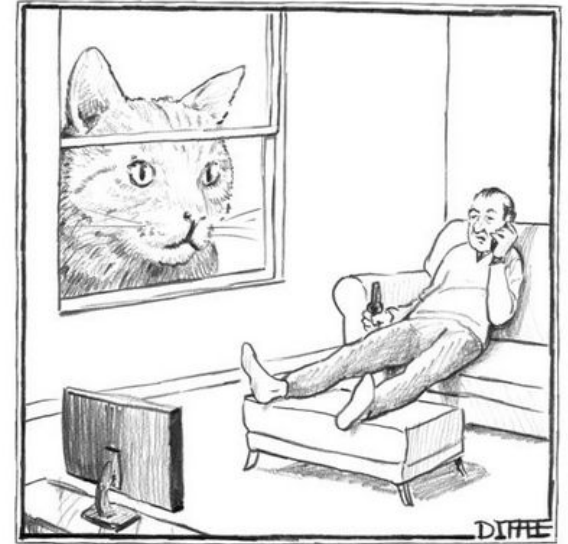
Add a sentence to the story:

Add Line to Story

Characters: 0

Click here to submit the finished story and answer evaluation questions:

Submit Story



Diffee, Matthew. *The New Yorker*. 11 Aug 2014.

Story writing with a machine in the loop

Add a sentence to the story:

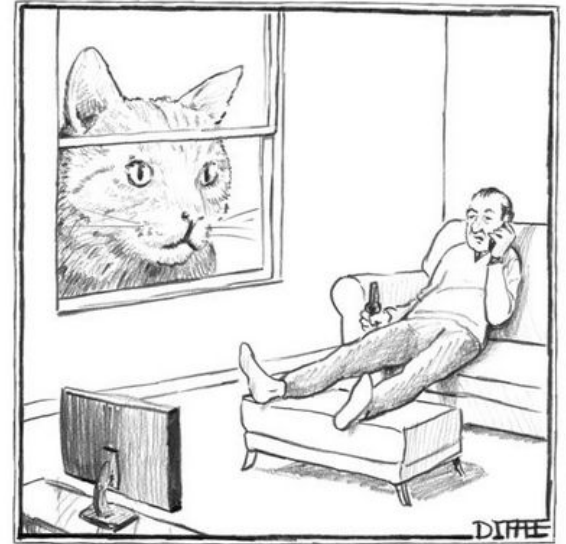
Phil woke up on the couch with a huge hangover.

Add Line to Story

Characters: 47

Click here to submit the finished story and answer evaluation questions:

Submit Story



Diffee, Matthew. *The New Yorker*. 11 Aug 2014.

Story writing with a machine in the loop

The prompt will appear below.
You can edit it as much as you like before adding it to the story.

Phil woke up on the couch with a huge hangover.

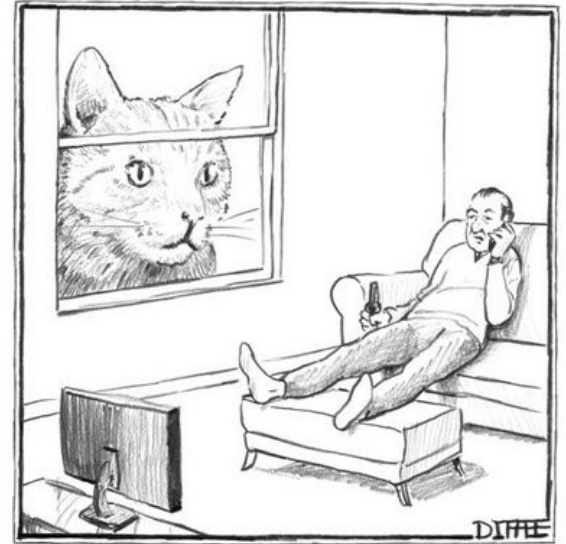
Now he looked at Anne.

Add Line to Story

Characters: 22

Click here to submit the finished story and answer evaluation questions: [Submit Story](#)

Initiation: Push



Diffee, Matthew. *The New Yorker*. 11 Aug 2014.

Story writing with a machine in the loop

The prompt will appear below.
You can edit it as much as you like before adding it to the story.

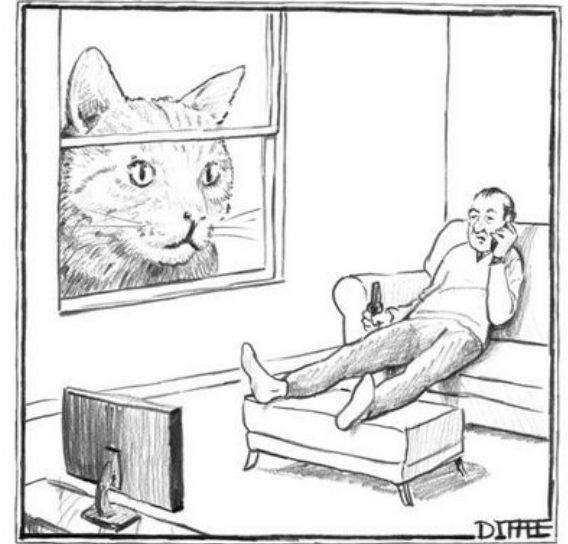
Phil woke up on the couch with a huge hangover.

He looked out the window at Anne, the neighbor's cat.

Add Line to Story

Characters: 53

Click here to submit the finished story and answer evaluation questions: [Submit Story](#)



Diffee, Matthew. *The New Yorker*. 11 Aug 2014.

Initiation: Push Intrusiveness: High

Story writing with a machine in the loop

Add a sentence to the story:

Phil woke up on the couch with a huge hangover.

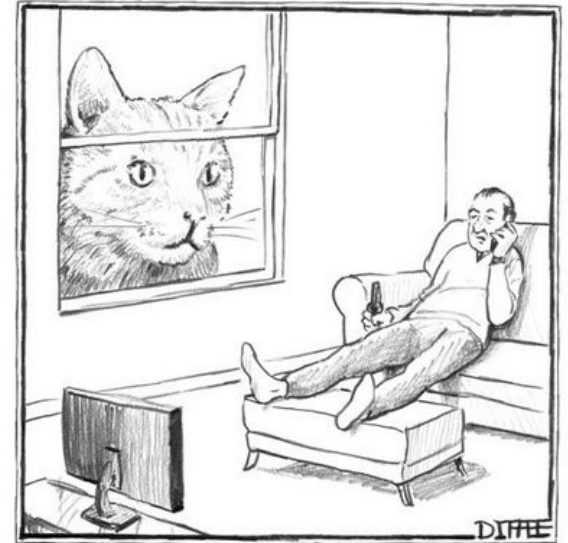
He looked out the window at Anne, the neighbor's cat.

Add Line to Story

Characters: 0

Click here to submit the finished story and answer evaluation questions:

Submit Story



Diffee, Matthew. *The New Yorker*. 11 Aug 2014.

Initiation: Push

Intrusiveness: High

Structure: Additive

Slogan writing with a machine in the loop

TReMoLoop Home Sign in Sign up

Write a few keywords to tell us what your slogan is for (e.g., fight terrorism, tremoloop, etc.):

Revise your text (you can always resubmit to get more suggestions):

[Submit to get machine suggestions](#)

Initiation: Pull
Intrusiveness: Low
Structure: Iterative

Machine suggestions:

- tremoloop is the text of the time.
[copy machine suggestion to text editor](#)
- tremoloop brings up a truly great text.
[copy machine suggestion to text editor](#)
- tremoloop is not a revision of life.
[copy machine suggestion to text editor](#)

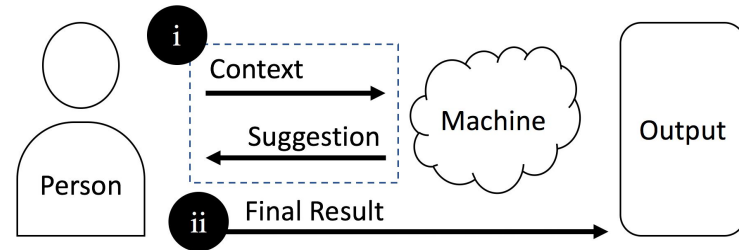
History (machine suggestions are in blue):

- tremoloop is not a revision of life.
- tremoloop brings up a truly great text.
- tremoloop is the text of the time.
- text revision with machines in the loop

[Clear history and restart](#)

Machine-in-the-loop characteristics

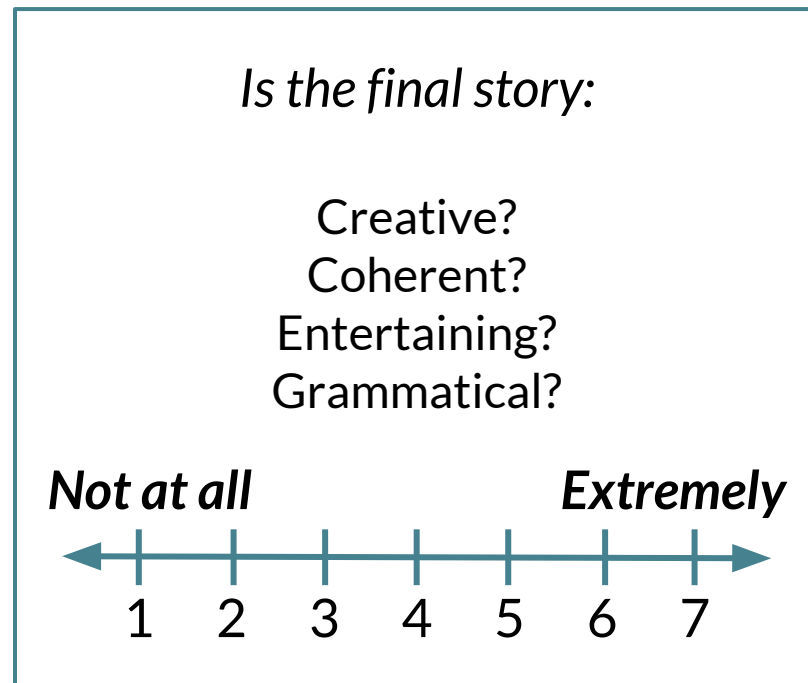
	Story Writing	Slogan Writing
Initiation	push	pull
Intrusiveness	high	low
Structure	additive	iterative



User study: writing with a machine in the loop

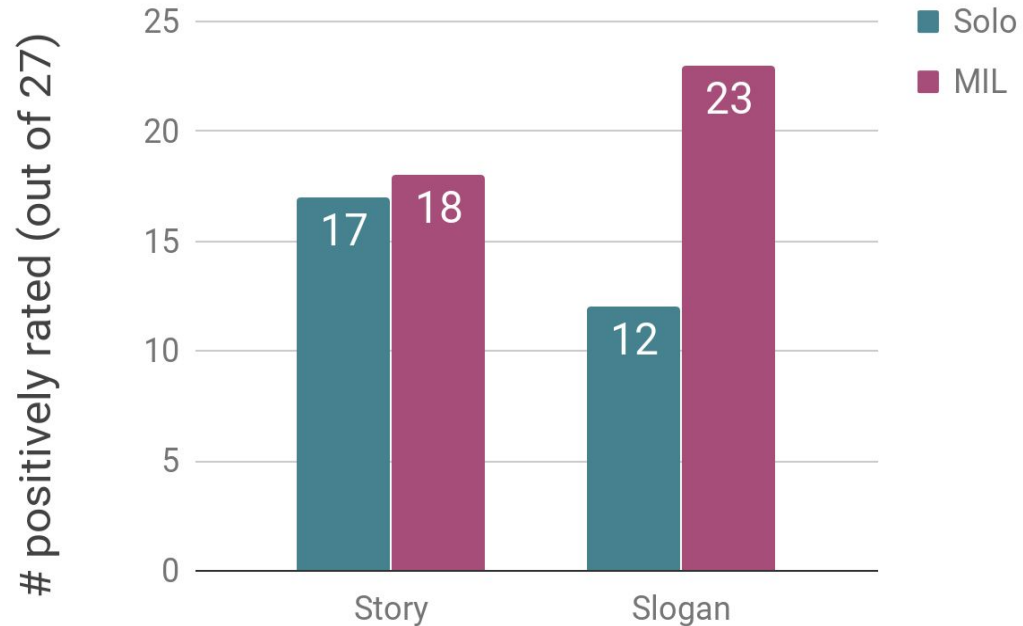
Experiment setup

- ❖ 1 hour session
 - Perform 3 tasks + evaluation surveys
 - Final survey
 - Open-ended interview
- ❖ 3rd party evaluations with Amazon Mechanical Turk



Participant satisfaction

Are you satisfied with your final story/slogan?



Participant satisfaction

<i>Would you use this system again?</i>	Stories	Slogans
I'd use it exactly as it is now.	2	0
I'd use it if the suggestions were better.	4	5
I'd use it if the writing set-up changed.	0	1
I wouldn't use it.	3	3

How can we improve
collaborative writing systems?

Importance of characters

Jim slouched in the corner, feeling sorry for the patient in front of him.



"This is ridiculous," said Duke.

"Yesterday I felt fine, and now you're telling me I'm at death's door?!"

"We'll take care of Furble tomorrow," the doctor said.

"You've named my tumor?!" Duke shrieked.

"Yeah," replied the doctor coolly, "we've found that anthropomorphizing tumors helps people in your position come to terms with their condition more easily."

...

Lance yells over the speakers "no sudden hammering"

"Anyway, we feel that Furble will most likely be gone within a month," the doctor said.

Character-aware generation

"I would also recommend **incorporating proper nouns introduced by the writer into the suggestions**. I had three people, but then the suggestion brings in another name I never accounted for and it threw the whole thing off."

→ Use character information to improve generation

Importance of keywords



www.thegreenhead.com/2009/08/copco-bag-caps.php

- ❖ "Relax. Refresh. Enjoy."
- ❖ "Feed, snap, snack"
- ❖ "Snack it, save it, Cap it"
- ❖ "Open, eat, seal, repeat!"

Generate different types of suggestions

"[It] might be helpful in the creative process to suggest additional keywords too, like **synonyms of words already typed. Words that rhyme** might also be helpful in coming up with something creative and catchy!"

→ Suggestion variety: keywords, rhyme, synonyms

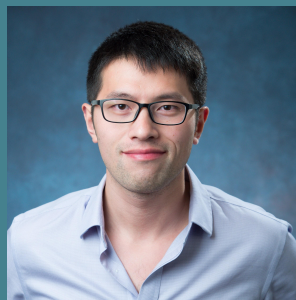
Conclusion

- ❖ Machine-in-the-loop framework for creative writing systems
- ❖ User study investigating story and slogan writing with a machine in the loop
- ❖ Future modeling directions: add characters, suggestion variety

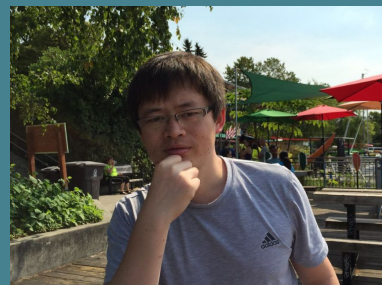
Thank you!



Anne Spencer Ross



Chenhao Tan



Yangfeng Ji



Noah A. Smith