Convince Me If You Can: Argument Generation with Content Planning and Style Specification

Lu Wang
Assistant Professor
Khoury College of Computer Sciences
Northeastern University

Website: http://www.ccs.neu.edu/home/luwang/

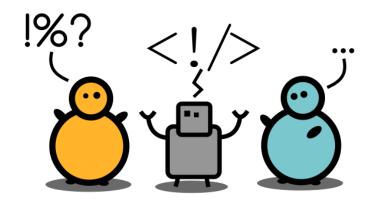
Outline

Why study arguments?

Prior work on argument mining and generation

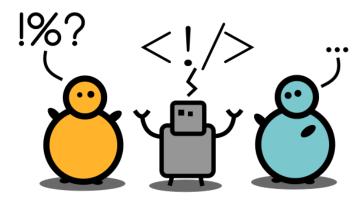
Argument generation with content selection and style control

 Argument: a reason or set of reasons given with the aim of persuading others that an action or an idea is right or wrong



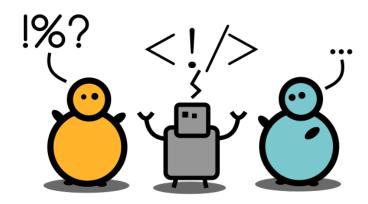
- Argument: a reason or set of reasons given with the aim of persuading others that an action or an idea is right or wrong
 - From online discussion forum:

More gun control laws would reduce gun deaths. There were 572,537 total gun deaths between 1999 and 2016: 336,579 suicides (58.8% of total gun deaths); 213,175 homicides (37.2%); and 11,428 unintentional deaths (2.0%). A study in the New England Journal of Medicine found that firearms were the second leading cause of deaths for children, responsible for 15% of child deaths compared to 20% in motor vehicle crashes.



 Argument: a reason or set of reasons given with the aim of persuading others that an action or an idea is right or wrong

- Arguments vs. Opinions
 - Related concepts
 - An opinion does not have to be supportable
 - An argument is an assertion that is supported with concrete, real-world evidence



- Argument: a reason or set of reasons given with the aim of persuading others that an action or an idea is right or wrong
- Why do we study arguments?
 - Problem-solving and decision-making
 - Which disease treatment to follow?
 - Which product to purchase?
 - Or should I watch that new movie?

- Argument: a reason or set of reasons given with the aim of persuading others that an action or an idea is right or wrong
- Why do we study arguments?
 - Problem-solving and decision-making
 - Which disease treatment to follow?
 - Which product to purchase?
 - Or should I watch that new movie?
 - Arguments are everywhere
 - Reviews
 - Patents
 - Supreme court arguments
 - Debates
 - Deliberation



Argumentation

• The process where arguments are constructed, exchanged and evaluated in light of their interactions with other arguments.

- An desired ability for machine intelligence.
 - Synthesize information and evidence from massive amount of data
 - Perform reasoning and argumentation

Applications of Argumentation Study

- A refined search engine
- Understand and classify certain types of misinformation (e.g. with unsupported claims)
- Debate coaching
- For education: essay writing, critical thinking, ...

Research Goal

How can we teach a machine to argue like a human?

Outline

Why study arguments?

Prior work on argument mining and generation

Argument generation with content selection and style control

Existing Work

- Argument understanding
 - a new research area: Argument Mining
 - Argument components: what types of information is used in an argument?
 (Stab and Gurevych, 2014)
 - Argument structure: how is the information organized? (Park and Cardie, 2014; Niculae et al, 2017)
- Argument generation
 - Retrieval-based argument generation (Sato et al., 2015; Reisert et al., 2015; Yanase et al., 2015)
 - IBM Project Debater: real-time debate with human

Our Project: Counter-argument Generation

- Input: a statement of belief on some controversial topic
- Output: a counterargument refuting the statement

Our Project: Counter-argument Generation

- Input: Death penalty is more rational than life in prison.
- Output: In theory I agree with you. But in reality we will never have a perfect justice system. Unreliable evidence is used when there is no witnesses, which could result in wrongful convictions. In the US, there had been 156 death row inmates who were exonerated since 1973. If we execute them, we can never undo it.





- ♠ Posted by u/CherrySlurpee 16Δ 6 years ago =
- ¹⁹ I think the United States should cut off foreign aid completely. CMV

2011 saw 49.5B in spending on foreign aid. Why aren't US tax dollars being spent to help US citizens in need instead of foreign citizens in need? 2007 saw over 70B in private companies/individuals foreign aid, which I am completely on board with.

Why is the US government taking money from citizens and spending it on (mostly) Africa when the US has its own problems? Let the private investors help those outside of the borders.

[U1] Because if the US government did, then really bad shit would happen, in short.

[U2] Foreign aid allows for allies in places that are economically advantageous. ...

Δ

Input Statement





- Posted by u/CherrySlurpee 16Δ 6 years ago
- ¹⁹ I think the United States should cut off foreign aid completely. CMV

2011 saw 49.5B in spending on foreign aid. Why aren't US tax dollars being spent to help US citizens in need instead of foreign citizens in need? 2007 saw over 70B in private companies/individuals foreign aid, which I am completely on board with.

Why is the US government taking money from citizens and spending it on (mostly) Africa when the US has its own problems? Let the private investors help those outside of the borders.

[U1] Because if the US government did, then really bad shit would happen, in short.

[U2] Foreign aid allows for allies in places that are economically advantageous. ...

Δ





- Posted by u/CherrySlurpee 16Δ 6 years ago
- ¹⁹ I think the United States should cut off foreign aid completely. CMV

2011 saw 49.5B in spending on foreign aid. Why aren't US tax dollars being spent to help US citizens in need instead of foreign citizens in need? 2007 saw over 70B in private companies/individuals foreign aid, which I am completely on board with.

Why is the US government taking money from citizens and spending it on (mostly) Africa when the US has its own problems? Let the private investors help those outside of the borders.

[U1] Because if the US government did, then really bad shit would happen, in short.

[U2] Foreign aid allows for allies in places that are economically advantageous. ...

Target Argument

Δ





- Posted by u/CherrySlurpee 16Δ 6 years ago
- ¹⁹ I think the United States should cut off foreign aid completely. CMV

2011 saw 49.5B in spending on foreign aid. Why aren't US tax dollars being spent to help US citizens in need instead of foreign citizens in need? 2007 saw over 70B in private companies/individuals foreign aid, which I am completely on board with.

Why is the US government taking money from citizens and spending it on (mostly) Africa when the US has its own problems? Let the private investors help those outside of the borders.

[U1] Because if the US government did, then really bad shit would happen, in short.

[U2] Foreign aid allows for allies in places that are economically advantageous. ...

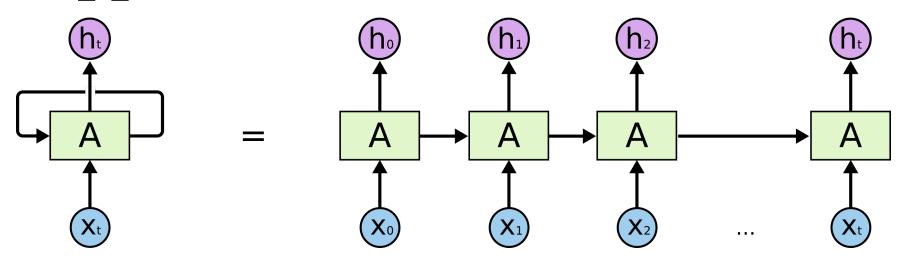
~286K Input and target argument pairs.

Δ

Neural Generation Models knob know "don't" • • • ZOO Encoder Decoder "tell" "me" "something" "new"

Long Distance Dependencies

- It is very difficult to train neural networks to retain information over many time steps.
- This makes it very difficult to handle long-distance dependencies.
- E.g. Jane walked into the room. John walked in too. It was late in the day. Jane said hi to _?_



Recurrent Neural Networks

Feed-forward NN

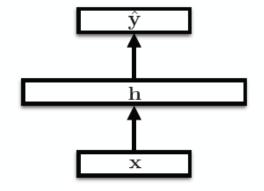
$$\mathbf{h} = g(\mathbf{V}\mathbf{x} + \mathbf{c})$$

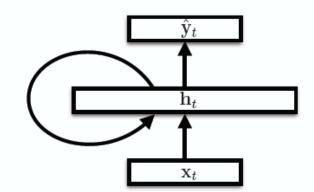
$$\hat{\mathbf{y}} = \mathbf{W}\mathbf{h} + \mathbf{b}$$

Recurrent NN

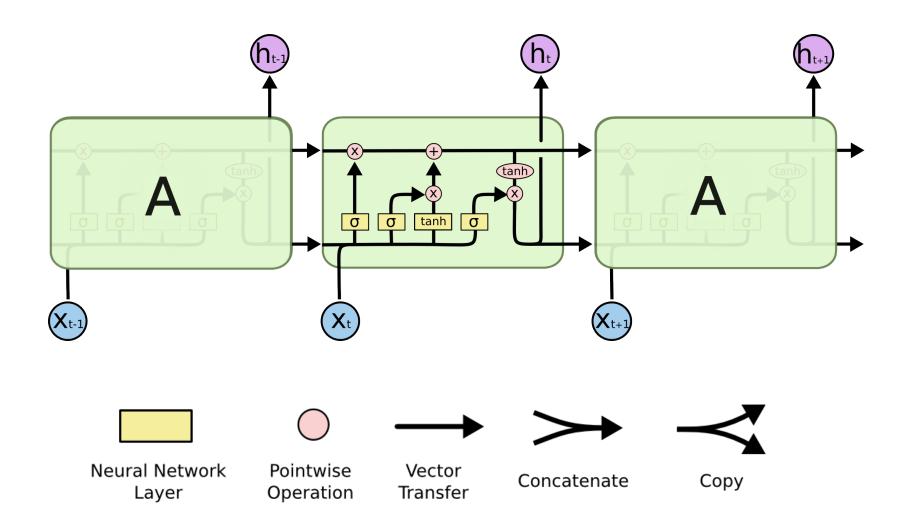
$$\mathbf{h} = g(\mathbf{V}\mathbf{x} + \mathbf{c})$$
 $\mathbf{h}_t = g(\mathbf{V}\mathbf{x}_t + \mathbf{U}\mathbf{h}_{t-1} + \mathbf{c})$

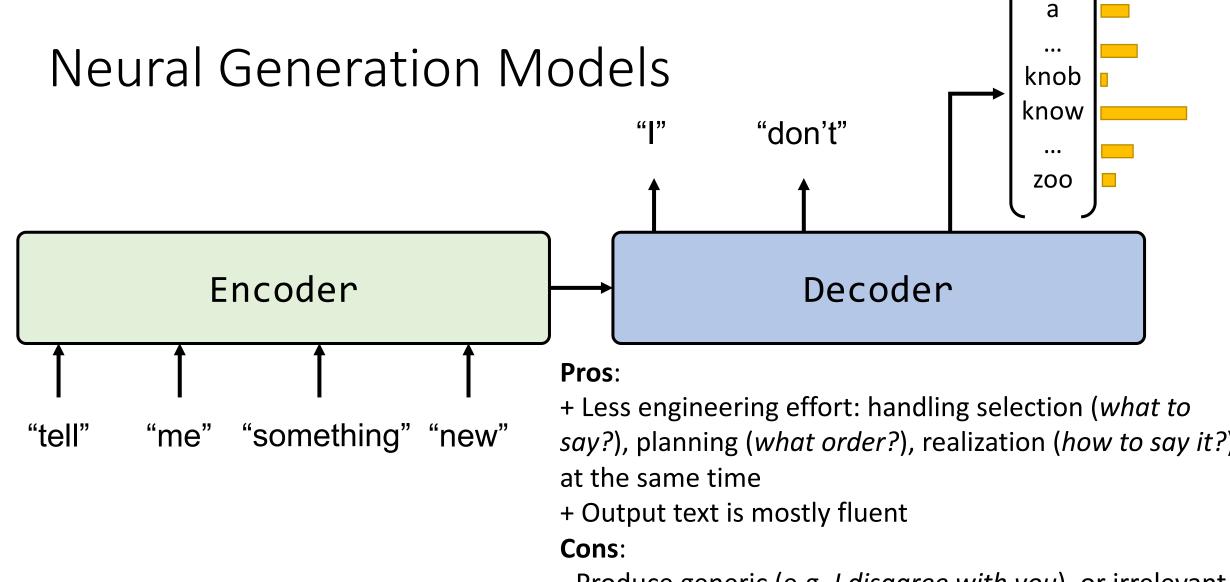
$$\hat{\mathbf{y}} = \mathbf{W}\mathbf{h} + \mathbf{b}$$
 $\hat{\mathbf{y}}_t = \mathbf{W}\mathbf{h}_t + \mathbf{b}$





Long-Short Term Memory Networks (LSTMs)





- Produce generic (e.g. *I disagree with you*), or irrelevant and hallucinated content
- Lack of structural planning

Outline

Why study arguments?

Prior work on argument mining and generation

Argument generation with content selection and style control

Our Objectives

• Objective 1: enrich the content (combating generic generations)

• Objective 2: better control over generation (improving relevance)

Our Proposed Pipeline

US should cut off foreign aid completely!





External passages from major news media and Wikipedia

2011 saw 49.5B in spending on foreign aid. Why is the US government taking money from citizens and

spending it on others?

Argument Generation

It can be a useful political bargaining chip. US threatened to cut off financial aid to Uganda. Because it planed to criminalize homosexuality. Please consider change your mind!

Our Proposed Pipeline

US should cut off foreign aid completely!



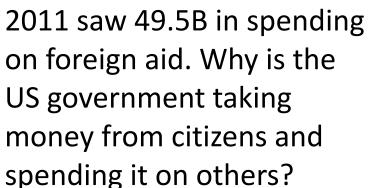


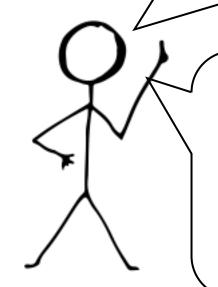
External passages from major news media and Wikipedia



Argument Generation

It can be a useful political bargaining chip. US threatened to cut off financial aid to Uganda. Because it planed to criminalize homosexuality. Please consider change your mind!





 We want to leverage resources with both subjective and factual content to form talking points.

• Indexed data:

Source	# documents
Wikipedia	5,743,901
Washington Post	1,109,672
The New York Times	1,952,446
Reuters	1,052,592
Wall Street Journal	2,059,128
Total	11,917,739

• Indexed data:

Objective, fact-based

Source	# documents
Wikipedia	5,743,901
Washington Post	1,109,672
The New York Times	1,952,446
Reuters	1,052,592
Wall Street Journal	2,059,128
Total	11,917,739

• Indexed data:

Objective, fact-based			
Left †			
Right			

By https:	//www.adfontesmedia.co	m/

Source	# documents
Wikipedia	5,743,901
Washington Post	1,109,672
The New York Times	1,952,446
Reuters	1,052,592
Wall Street Journal	2,059,128
Total	11,917,739

• Step 1: Documents are segmented into passages (of 3 sentences).

President Donald J. Trump has repeatedly called for deep cuts to foreign assistance programs. It raises pointed questions about the role the United States should play around the world. There has long been broad bipartisan agreement on the moral and strategic significance of foreign aid. Aid levels rose sharply after the 9/11 attacks. Policymakers see global economic development as a way to promote U.S. national security.

• Step 1: Documents are segmented into passages (of 3 sentences).

President Donald J. Trump has repeatedly called for deep cuts to foreign assistance programs. It raises pointed questions about the role the United States should play around the world. There has long been broad bipartisan agreement on the moral and strategic significance of foreign aid. Aid levels rose sharply after the 9/11 attacks. Policymakers see global economic development as a way to promote U.S. national security.

• Step 1: Documents are segmented into passages (of 3 sentences).

President Donald J. Trump has repeatedly called for deep cuts to foreign assistance programs. It raises pointed questions about the role the United States should play around the world. There has long been broad bipartisan agreement on the moral and strategic significance of foreign aid. Aid levels rose sharply after the 9/11 attacks. Policymakers see global economic development as a way to promote U.S. national security.

- Step 1: Documents are segmented into passages (of 3 sentences).
- Step 2: Passages are retrieved and ranked based on input queries.

US should cut off foreign aid completely. QUERY PASSAGES US cut foreign aid EMM25

- Step 1: Documents are segmented into passages (of 3 sentences).
- Step 2: Passages are retrieved and ranked based on input queries.
- **Step 3**: Passages with wrong stance are discarded.

INPUT SENT

US should cut off foreign aid completely.

PASSAGES

President Trump has criticized foreign aid in general, cutting aid to Palestinian refugees and three Central American countries, among others.

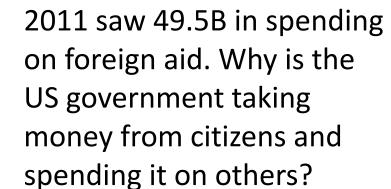
Our Proposed Pipeline

US should cut off foreign aid completely!





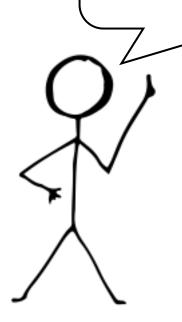
External passages from major news media and Wikipedia



Argument Generation

It can be a useful political bargaining chip. US threatened to cut off financial aid to Uganda. Because it planed to criminalize homosexuality. Please consider to change your mind!

US should cut off foreign aid completely!



- cut financial aid
- make homosexuality a crime
- uganda
- -
- political bargaining chip



Keyphases are extracted based on topic signatures.

US should cut off foreign aid completely!

Sentence 1: [political bargaining chip]

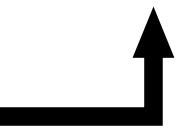
Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]



- make homosexuality a crime
- uganda
- ..
- political bargaining chip



US should cut off foreign aid completely!

Sentence 1: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]

<u>Sentence 1</u>: It can be a useful political bargaining chip.

Sentence 1: [political bargaining chip]

US should cut off foreign aid completely!

Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]

Sentence 1: It can be a useful political bargaining chip.

<u>Sentence 2</u>: US threatened to cut off financial aid to Uganda.

Sentence 1: [political bargaining chip]

US should cut off foreign aid completely!

Sentence 2: [cut financial aid; uganda]

<u>Sentence 3</u>: [make homosexuality a crime]

Sentence 4: [NULL]

Sentence 1: It can be a useful political bargaining chip.

Sentence 2: US threatened to cut off financial aid to Uganda.

<u>Sentence 3</u>: Because it planed to <u>criminalize homosexuality</u>.

Sentence 1: [political bargaining chip]

US should cut off foreign aid completely!

Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]

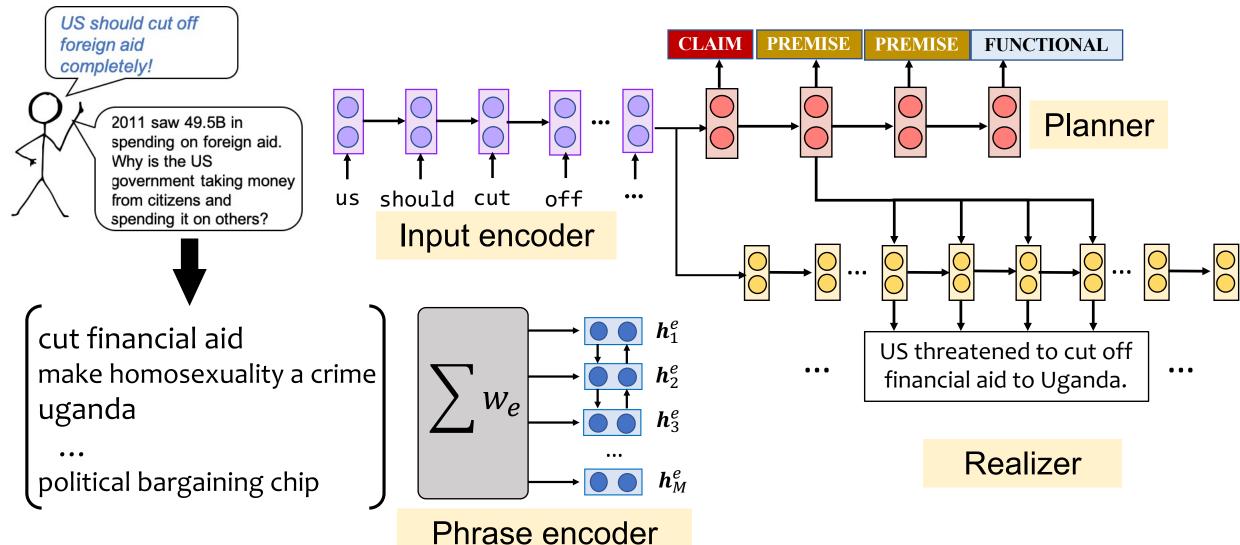
Sentence 1: It can be a useful political bargaining chip.

Sentence 2: US threatened to cut off financial aid to Uganda.

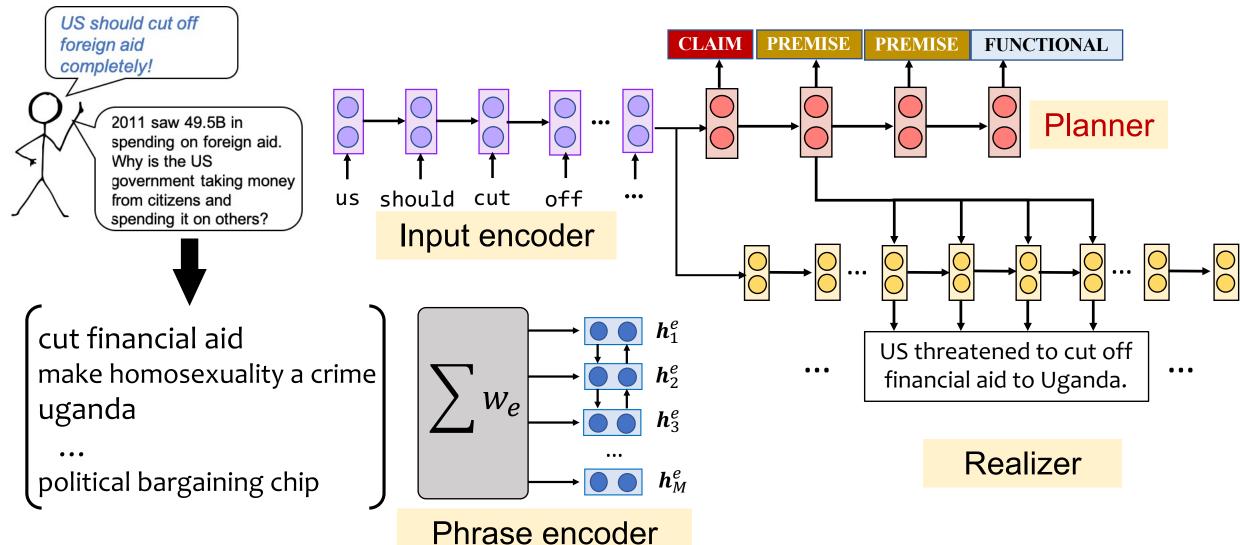
Sentence 3: Because it planed to criminalize homosexuality.

<u>Sentence 4</u>: Please consider to change your mind!

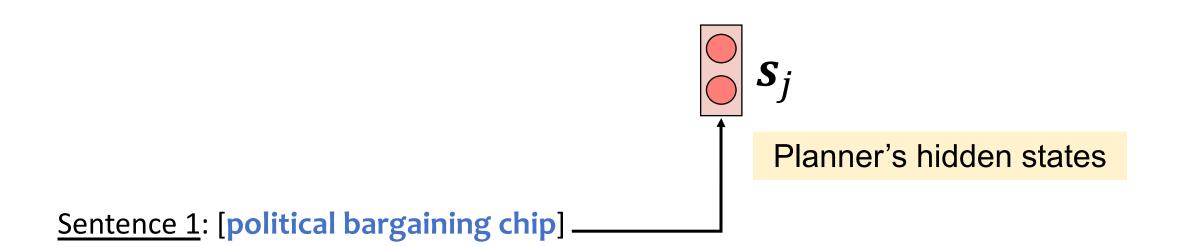
Argument Generation Model

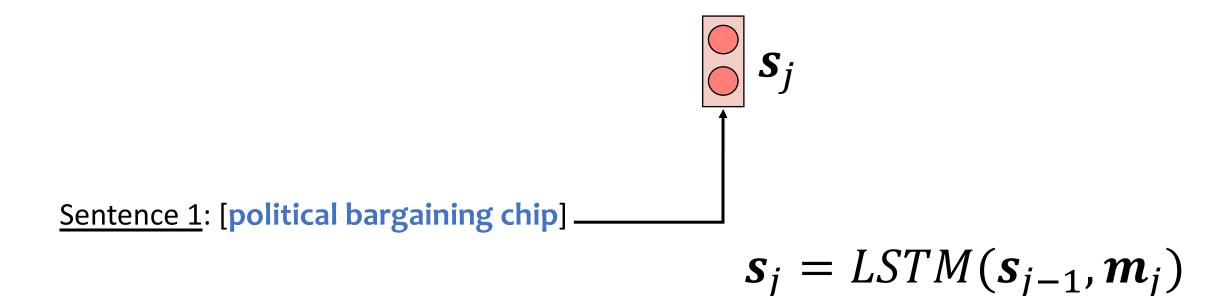


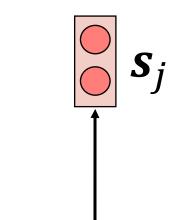
Argument Generation Model











<u>Sentence 1</u>: [political bargaining chip]

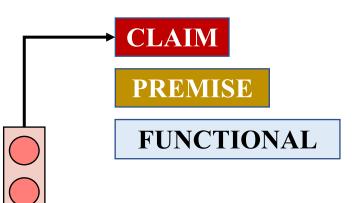
$$egin{aligned} oldsymbol{s}_j &= LSTM(oldsymbol{s}_{j-1}, oldsymbol{m}_j) \ oldsymbol{m}_j &= \sum oldsymbol{h}_k^e \ & ext{Selected} \ & ext{keyphrases} \end{aligned}$$

 $softmax(\mathbf{w}_s^T tanh(\mathbf{W}^s[\mathbf{m}_j; \mathbf{s}_j]))$

Style specification

Sentence 1: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]

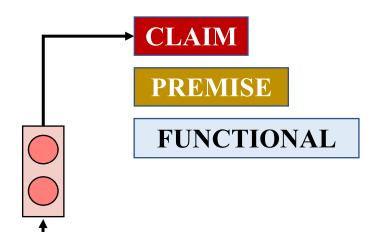


 $softmax(\mathbf{w}_{s}^{T} tanh(\mathbf{W}^{s}[\mathbf{m}_{j}; \mathbf{s}_{j}]))$

Style specification

Sentence 1: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]



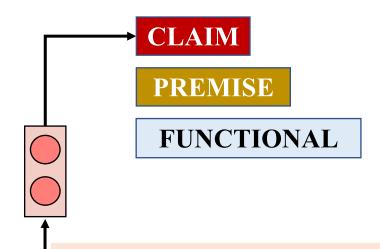
<u>CLAIM</u>: "I believe foreign aid is a useful bargaining chip."

 $softmax(\mathbf{w}_s^T tanh(\mathbf{W}^s[\mathbf{m}_j; \mathbf{s}_j]))$

Style specification

Sentence 1: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]



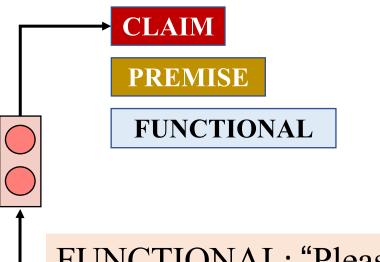
PREMISE: "In 2014, the US cuts aid to Uganda over anti-gay law."

 $softmax(\mathbf{w}_s^T tanh(\mathbf{W}^s[\mathbf{m}_j; \mathbf{s}_j]))$

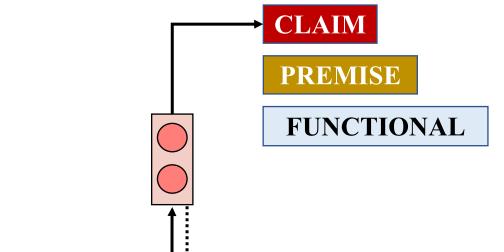
Style specification

<u>Sentence 1</u>: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]



FUNCTIONAL: "Please change your mind!"



<u>Sentence 1</u>: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]

Keyphrase selection

$$P(\mathbf{v}_{j+1,k} = 1 | \mathbf{v}_{1:j}) = \sigma(\mathbf{w}_v^T \mathbf{s}_j + \mathbf{q}_j \mathbf{W}^c \mathbf{h}_k^e)$$

select *k*-th phrase in (*j*+1)-th sentence

PREMISE

FUNCTIONAL

<u>Sentence 1</u>: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]

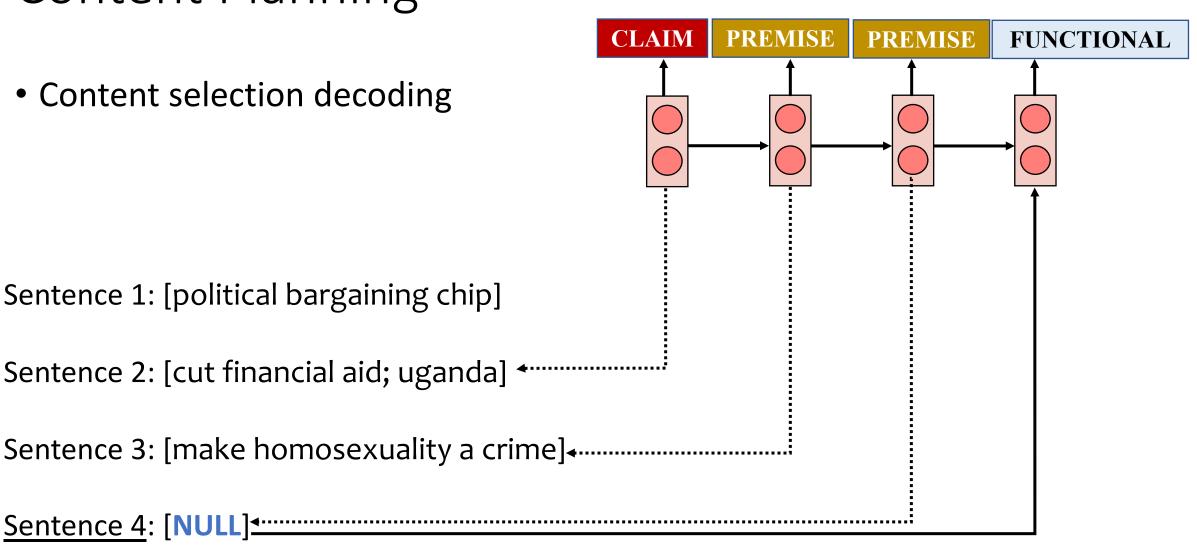
Keyphrase selection

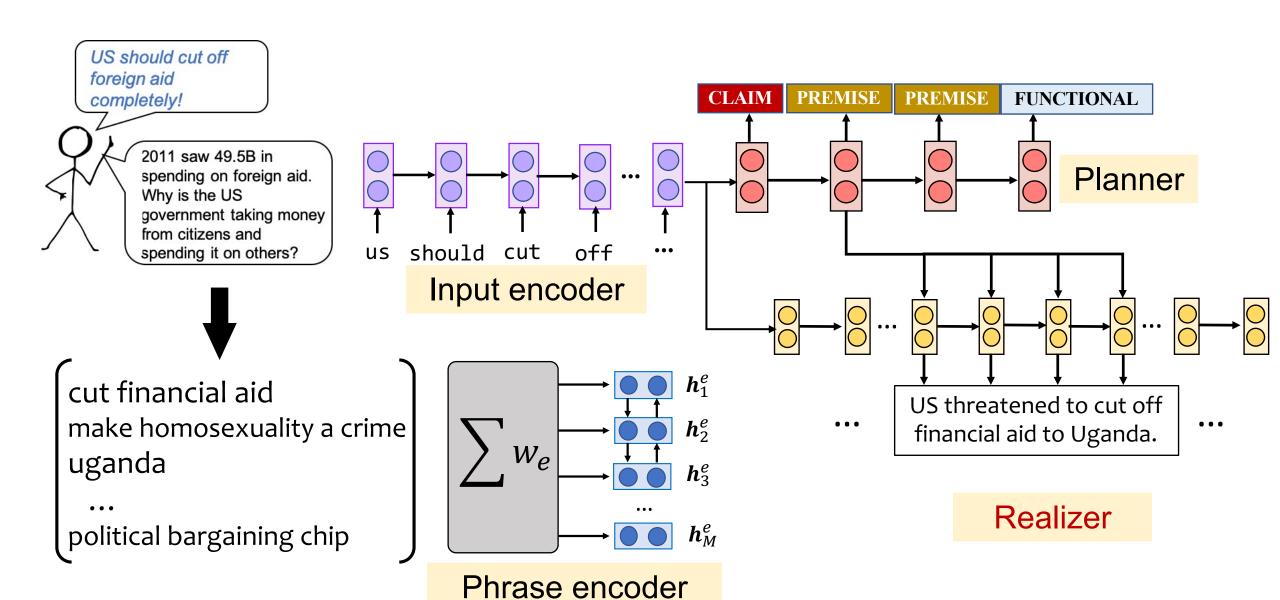
$$P(\mathbf{v}_{j+1,k} = 1 | \mathbf{v}_{1:j}) = \sigma(\mathbf{w}_v^T \mathbf{s}_j + \mathbf{q}_j \mathbf{W}^c \mathbf{h}_k^e)$$

Selection history

Content selection decoding

Sentence 1: [political bargaining chip]



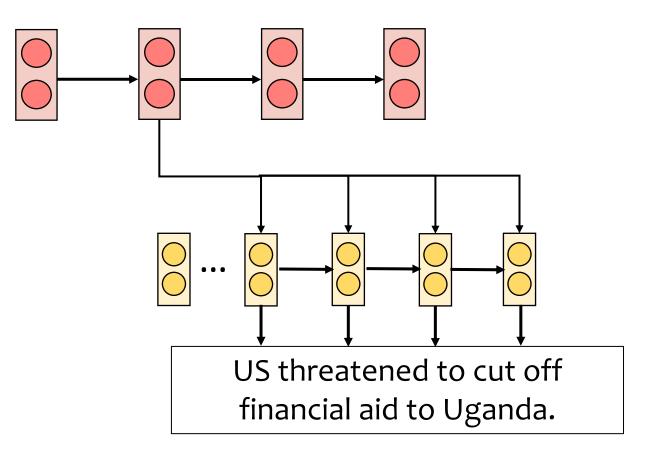


Sentence 1: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]

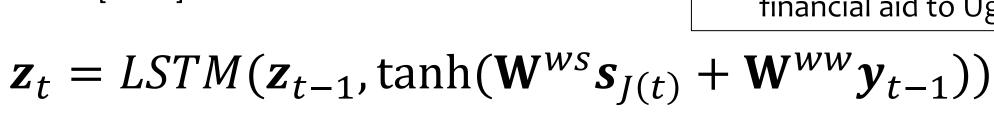


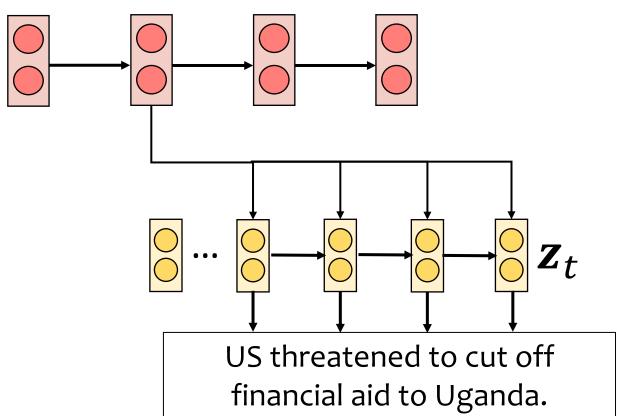
Sentence 1: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]



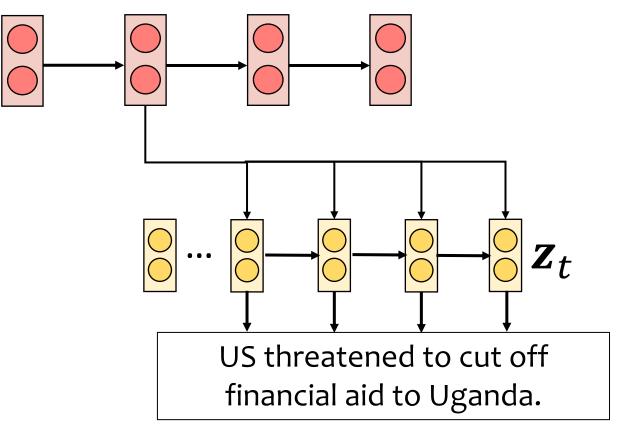


Sentence 1: [political bargaining chip]

Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]



$$\mathbf{z}_t = LSTM(\mathbf{z}_{t-1}, \tanh(\mathbf{W}^{ws}\mathbf{s}_{J(t)} + \mathbf{W}^{ww}\mathbf{y}_{t-1}))$$

Content control

Sentence 1: [political bargaining chip]

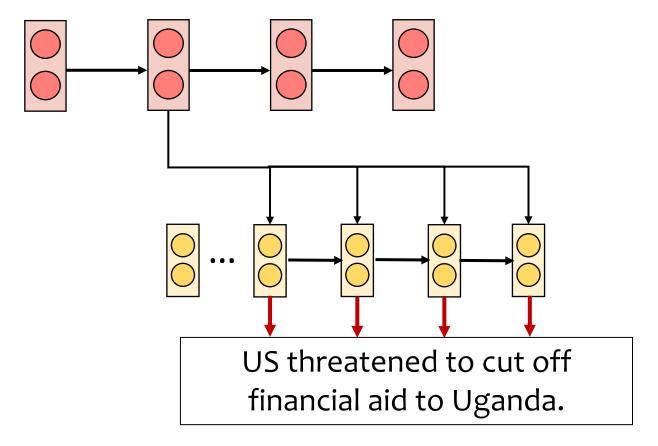
Sentence 2: [cut financial aid; uganda]

Sentence 3: [make homosexuality a crime]

Sentence 4: [NULL]

Output layer

$$P(y_t|y_{1:t-1}) = softmax(tanh(\mathbf{W}^o[\mathbf{z}_t; \mathbf{c}_t; \mathbf{t}_{J(t)}]))$$



Style control

Training objective

$$L(\theta) = \sum -\log P(y^*|X;\theta) + \gamma L_{style}(\theta) + \eta L_{sel}(\theta)$$

Training objective

$$L(\theta) = \sum_{i=1}^{n} -\log P(y^*|X;\theta) + \gamma L_{style}(\theta) + \eta L_{sel}(\theta)$$

Token level cross-entropy

Style cross-entropy

Selection, binary cross-entropy

- Dataset: input statement-argument pairs from /r/ChangeMyView community
- 217K pairs for train, 33K and 36K for dev and test
- LM pre-training: an extended set of replies (353K)

- Dataset: input statement-argument pairs from /r/ChangeMyView community
- 217K pairs for train, 33K and 36K for dev and test
- LM pre-training: an extended set of replies (353K)
- Topics: politics and policy making related
- Keyphrases: noun phrases/verb phrases that contains a Wikipedia title
 OR a topic signature word [Lin and Hovy, 2000]

Input
Output
Additional
Input

	Average # words per statement	383.7
•	Average # words per argument	66.0
	Average # passage	4.3
	Average # keyphrase	57.1

- Comparisons
 - RETRIEVAL: returns the highest ranked passage as output
 - SEQ2SEQ: encodes input and keyphrases
 - Our ACL 2018 model (Multi-task Gen.): generates keyphrases as an auxiliary task

	BLEU-2	ROUGE-L	METEOR	Length
RETRIEVAL	7.81	15.68	10.59	150.0
SEQ2SEQ	3.64	19.00	9.85	51.7
Multi-task Gen.	5.73	14.44	3.82	36.5
Ours	13.19	20.15	10.42	65.5
w/o Style	12.61	20.28	9.03	62.6
w/ Oracle Plan	16.30	20.25	11.61	65.5

Human argument length is 66.0.

	BLEU-2	ROUGE-L	METEOR	Length
RETRIEVAL	7.81	15.68	10.59	150.0
SEQ2SEQ	3.64	19.00	9.85	51.7
Multi-task Gen.	5.73	14.44	3.82	36.5
Ours	13.19	20.15	10.42	65.5
w/o Style	12.61	20.28	9.03	62.6
w/ Oracle Plan	16.30	20.25	11.61	65.5

Human argument length is 66.0.

	BLEU-2	ROUGE-L	METEOR	Length
RETRIEVAL	7.81	15.68	10.59	150.0
SEQ2SEQ	3.64	19.00	9.85	51.7
Multi-task Gen.	5.73	14.44	3.82	36.5
Ours	13.19	20.15	10.42	65.5
w/o Style	12.61	20.28	9.03	62.6
w/ Oracle Plan	16.30	20.25	11.61	65.5

Adding style control in general leads to better generation. The outputs are also more fluent.

	BLEU-2	ROUGE-L	METEOR	Length
RETRIEVAL	7.81	15.68	10.59	150.0
SEQ2SEQ	3.64	19.00	9.85	51.7
Multi-task Gen.	5.73	14.44	3.82	36.5
Ours	13.19	20.15	10.42	65.5
w/o Style	12.61	20.28	9.03	62.6
w/ Oracle Plan	16.30	20.25	11.61	65.5

Better planning can further improve performance.

Human Evaluation

- Grammaticality (1-5): fluency, free of grammar errors
- Correctness (1-5): non-contradictory, right stance
- Content richness (1-5): coverage of relevant points (too generic generation will also get low scores)
- 30 topics

	Gram.	Corr.	Cont.
HUMAN	4.81	3.90	3.48
Ours	3.99	2.78	2.61
w/o Style	3.03	2.26	2.03

Sample Argument Output

Input: Aborting a fetus has some non-zero negative moral implications.

SEQ2SEQ: I'm not going to try to change your view here, but I don't want to change your position. I don't think it's fair to say that a fetus is not a person. It's not a matter of consciousness.

OURS: TL;DR: I agree with you, but I think it's important to note that fetuses are not fully developed. I don't know if this is the case, but it doesn't seem to be a compelling argument to me at all, so I'm not going to try to change your view by saying that it should be illegal to kill.

OURS w/o Style: Now, I don't think it's fair to say that it's okay to kill someone. If you don't want to die, you shouldn't be able to do that for the sake of the mother and the fetus.

Other Applications

Abstract generation for scientific papers

Title: Semantic Embeddings from Hashtags

Entities:

- short textual posts
- document recommendation task
- hastag prediction task
- •
- convolutional neural network

Abstract: We describe a convolutional neural network that learns feature representations for short textual posts using hashtags as a supervised signal. The proposed approach is ...

Other Applications

- Wikipedia paragraph generation
 - First paragraphs of Wikipedia articles

In computer science, artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. Leading AI textbooks define the field as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals.^[1] Colloquially, the term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving".^[2]

- computer science
- artificial intelligence
- machine intelligence
- •
- perceives its environment

Other Applications

- Wikipedia paragraph generation
 - First paragraphs of Wikipedia articles

Model needs to capture the interplay between style and content.

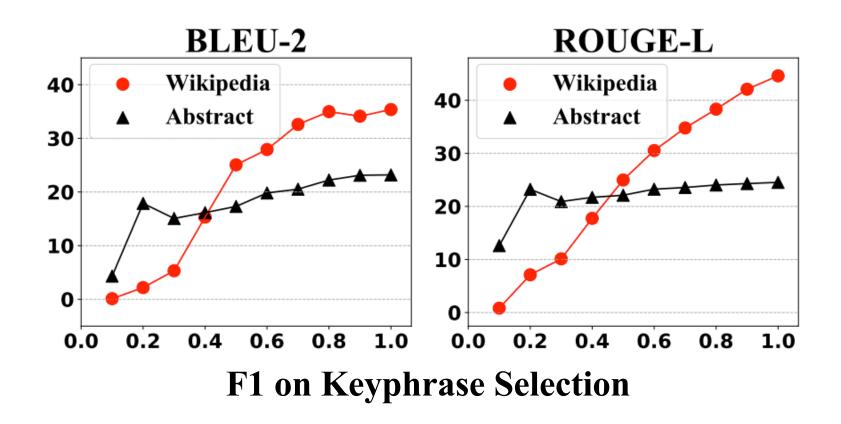


In computer science, (...) any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals (...) that mimic "cognitive" functions that humans...



Artificial intelligence is the ability of a computer program or a machine to think and learn. (...) which tries to make computers "smart". (...) John McCarthy came up with the name (...)

Effect of Content Selection



Conclusion

- Explicit modeling of content selection and style control is useful for neural argument generation. Better interpretability too!
- But the current generations still lack of coherence and focus, and can generate contradictory content.
- Future directions: working with large pre-trained language models, and adding controllability for better generation.
- Papers and project page URLs can be found at

http://www.ccs.neu.edu/home/luwang/publications.html

http://www.ccs.neu.edu/home/luwang/nsf argument.html

Acknowledgements

- Thanks to my students (Xinyu Hua, Zhe Hu, Varun Raval) who did the work in this talk.
 - Sentence-Level Content Planning and Style Specification for Neural Text Generation, EMNLP 2019
 - Argument Generation with Retrieval, Planning, and Realization, ACL 2019

• The research is partially funded by National Science Foundation (1813341).

Thank you!

Feel free to email questions to: luwang@ccs.neu.edu

Sample Argument Output

Input: All alleged crimes or infractions involving a police officer should be investigated by a higher-level agency.

SEQ2SEQ: If you look at the history of history, there was a time when the founding fathers didn't understand the history of the world. They didn't want to go to war. It wasn't be cause they didn't exist.

OURS: Jail sentences for example are a result of negligence. If you don't like it, you're going to have to deal with a lot of bad lawyers, and you'll have to prove your're guilty of a crime in the first place and you're not going to be able to sue for damages if you're in jail.

OURS w/o Style: The biggest problem with this is that this is a huge problem. The problem is that there are a lot of cases where the defendant is innocent, and the defendant has the power to prove that the defendant didn't want to go to trial, (...)

Sample Wikipedia Output

<u>TITLE</u>: Breaking Bad <u>STYLE</u>: Simple Wikipedia

SEQ2SEQ: Breaking is an American television soap opera that aired on CBS from September 26, 2007 to April 19, 2009. The series is set in main, New South Wales, in the United Kingdom. It is a spin-off of the "breaking" series, and was produced by colloquialism productions and broadcast from the television series ".

OURS: Breaking bad is an American television series set in Albuquerque, New Mexico. It was started by January 2008 and ended on September 2013 after being cancelled shortly thereafter.

OURS w/o Style: Bad breaking is an American television series set in Albuquerque, New Mexico on cable channel from 2007 to 2013.