R3: Reverse, Retrieve, and Rank for Sarcasm Generation with Commonsense Knowledge

Tuhin Chakrabarty, Debanjan Ghosh, Smaranda Muresan and Nanyun Peng

Presented by Xiangjue Dong

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Characteristics of Generated Utterance

- Evaluative
- Reversal of valence between literal and intended meaning
- Semantic incongruity with context
- Target
- Relevant to communicative situation

Examples

Literal Input 1	I hate getting sick from fast food.
GenSarc 1	I love getting sick from fast food.
GenSarc 2	[I love getting sick from fast food.] [Stomach ache is just an additional side effect.]
Human 1	Shout out to the Mc donalds for giving me bad food and making me sick right before work in two hours.

Literal Input 2	I inherited unfavorable genes from my mother.
GenSarc 3	I inherited great genes from my mother.
GenSarc 4	[I inherited great genes from my mother.] [Ugly goes down to the bone.]
Human 2	Great I inherited all of my mother's GOOD genes.

Modules

- Reversal of valence
  - Negation
  - Lexical antonyms
  - E.g. I hate getting sick from fast food.
  - -> I love getting sick from fast food

Modules

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  - Lexical antonyms
- Retrieval of commonsense context
  - Generate relevant commonsense knowledge
  - Retrieve relevant sentences

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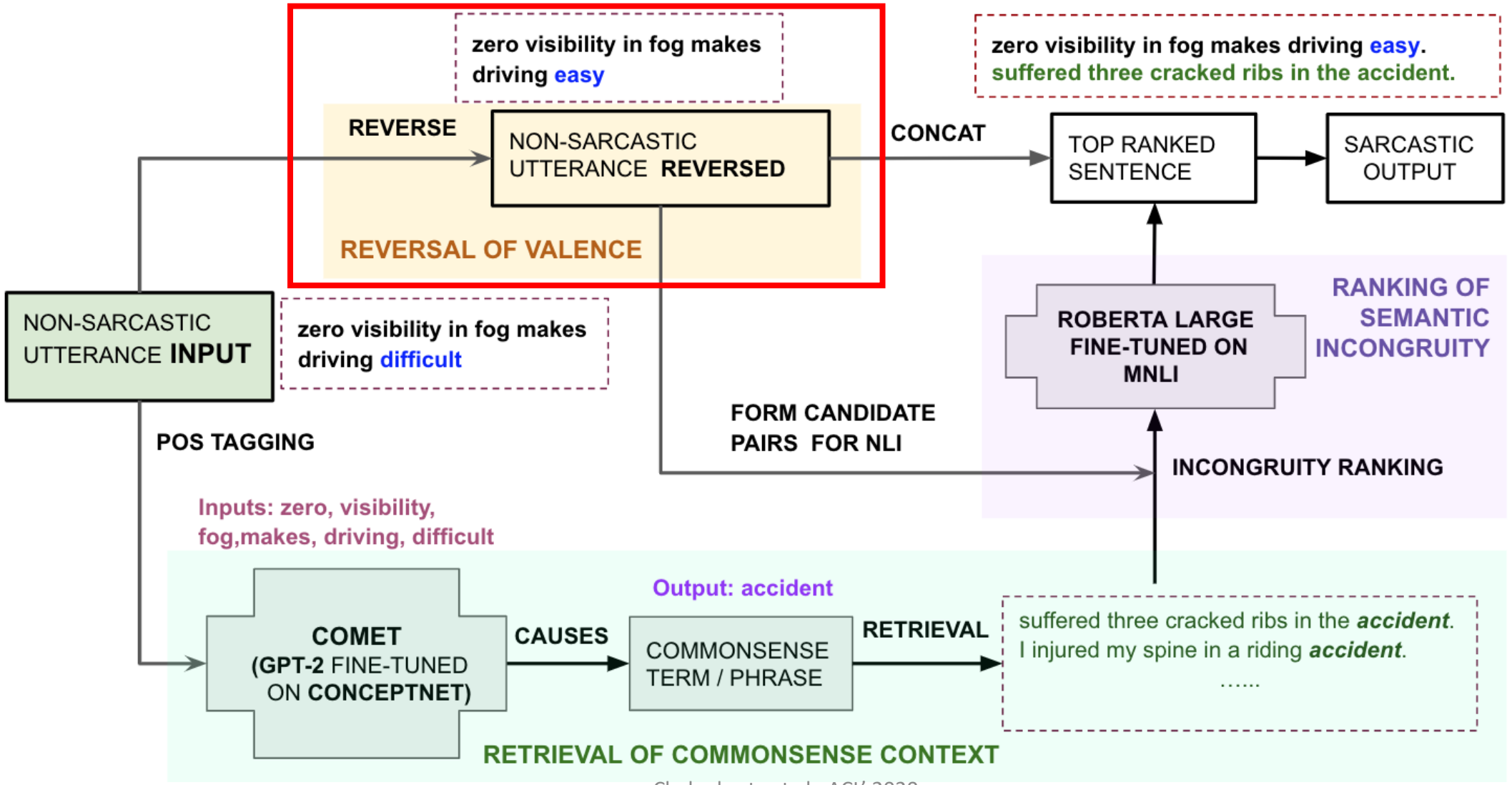
- Reversal of valence
  - Negation
  - Lexical antonyms
- Retrieval of commonsense context
  - Generate relevant commonsense knowledge
  - Retrieve relevant sentences
- Ranking of semantic incongruity
  - Measure contradiction between commonsense contexts and the sentence generated by the reversal of valence approach
  - Select the commonsense context that has the highest contradiction score

Sarcasm Factors Used in Generation

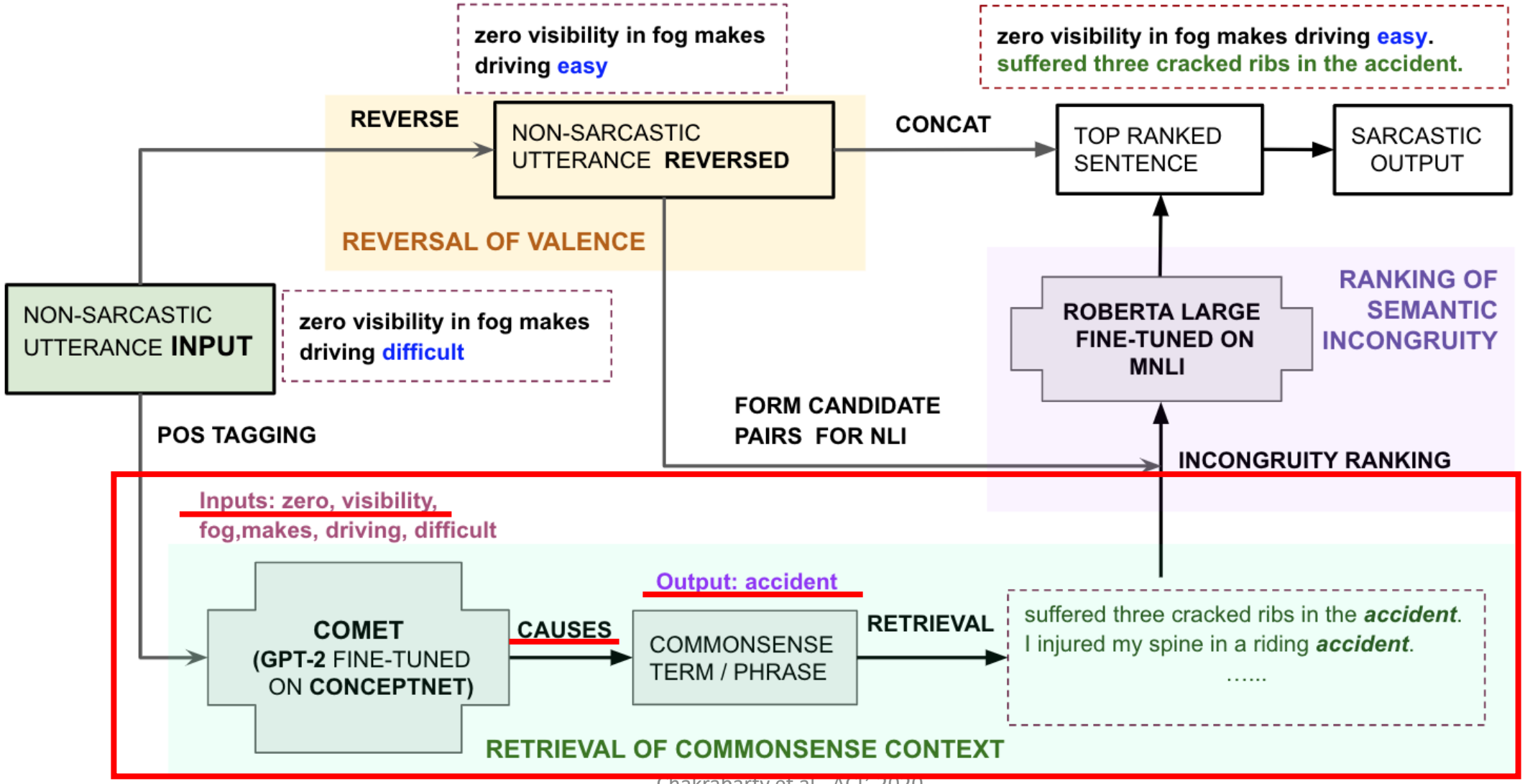
- Reversal of valence
  - Lexical antonym of negative sentiment words
  - Negation
- Semantic incongruity
  - E.g. “I love getting sick from fast food”.

Unsupervised Sarcasm Generation



Chakrabarty et al., ACL' 2020

Unsupervised Sarcasm Generation



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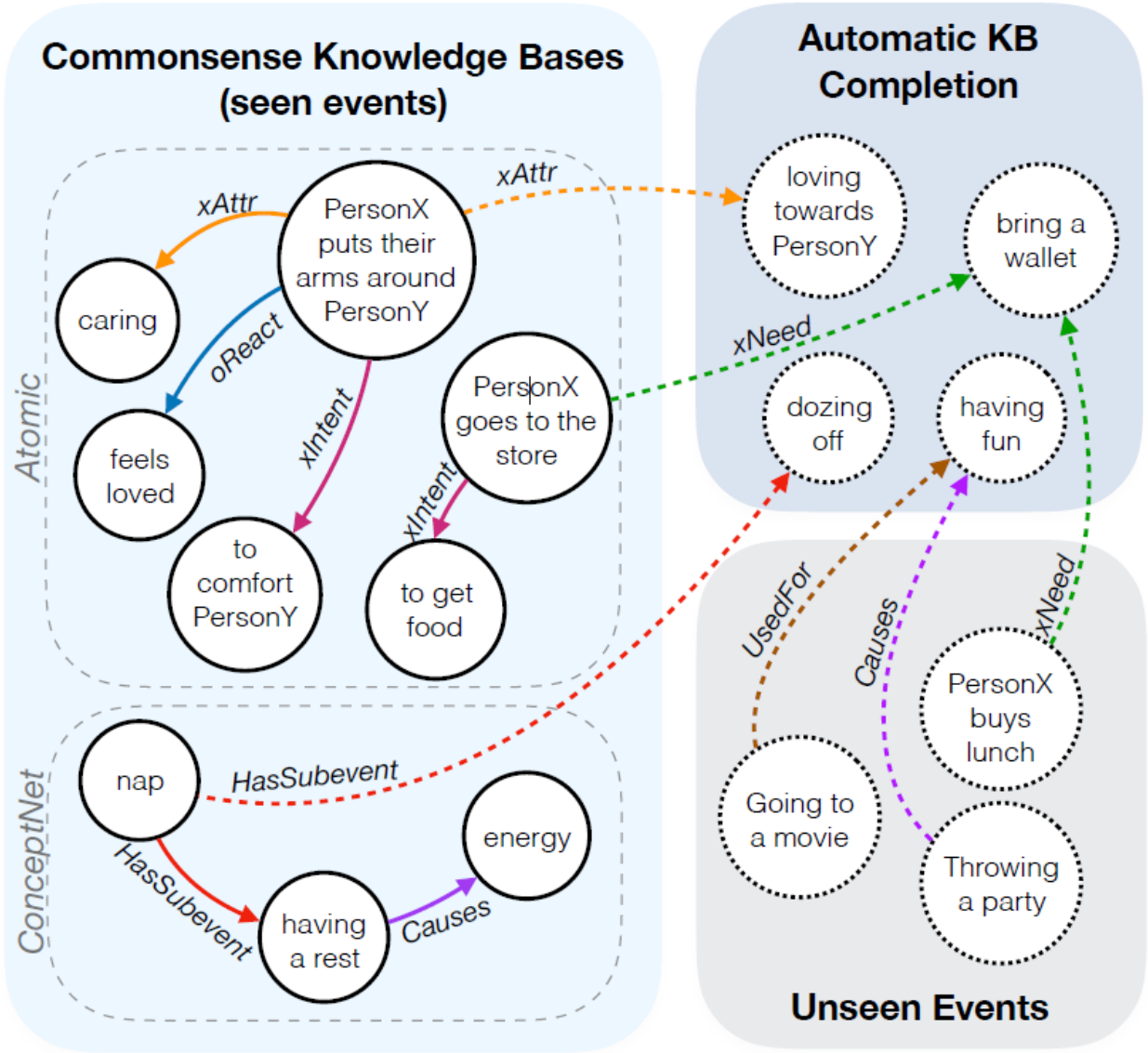
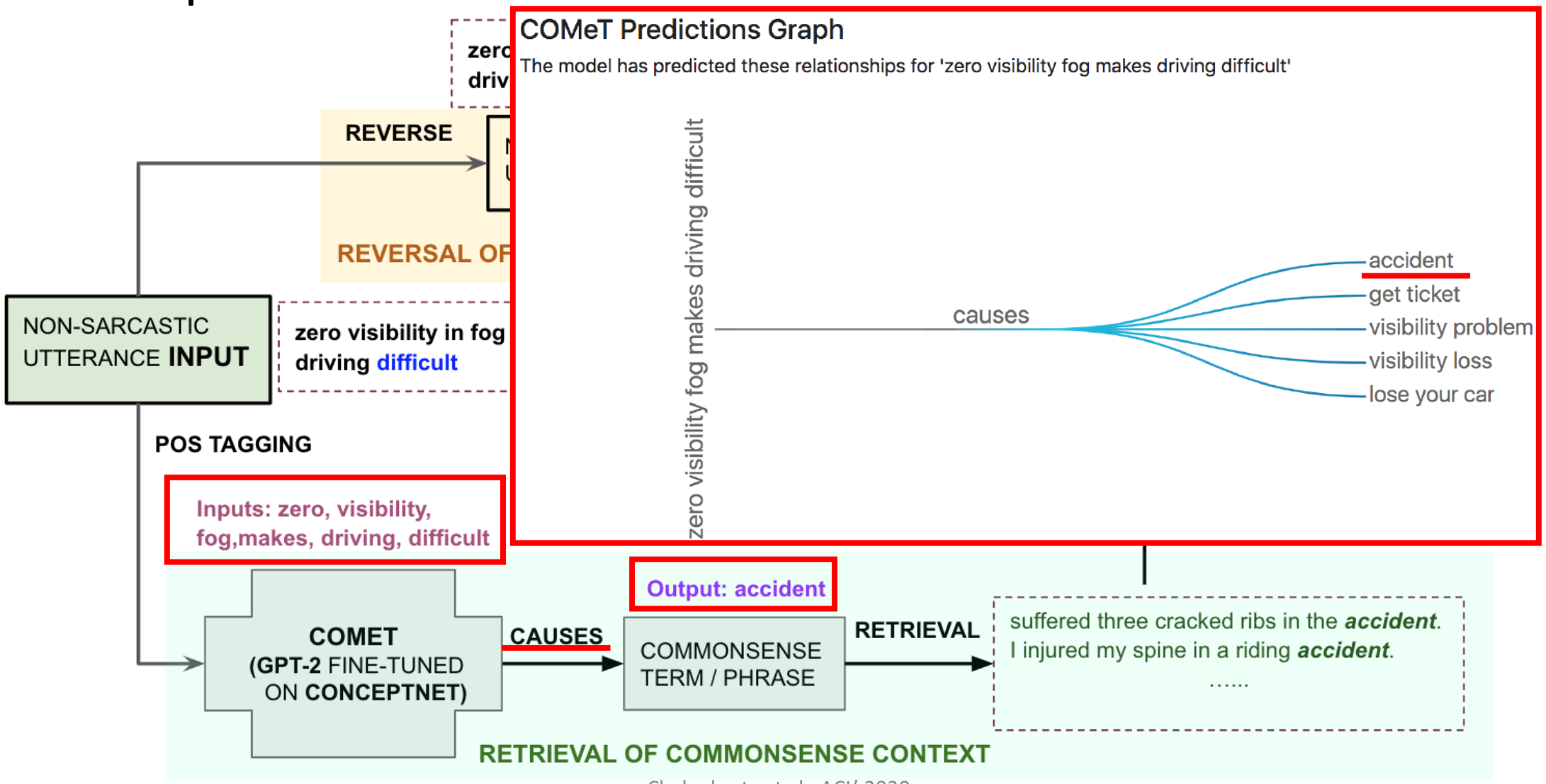
COMET



Bosselut et al., ACL' 2019

Unsupervised Sarcasm Generation



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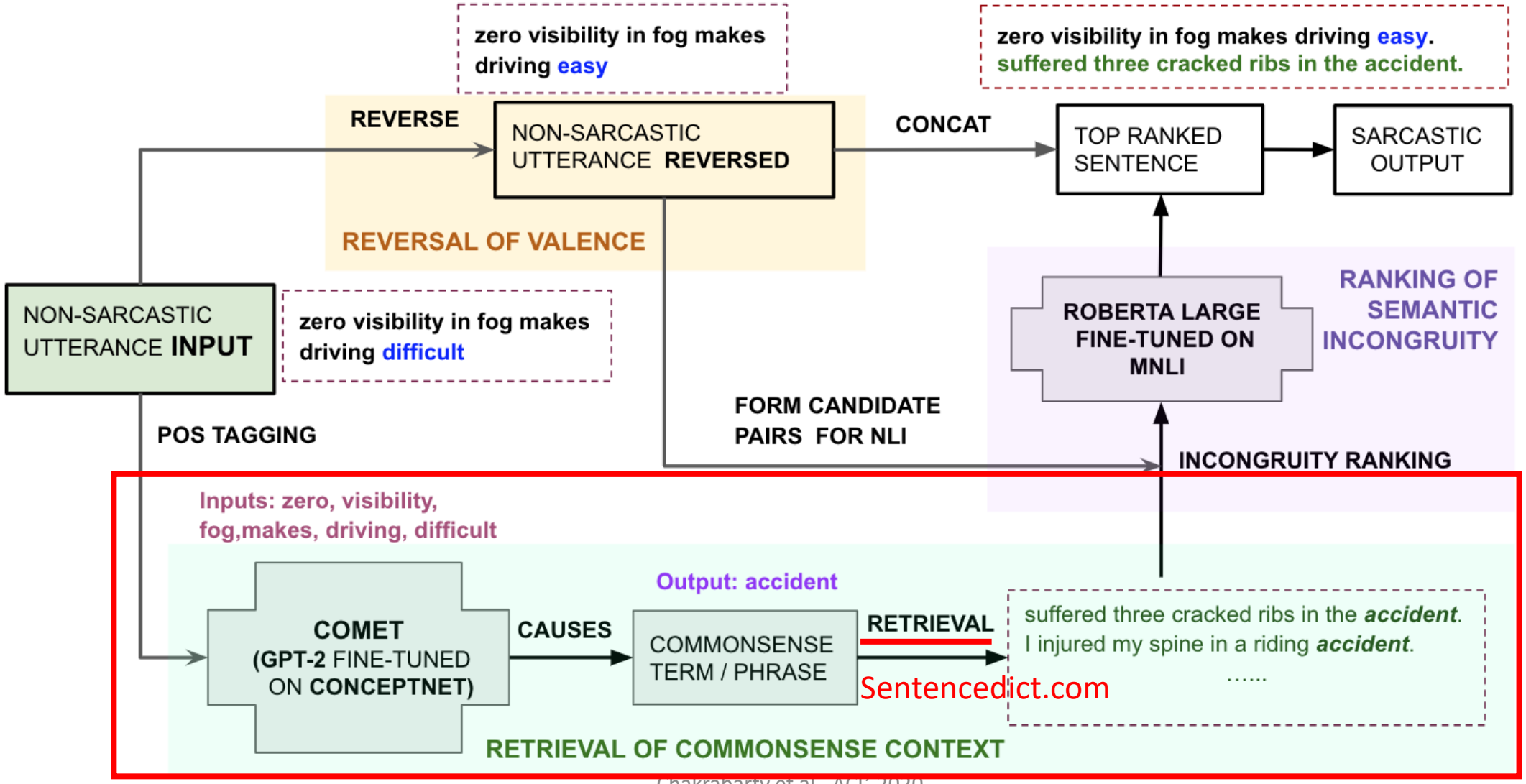
Unsupervised Sarcasm Generation



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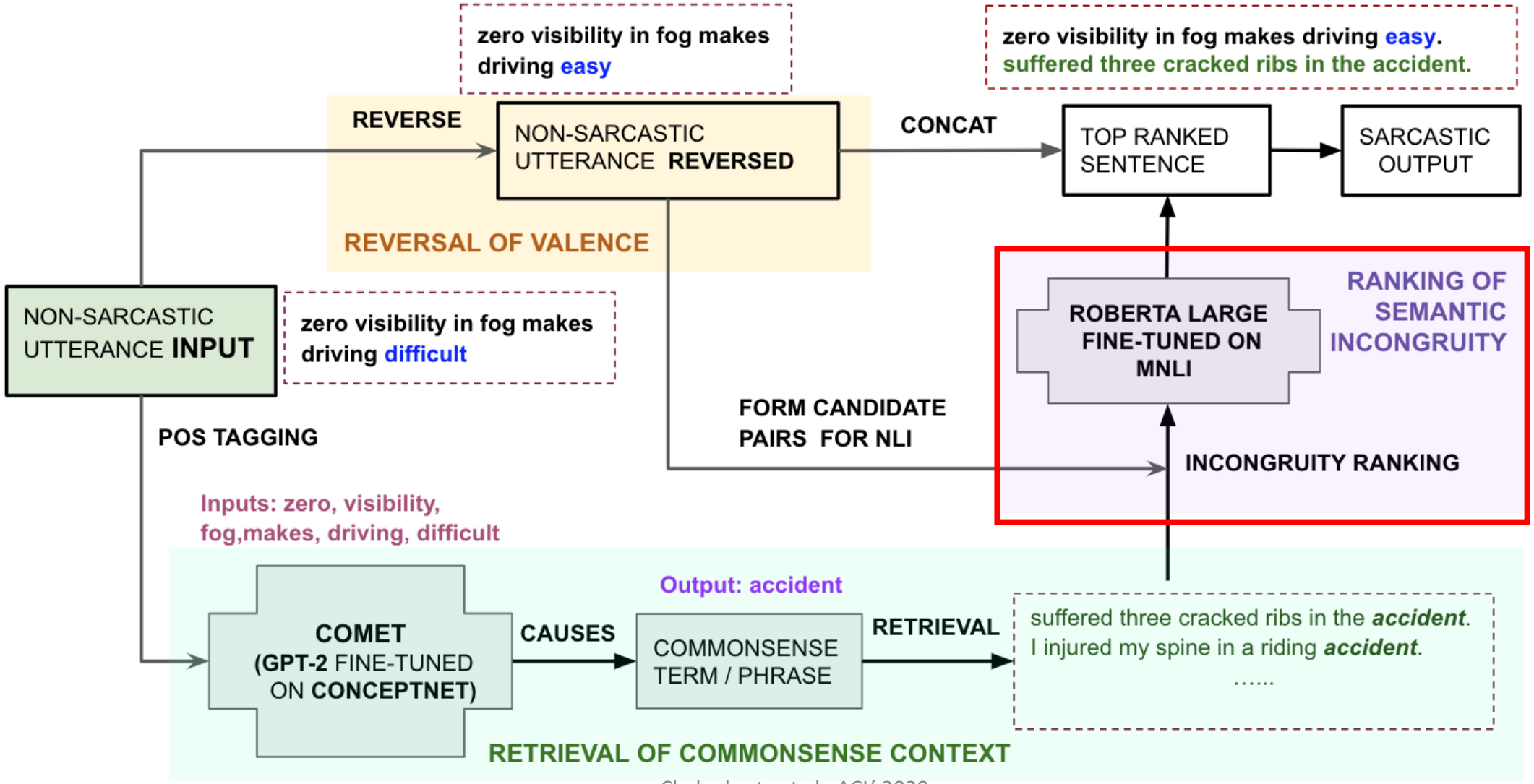
Grammatical Consistency

- Mismatched – modify
- Non-sarcastic input does not have any pronoun – change to “I”
  - E.g. input: Ignoring texts is literally the worst part of communication.
  - Retrieved: **He** has never suffered the torment of rejection.
  - Modified: **I** have never suffered the torment of rejection.
- Neural Grammatical Error Corrections System
  - Zhao, Wei et al. “Improving Grammatical Error Correction via Pre-Training a Copy-Augmented Architecture with Unlabeled Data.” *NAACL-HLT* (2019).

Unsupervised Sarcasm Generation



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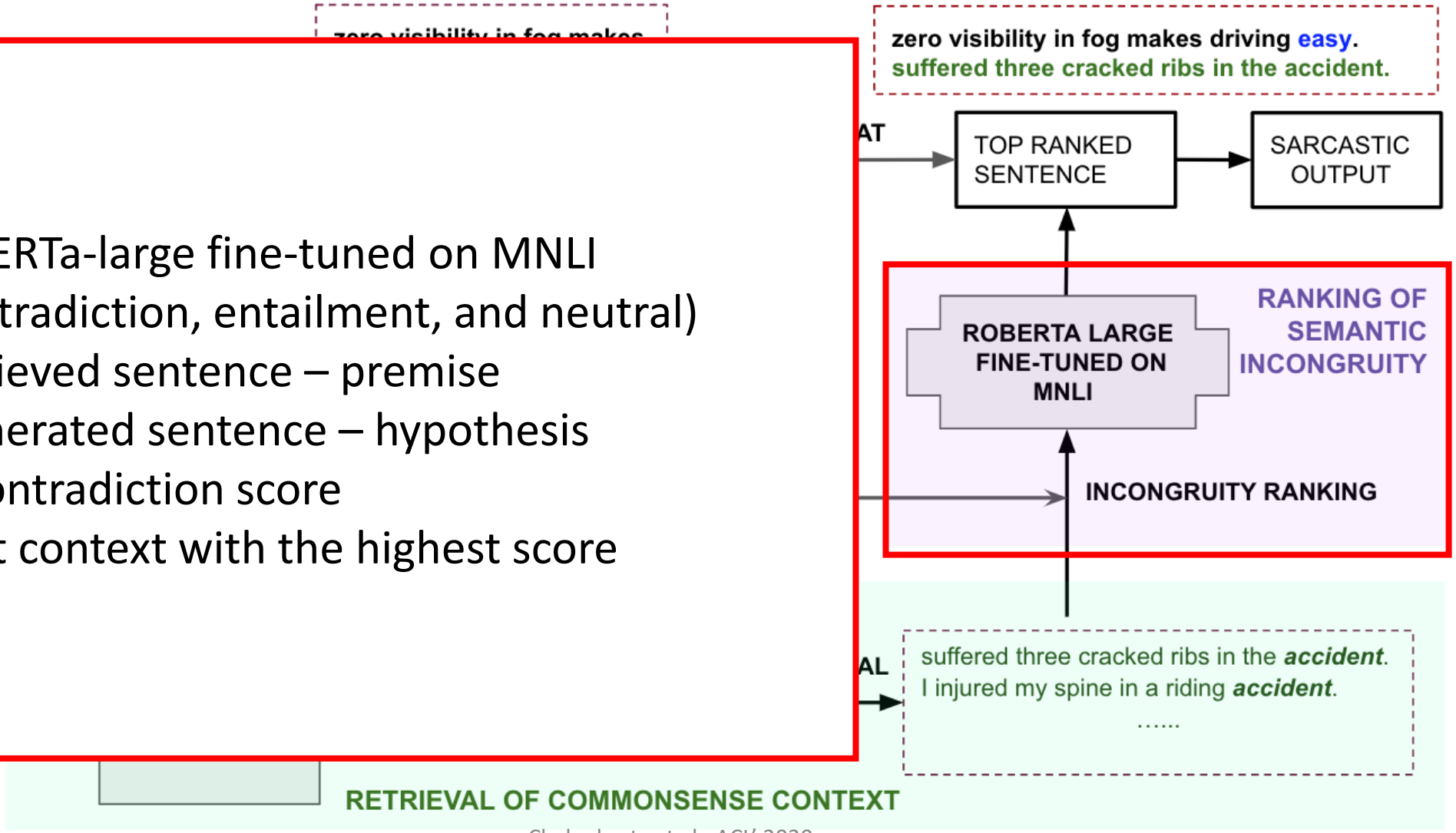
Unsupervised Sarcasm Generation

1) RoBERTa-large fine-tuned on MNLI (contradiction, entailment, and neutral)
2) Retrieved sentence – premise
   Generated sentence – hypothesis
   – contradiction score
3) Select context with the highest score



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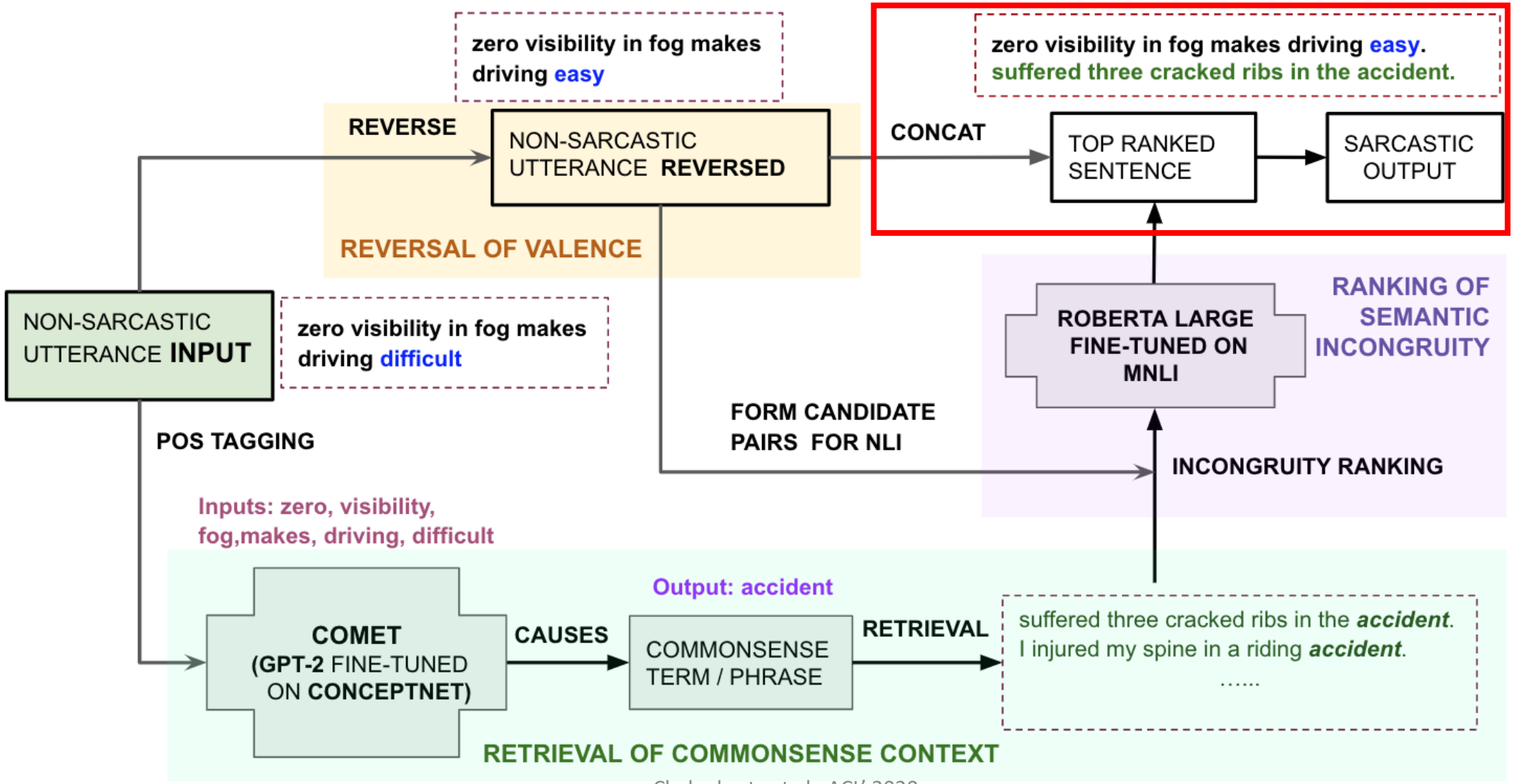

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Experiments - Datasets

- merge Ghosh et al. (2020): 4762
- Peled and Reichart (2017): 3000
- non-sarcastic utterances: no longer than 15 words
- test set: 150

Experiments - Systems

- Full Model (FM)
- Reversal of Valence (RV)
- No Reversal of Valence (NoRV)
- No Semantic Incongruity (NSI)
- MTS2019: Mishra et al. (2019)
- Human (Gold) Sarcasm

Experiments – Evaluation Criteria

- Creativity
- Sarcasticness
- Humour
- Grammaticality

Experiments – Results

System	Sarcasticness	Creativity	Humor	Grammaticality
State-of-the-art (Mishra et al., 2019)	1.63	1.60	1.50	1.46
Human Generated	**3.57**	3.16	**3.18**	3.98
Reversal of Valence (RV)	3.00	2.80	2.72	**4.29**
No Reversal of Valence (NoRV)	1.79	2.28	2.09	3.91
No Semantic Incongruity (NSI)	3.04	2.99	2.90	3.68
Full Model (FM)	3.23*	**3.24**	3.08*	3.69

Experiments – Results

Aspect	FM vs Human		FM vs MTS2019	
	win%	lose%	win%	lose%
Sarcasticness	34.0	**55.3**	**90.0**	6.0
Creativity	**48.0**	36.0	**95.3**	4.0
Humor	40.6	**48.0**	**90.0**	4.0
Grammaticality	26.6	**56.6**	**98.0**	1.3

Future Work

- Build a model that can decide whether just the RV strategy is sufficient or if we need to add additional commonsense context to it

References

- Chakrabarty, T., Ghosh, D., Muresan, S., & Peng, N. (2020). R^3: Reverse, Retrieve, and Rank for Sarcasm Generation with Commonsense Knowledge. *ACL*.
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