Fact-Enhanced Synthetic News Generation

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Introduction

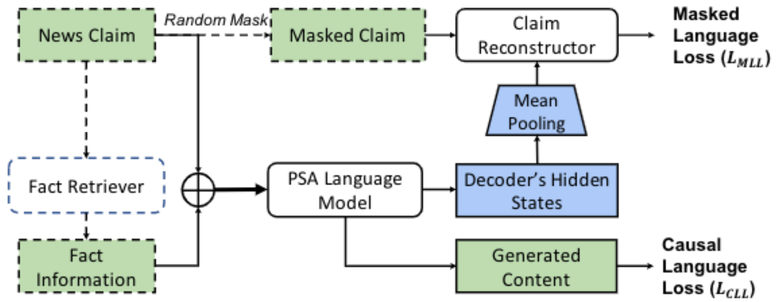
- Advanced language models can be abused to generate fake reviews and fake news.
- To identify the potential attack, we propose an advanced synthetic news generation framework: FACTGEN.

- **Challenges in Synthetic News Generation:**
  - **Factual Inconsistency:** the generated news content contradicts or refutes the news claims;
  - **Factual Scarcity:** the generated news content misses essential details to supplement the claim.

- **Contributions:**
  - A new problem of fact-enhanced synthetic news generation;
  - A principled framework - FACTGEN, generating realistic synthetic news; and
  - Comprehensive experiments on two real-world datasets demonstrating the effectiveness of FACTGEN and its defense.

The Proposed Framework - FACTGEN

- **Framework Structure:**



  - **Pseudo-Self-Attentive (PSA) Language Model:** integrating the task specific encoder and pre-trained decoder.
  - **Fact Retriever (FR):** retrieving the supplement fact information to enrich the input.
  - **Claim Reconstructor (CR):** reconstructing the input claims to guarantee the fact consistency.

- **Objective function of FACTGEN:**

$$L = L_{CLL} + \lambda L_{MLL}$$

where $L_{CLL} = -\sum_{i=1}^{M} (log\ P(y_i|y_1, \ldots, y_{i-1}; X, F))$, and

$$L_{MLL} = \sum_{x \in X_{[Masked]}} -log\ P(x|X_{[Unmasked]}, h_Y))$$

Experimental Results

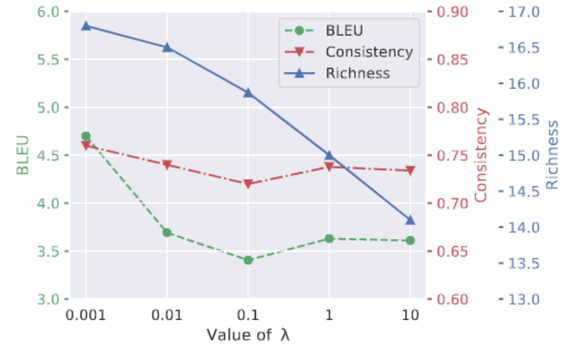
- Generation Quality (more results in paper)

Models	GossipCop			CNN/DailyMail		
	Fluency	Richness	Consistency	Fluency	Richness	Consistency
CopyTransformer	0.2	11.0	0.04	0.5	9.5	0.66
ConvSeq2seq	0.5	5.9	0.09	3.3	9.5	0.44
PPLM	0.7	12.5	0.67	0.8	13.1	0.68
GPT-2	0.8	13.4	0.35	1.65	13.5	0.70
Grover	1.2	**15.7**	0.56	0.3	15.3	0.72
FACTGEN	**2.1**	14.5	**0.80**	**4.6**	**16.6**	**0.76**

- Defending Against Synthetic Fake News (on GossipCop)

	EANN	MWSS-CNN	RoBERTa	FACTGEN$_{def}$
Accuracy	0.64	0.58	0.74	**0.82**

- Parameter Analysis (on CNN/DailyMail)



Future Work

- Include other formats of external information like tabular or knowledge graph;
- Make the generated content prone to be spread.

AAAI 2021