Generating Artificial Texts as Substitution or Complement of Training Data

Vincent Claveau, Antoine Chaffin and Ewa Kijak

1 • Research question

Explore the use of artificially generated texts for supervised tasks within two scenarios:

- the data is used as a substitute of the original data (for instance, when the original data cannot be shared because they contain confidential information [1])

- the artificial data is used as a complement of the original training dataset (= data augmentation)

3 • Experimental settings

Datasets:

- MediaEval 2020 FakeNews [4]: tweets about 5G/covid in English; 3 imbalanced classes (covid+5G, other conspiracies, no conspiracies)
- Cross Lingual Sentiment (CLS-FR) [5] from FLUE: Amazon reviews in French; 2 classes (positive, negative)

Classification models:

- RoBERTa [3] for MediaEval and AG news

Examples of generated texts

Tweets generated with the GPT-2 model trained on the MediaEval example with class "covid+5G"

If the FBI ever has evidence that a virus or some other problem caused or contributed to the unprecedented 5G roll out in major metro areas, they need to release it to the public so we can see how much of a charade it is when you try to downplay the link.

So let’s think about this from the Start. Is it really true that 5G has been activated in Wuhan during Ramadan? Is this a cover up for the fact that this is the actual trigger for coronavirus in the first place? Hard to say.

5 • More results

Experiments with Bag-of-Words/legacy classifiers

Important performance gains; see our paper

Impact of the quality of the generated data

we simulate filtering done with classifiers of varying quality (accuracy)

2 • Class-constrained text generation

One generative LM for each class:

- a GPT-2 [6] large model (774M parameters) is fine-tuned for each class
- prompts are first 2 words of randomly chosen texts in training set

Additional filtering

- first results suggests that some of the generated data do not belong to the expected class (cf. paper)
- we propose to filter out texts that do not belong to the desired class according to a BERT classifier (kept private) trained on the original dataset

Notations

- $T$: original training set
- $g^T$: filtered artificial training set

4 • Results

Performance with neural classifiers

with bert models (Robertà, Flaubert)

Performance (%) of neural classification approaches on the MediaEval, CLS-FR, and AG-news tasks according to the usage of the artificially generated texts (after filtering).

Prediction differences

Does a classifier trained on the artificial data predicts similarly to one trained on the original data?

5 • More results

Class-conditioned generated texts

- can be used as substitute
  - very small performance drop with BERT based classifiers
  - important gain when used with Bag-of-Word classifiers
- can be used as data augmentation to get a some improvements, re-balance the classes
- importance of filtering

6 • Conclusion

Class-conditioned generated texts

- can be used as substitute
- very small performance drop with BERT based classifiers
- important gain when used with Bag-of-Word classifiers
- can be used as data augmentation to get a some improvements, re-balance the classes
- importance of filtering

References:


Contact: Vincent.Claveau@irisa.fr