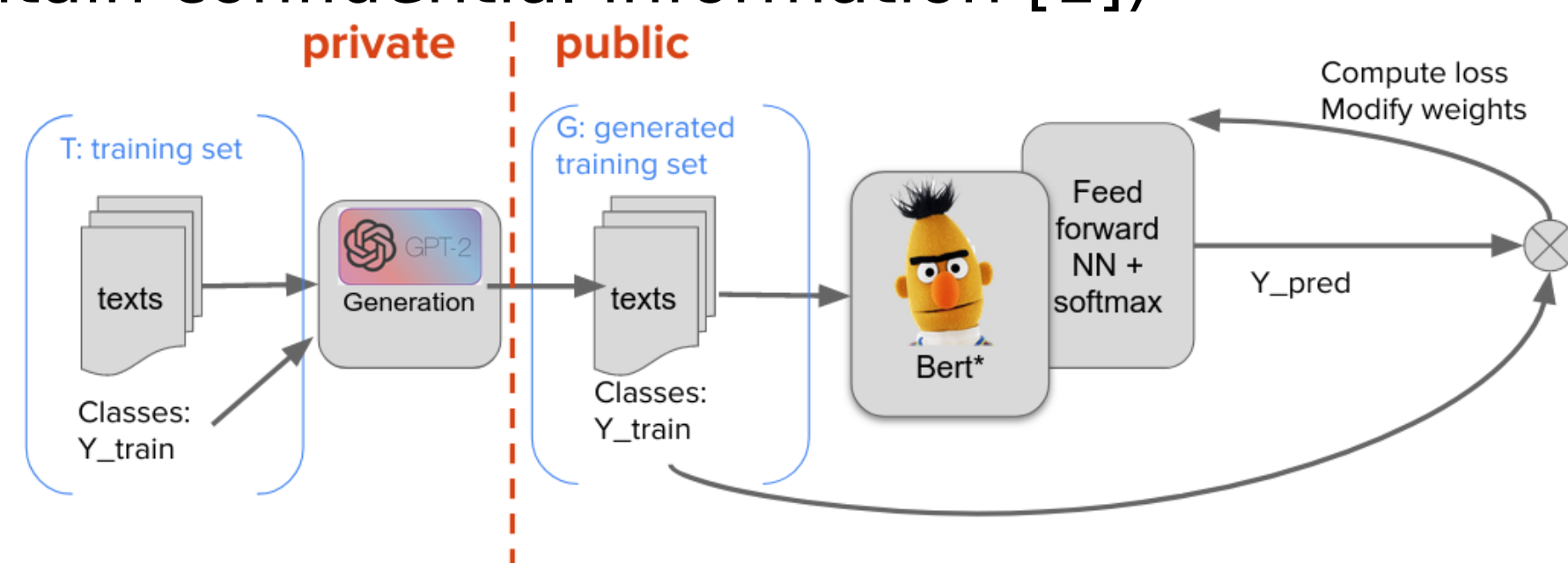


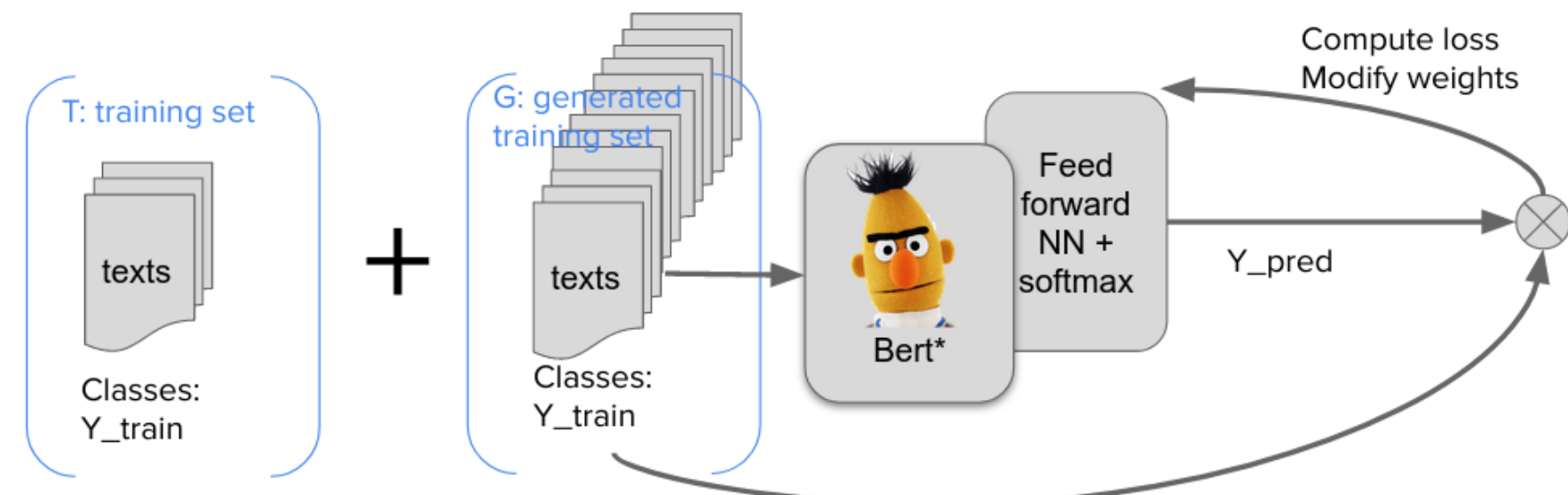
## 1 • Research question

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)
- ▶ AG news [7]: in English; 4 categories of news ("World", "Sports", "Business", "Sci/Tech")

### Classification models:

- ▶ RoBERTa [3] for MediaEval and AG news
- ▶ FlauBERT [2] for CLS-FR

### Examples of generated texts

Tweets generated with the GPT-2 model trained on the MediaEval examples 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 the coronavirus virus? Was there a link between 5G and the coronavirus in the first place? Hard to say.

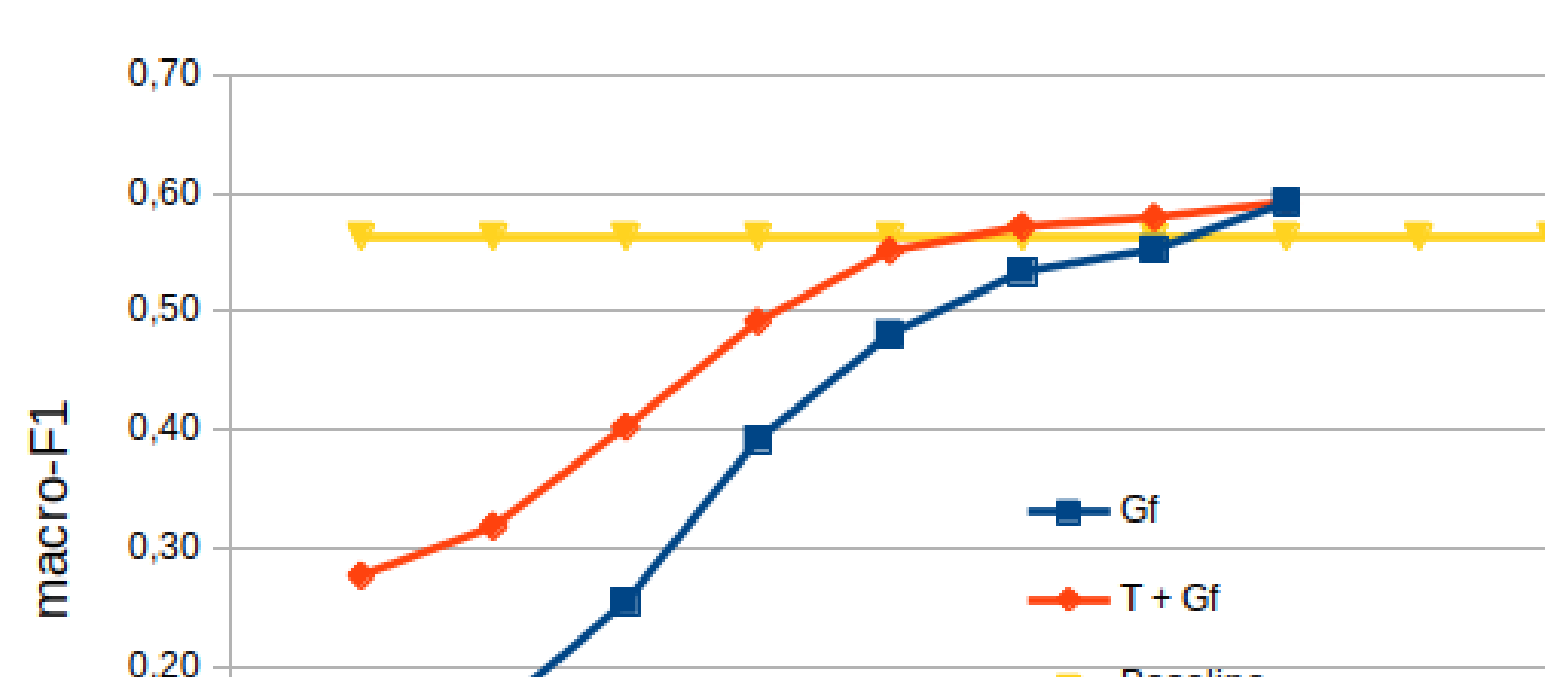
## 5 • More results

### 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 texts 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

- ▶  $\mathcal{T}$ : original training set
- ▶  $\mathcal{G}^f$ : filtered artificial training set

## 4 • Results

### Performance with neural classifiers

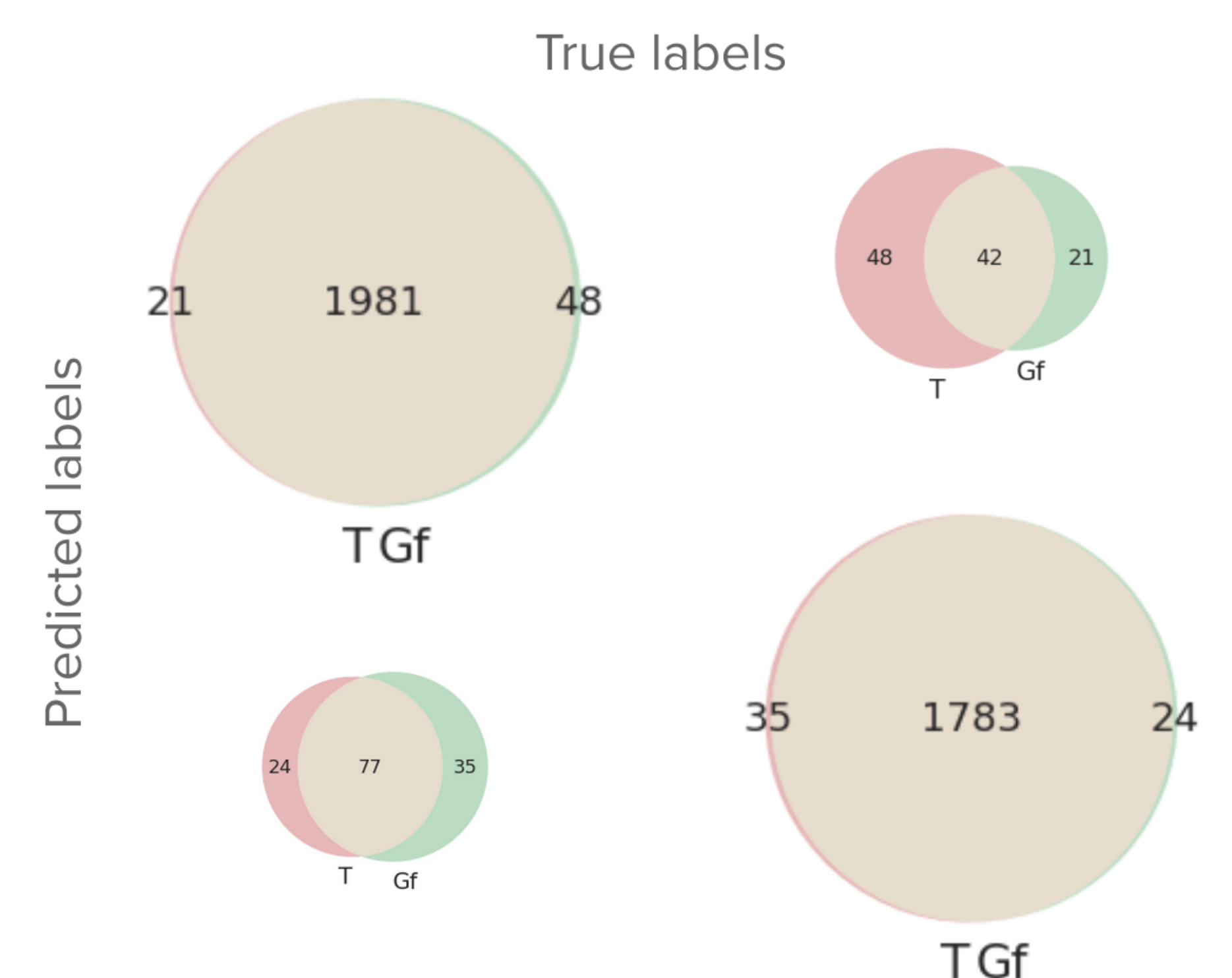
with bert models (RobertA, Flaubert)

training set	MediaEval			CLS-FR			AG-news		
	micro-F1	macro-F1	MCC	micro-F1	macro-F1	MCC	micro-F1	macro-F1	MCC
$\mathcal{T}$	79.57	62.66	55.71	95.44	95.42	90.86	94.35	94.35	92.47
$\mathcal{G}^f$	76.22	64.18	52.75	95.76	95.75	91.51	93.49	93.49	91.35
$\mathcal{T} + \mathcal{G}^f$	80.12	66.08	57.44	<b>95.99</b>	<b>95.98</b>	<b>91.97</b>	93.47	93.47	91.34
$\mathcal{G}^f$ then $\mathcal{T}$	<b>83.55</b>	<b>67.90</b>	<b>60.05</b>	95.96	95.95	91.96	<b>95.10</b>	<b>95.10</b>	<b>92.89</b>

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?



## 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

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[3] Yinhan Liu, Myle Ott, Naman Goyal, Jingfei Du, Mandar Joshi, Danqi Chen, Omer Levy, Mike Lewis, Luke Zettlemoyer, and Veselin Stoyanov. RoBERTa: A Robustly Optimized BERT Pretraining Approach, 2019.

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[6] Alec Radford, Jeff Wu, Rewon Child, David Luan, Dario Amodei, and Ilya Sutskever. Language models are unsupervised multitask learners. *OpenAI Blog*, 2019.

[7] Xiang Zhang, Junbo Zhao, and Yann LeCun. Character-level convolutional networks for text classification. In *Proceedings of the 28th International Conference on Neural Information Processing Systems - Volume 1*, NIPS'15, page 649–657, Cambridge, MA, USA, 2015. MIT Press.