Experiments in Detecting Persuasion Techniques in the News

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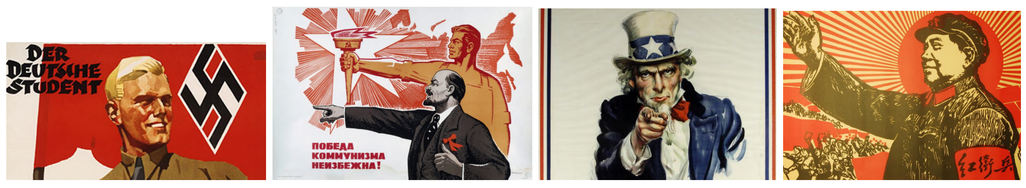
Computational Propaganda

- Propaganda has been widely used since the advent of mass media



- However, Internet and social media "*have allowed cross-border computational propaganda by foreign states or even private organizations*" (Bolsover and Howard, Big Data 2017)
- Can we automatically detect the use of propaganda?
  Can we make America (and the world) aware again?
- Current approaches provide document-level predictions
  - rely on gold labels based on distant supervision → noisy
  - lack model explainability

Propaganda Techniques

- Propaganda is conveyed through a series of rhetorical and psychological techniques

Figure 1: *Bandwagon*: join in because everyone else is taking the same action.

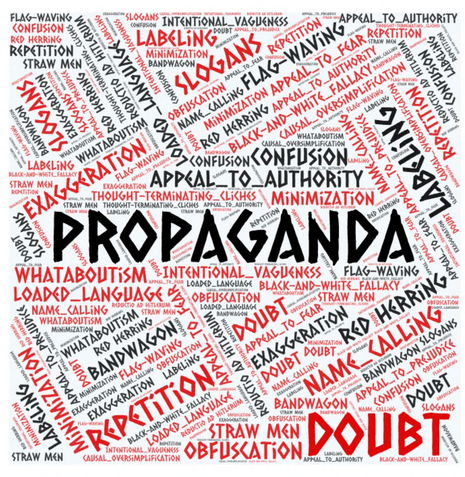


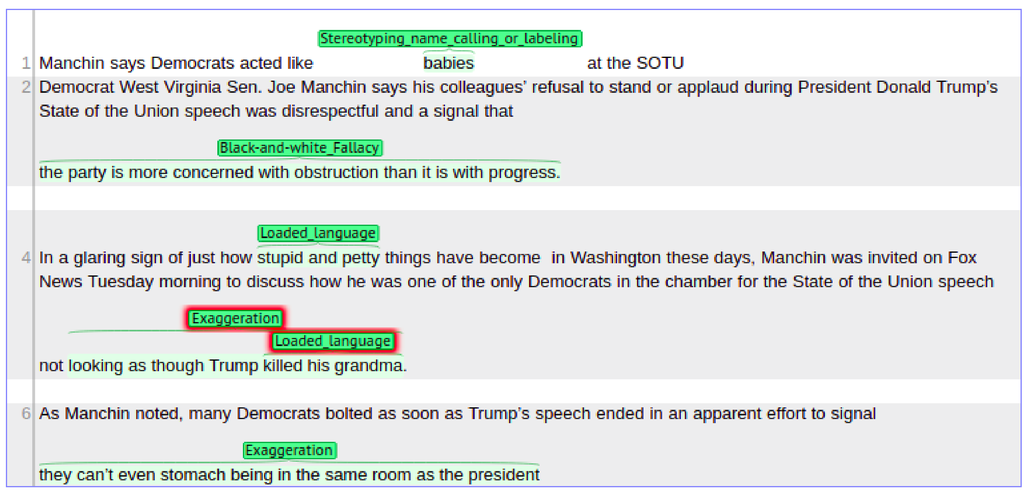
Figure 2: *Name calling*.

Figure 3: *Appeal to fear.*

Greta Thunberg: "*We are in the middle of the sixth mass extinction, with more than 200 species getting extinct every day.*"

Propaganda Techniques Corpus

450 news articles from 48 sources (21,230 sentences, 350K tokens) annotated at the fragment level with 18 propaganda techniques.



Annotation Process

- Phase 1: two annotators, a_i and a_j, independently annotated the same article
- Phase 2: a_i and a_j discussed with a consolidator c_1 all instances to come up with a final annotation.

The table shows γ inter-annotator agreement for spans only and spans + labels between two annotators and one annotator and one consolidator.

Annotations		spans (γ_s)	+labels (γ_{sl})
a_1	a_2	0.30	0.24
a_3	a_4	0.34	0.28
a_1	c_1	0.58	0.54
a_2	c_1	0.74	0.72
a_3	c_2	0.76	0.74
a_4	c_2	0.42	0.39

Tasks and Evaluation Measure

- **FLC**: detect the text fragments in which a propaganda technique is used and identify the technique. **Spans** is a lighter version of the task in which only the span has to be identified.
- **SLC** detect the sentences that contain one or more propaganda techniques (binary task).

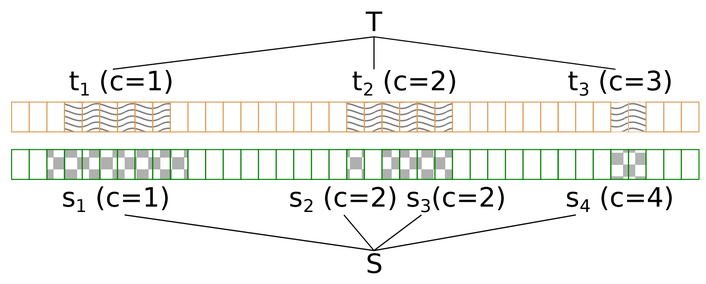
An evaluation measure for Task FLC needs to be defined. We use a variant of the standard F_1 (and Precision, P, and Recall, R) taking into account partially overlapping spans:

$$P(S,T) = \frac{1}{|S|} \sum_{\substack{s \in S, \\ t \in T}} C(s,t,|s|), \qquad R(S,T) = \frac{1}{|T|} \sum_{\substack{s \in S, \\ t \in T}} C(s,t,|t|),$$

where

$$C(s,t,h) = \frac{|(s \cap t)|}{h} \delta\left(l(s), l(t)\right)$$

here $\delta(a,b) = 1$ if $a = b$, and 0 otherwise.



Example of gold annotation (top) and the predictions of a supervised model (bottom) in a document represented as a sequence of characters. The class of each fragment is shown in parentheses.

Models

- **Multi-Granularity Network**: It drives the higher-granularity task (FLC, g_2) on the basis of the lower-granularity information (SLC, g_1) through a trainable gate f:

$$o_{g_2} = f(o_{g_1}) * o_{g_2}$$

and we used a weighted sum of losses with a hyper-parameter α

$$L_J = L_{g_1} * \alpha + L_{g_2} * (1 - \alpha)$$

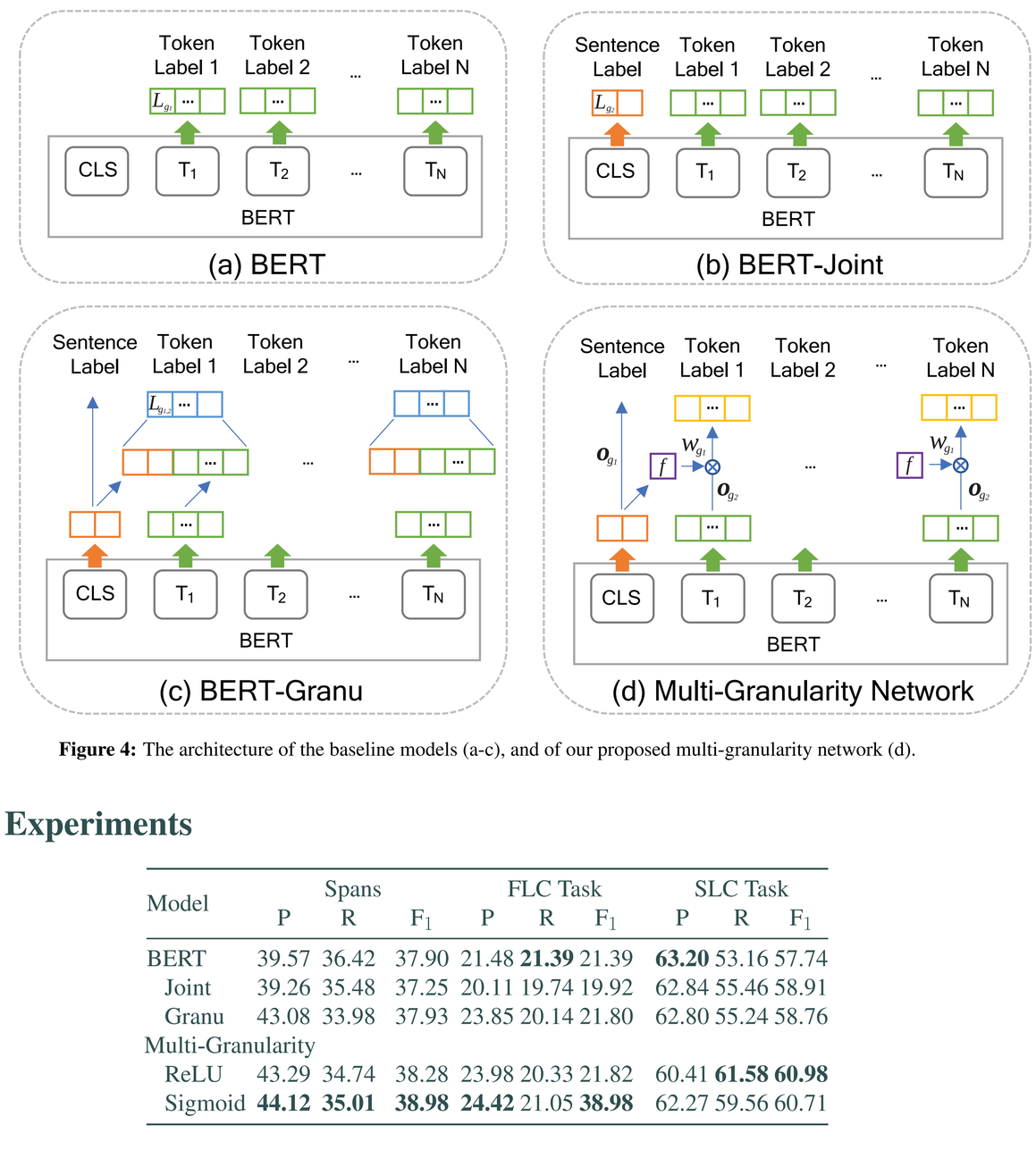


Figure 4: The architecture of the baseline models (a-c), and of our proposed multi-granularity network (d).

Experiments

Model	Spans P	Spans R	Spans F_1	FLC Task P	FLC Task R	FLC Task F_1	SLC Task P	SLC Task R	SLC Task F_1
BERT	39.57	36.42	37.90	21.48	**21.39**	21.39	**63.20**	53.16	57.74
Joint	39.26	35.48	37.25	20.11	19.74	19.92	62.84	55.46	58.91
Granu	43.08	33.98	37.93	23.85	20.14	21.80	62.80	55.24	58.76
Multi-Granularity									
ReLU	43.29	34.74	38.28	23.98	20.33	21.82	60.41	**61.58**	**60.98**
Sigmoid	**44.12**	**35.01**	**38.98**	**24.42**	21.05	**38.98**	62.27	59.56	60.71

Table 1: Evaluation of the models for Spans, FLC and SLC tasks. The proposed models improve over the baselines.

Conclusion and Future Work

- Our fine-grained task can complement document-level judgments, both to come out with an aggregated decision and to explain why it has been flagged as potentially propagandistic.
- We plan to build an online platform to annotate propaganda techniques and expand the corpus.

What We Are Up To

- SemEval 2020 Task 11 on Fine Grained Propaganda Detection:
  https://propaganda.qcri.org/semeval2020-task11
- Our Propaganda Analysis Project (where you can find this paper):
  https://propaganda.qcri.org
- The Tanbih Project, which aims to limit the effect of "fake news", propaganda and media bias by making users aware of what they are reading: http://tanbih.qcri.org