Voting Booklet Bias: Stance Detection in Swiss Federal Communication

Eric Egli, Noah Mamié, Mathias Müller, Eyal Liron Dolev

Are Voting Booklets Neutral?

The voting booklet informs Swiss citizens about upcoming popular votes

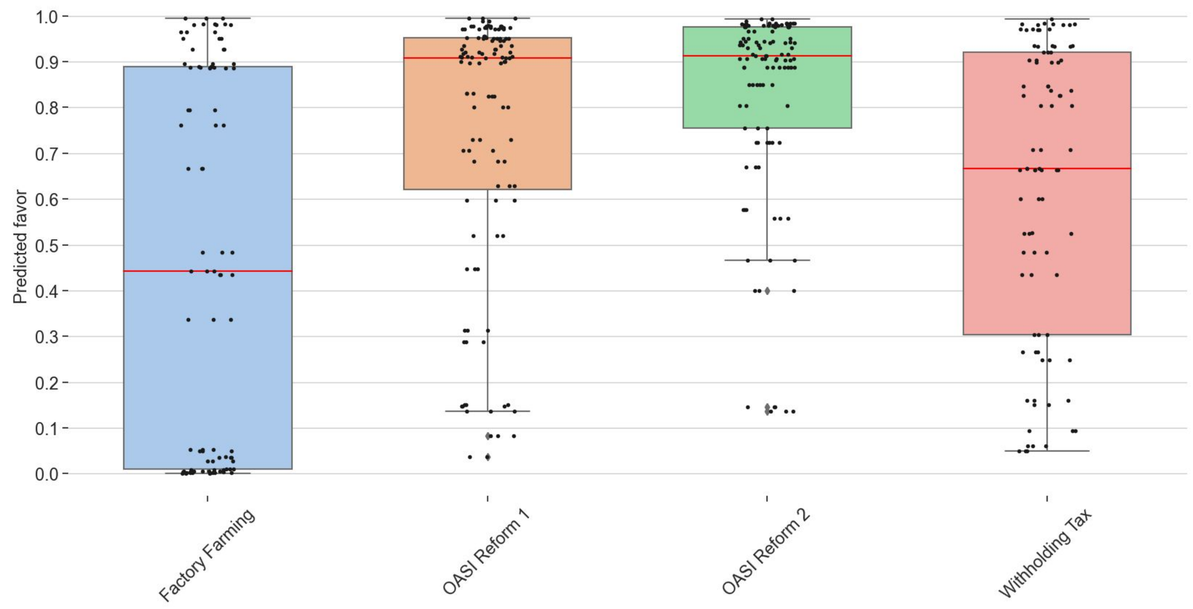
- Voting information shapes voters' opinions
- How neutral is this information?

We conduct **stance detection** on the Swiss federal voting booklets **in German, French and Italian**.

Each paragraph in the booklet is classified as either **in favor** of**, neutral** towards or **against** the initiative's goal (e.g., "No factory farming in Switzerland"). The neutral label is derived using a statistically motivated heuristic and not explicitly trained for.

Main findings

- Factory Farming: Overall balanced statements against and in favor of the initiative
- OASI Reform I & II: Most paragraphs tend to favor the initiative
- Withholding Tax: Slightly more paragraphs in favor of the initiative
- The results are consistent across all languages



Distribution of stance predictions for each issue of the popular vote*

Task and Data

Stance detection

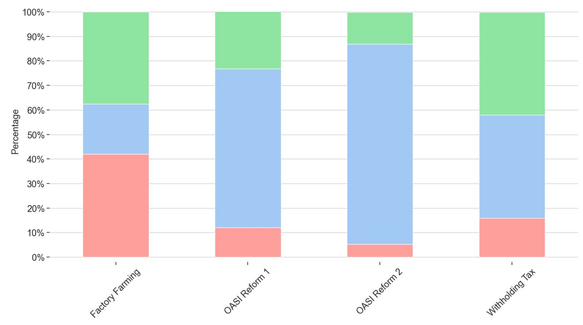
Predict the stance of a statement towards a target embedded into natural language.

Dataset

n = 407 statements in three languages (German, French, Italian), extracted from the Swiss voting booklets of the September 2022 popular vote.

Question (target)	DE	FR	IT
Do you want to accept the popular initiative "No factory farming in Switzerland (Factory Farming initiative)"?	Wollen Sie die Volksinitiative «Keine Massentierhaltung in der Schweiz (Massentierhaltungsinitiative)» annehmen?	Acceptez-vous l'initiative populaire «Non à l'élevage intensif en Suisse (initiative sur l'élevage intensif)» ?	Volete accettare l'iniziativa popolare «No all'allevamento intensivo in Svizzera (Iniziativa sull'allevamento intensivo)»?
Statement			
Switzerland has one of the strictest laws in the world for the protection of animals. The dignity and welfare of animals are protected, regardless of how many animals are kept in one place.	Die Schweiz hat eines der weltweit strengsten Gesetze zum Schutz der Tiere. Würde und Wohlergehen von Tieren sind geschützt, unabhängig davon, wie viele Tiere an einem Ort gehalten werden.	La loi suisse sur la protection des animaux est l'une des plus strictes au monde. La dignité et le bien-être des animaux sont protégés, indépendamment du nombre d'animaux détenus au même endroit.	La Svizzera dispone di una legge sulla protezione degli animali fra le più severe al mondo. La dignità e il benessere degli animali sono tutelati, indipendentemente dal numero di capi detenuti in un allevamento.
Detected stance			
	NEUTRAL	*NEUTRAL*	*NEUTRAL*

Neutral Labels



Distribution of stance labels for each issue of the popular vote**

Previous stance detection models: Binary statement classification with labels "favor" and "against".

Our heuristic: Extending binary classification, a statement *s* is assigned the label "neutral" if its "favor" probability is within one standard deviation of all statements related to its target:

*if ½ - (½ * σ) ≤ p(s) ≤ ½ + (½ * σ) then label = "neutral"*

Model Selection

Reproduction study

We selected Multilingual BERT (M-BERT) for our study due to its cross-lingual benefits over other models. This decision is based on a reproduction study of the X-stance project, where a similar political dataset was analyzed using stance detection.

Results

The results clearly indicate the superior performance of M-BERT in cross-lingual stance detection. Please refer to our paper for a more detailed analysis.

F1-scores of baselines, fastText and M-BERT models for German (DE) and French (FR) test set samples, including their harmonic mean as a third metric. *intra-target* = performance on known questions and topics that were seen during training. *cross-question* and *cross-topic* = performance on unseen kinds of data, where either the type of question or topic are held-out during training. The second group of results are scores reported by Vamvas and Sennrich (2020) that we are aiming to reproduce.

	Intra-target			Cross-question			Cross-topic		
	DE	FR	Mean	DE	FR	Mean	DE	FR	Mean
fastText (X-stance)	69.90	71.20	70.50	62.00	65.60	63.70	63.10	65.50	64.30
M-BERT (X-stance)	76.80	76.60	76.60	68.50	68.40	68.40	68.90	70.90	69.90
fastText (ours)	69.37	71.45	70.41	62.07	62.70	62.39	62.83	63.37	63.10
M-BERT (ours)	76.57	78.13	77.35	66.72	68.88	67.80	68.00	69.37	68.69

Ideas for the Future

- Larger dataset including historic voting booklets
- Analysis of linguistic characteristics
- Relationship to voting outcomes

Figure Notes

* Distribution of stance **predictions** for each issue of the popular vote. Results are aggregated across all languages (German, French and Italian). The y-axis denotes the probability of the "for" label, indicating that a statement supports the target issue. The whiskers extend to the interquartile range. The red line marks the median.

** Distribution of stance **labels** for each issue of the popular vote. The graph shows a three-way classification between "for", "against" and "neutral" (a heuristic, synthetic label). Results are aggregated across all languages (German, French and Italian). Red is against, blue is neutral and green is favor.

University of Zurich[UZH]

easier
intElligent Automatic SIgn languagE tRanslation

paper code poster