

# Multilingual Multi-target Stance Recognition in Online Public Consultations

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CENIA, European Commission's Joint Research Center

ReLeLa chair presentation

# Context

- Participatory Democracy
- Large scale implies automation
- Europe has high diversity of languages, topics, propositions and arguments



# Why Online Public Consultations?



## Use of technology for the social good

- Importance of letting citizen enter in the public debate
- Give insights to the decision makers
- Large-scale citizen consultation projects like *Decidim*<sup>1</sup> or *Make.org*<sup>2</sup>

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<sup>1</sup><https://decidim.org/>

<sup>2</sup><https://make.org/>

# Why Stance recognition?



## Definition

Stance recognition is a Natural Language Processing (NLP) task that has as its objective 17 the automatic detection and classification of the opinions and attitudes expressed by users 18 in different languages on a wide range of topics.

**Unique opportunity to study public opinion on political, societal, and economical issues.**

# Why Multilingual Multi-target?



## One continent, many countries!

Different geographical, sociological, and cultural backgrounds imply high variability:

- In terms of topics of interest
- In terms of language

# Presentation outline

- I. **Debating Europe:** Dataset of stance recognition in debates on ecological topics



We will study stance recognition where the target can be expressed in natural language.

# Presentation outline

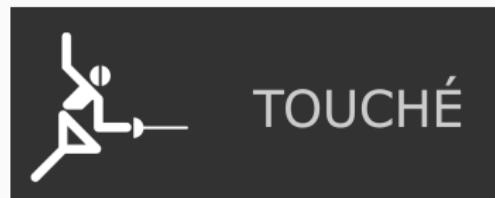
- I. **Debating Europe:** Dataset of stance recognition in debates on ecological topics
- II. **CoFE:** Dataset of stance recognition in multilingual debates



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# Presentation outline

- I. **Debating Europe:** Dataset of stance recognition in debates on ecological topics
- II. **CoFE:** Dataset of stance recognition in multilingual debates
- III. **Touché:** Argumentation Mining Lab



We will study stance recognition where the target can be expressed in natural language.

# Debating Europe

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**Debates**  
Browse all debates



**In Focus**  
Themed debate series



**Schools**  
Student-led debates



**Leaders**  
Debating YOUR ideas

## Debates

### Discuss YOUR ideas with Europe's leaders



**Should we give every homeless person a home?**

In 2007, Finland adopted a "Housing First" policy. This approach, building on efforts Finland has adopted



**Would a 'European FBI' help prevent terror attacks?**

In the 1930s, Bonnie and Clyde seemed unstoppable. Their gang was infamous for a series of brazen bank



**How can we end food waste?**

Roughly 30-40% of total food production in the world is lost before it reaches the market. In the EU alone,

Search debates...

#### Channels

[Asia-Europe](#)

[Future](#)

[Global](#)

[Greener](#)

[Quality](#)

[Security](#)

[Smarter](#)

22 comments

17 comments

8 comments

[Join the debate](#)

## DE – Motivation and Contributions

### Initial problem

Lack of multilingual multi-target stance-annotated debate dataset.

- We created a corpus of annotated stance in English online debates
- We assess the annotation quality by using our data to improve stance recognition in non-English
- We took advantage of the interactional structure of the debate using a context-aware transformer
- We show self-training can be used with the unlabeled data to improve the performances

# Dataset collection

## Does Europe need natural gas and nuclear to transition to green energy?

Started 08/02/2022 Greener

Does Europe need natural gas and nuclear to transition t... A régler ... Partager

## DOES EUROPE NEED NATURAL GAS AND NUCLEAR TO TRANSITION TO GREEN ENERGY?

debating

Regarder sur YouTube

Should nuclear and natural gas be counted as "green energy"? This is the question that European policymakers are grappling with at the moment, as the EU puts together a set of technical rules known as the "EU taxonomy", classifying precisely what counts as a "sustainable" investment.

Germany's environment minister has called the plans "absolutely wrong". His country is in the process of phasing out the last of its nuclear power plants, though critics argue this has left Germany dependent on polluting coal, as well as natural gas imports from Russia.

What do our readers think? We had a comment sent in from [Jessica](#) on our German-language platform, saying:

“As long as [Germany's] traffic light coalition finally gets serious about climate protection, I'm happy. The plans look better than before, but I have my doubts whether the coal phase-out will really happen by 2030. Germany should definitely implement the Green Deal laws consistently!”



24 comments Post a comment

What do YOU think?



Alfredo • February 11th, 2022 • ⚖

Let it freeze, let it freeze...

Write a reply



José • February 11th, 2022 • ⚖

The transition should be done but not that fast. If Russia shuts down gas how will we produce energy? the solar doesn't work all year and neither does the wind. it will be beautiful.

Write a reply



George • February 11th, 2022 • ⚖

Gas and nuclear IS green energy. 😊

Deal with it.

Write a reply



Jevgeni • February 15th, 2022 • ⚖

We are just cutting the branch of the tree we sit on by closing nuke stations, fighting cheap gas..

"green", "sustainable" and other marketing bs is not bringing us anywhere. Solar panels are dirty to produce and recycle and their lifespan is super short, same for windmills - we already have an issue in Europe where to store and how to recycle the one that we have (a huge amount).

We should do things gradually, not just cutting off everything in the name of clean energy. .. there is no such thing like clean energy.

Like Putin told in Berlin years ago: "what Europe will do, heating the houses with wood but for wood we would need to go to Siberia..."

Write a reply

Does Europe need natural gas and nuclear to transition to green energy?

24 comments

JOIN the debate!

<https://www.debatingeurope.eu/debates/>

## Dataset collection and annotation

- The different debate questions, debates texts, debates tags, comments and user ids were collected: 6.5M tokens
- We selected **18 debates** related to the topic of the '*European Green Deal*': *Should we consume less energy?*, *Should we make the cities greener?*, *Can renewables ever replace fossil fuels 100?*, ...
- One expert annotator tagged at the comment level regarding the text was *yes/no/neutral/not answering* toward the close question's debate, using the INCEpTION platform [11]

Label	% DE	Unit	$\mu_{com}$	$\mu_{deb}$	$\Sigma$
✗	100%	Comments	∅	89.5	125,798
		Words	51.7	4,623	6,499,625
✓	2.0%	Comments	∅	140	2,523
		Words	33.4	4,683	84,289

**Table 1:** Low-level statistics on the DE dataset.

# Experiments

## Experiment I: Multilinguality

Our labels come from one annotator, how to validate them using another dataset? Is our dataset useful for multilingual transfer learning? We used the multilingual X-Stance dataset [14] and studied transfer learning

## Experiment II: Interactional Context

The data is from online debates. Is it possible to simply integrate the interactional context inside the transformer?

## Experiment III: Semi-supervised learning

We annotated only 2% of the website. How to take advantage of the unbalanced and unlabeled data from the whole website?

## Technicalities

- We used pre-trained XLM-R [6] from the transformers library [15]
- Max sequence length of 128
- Optimization using Adam [10]

The data were represented as:

[CLS] Target [SEP] Comment [SEP]

We reformulated the debates as closed questions before using them as Target text.

# Experiment I: Multilinguality

- X-stance: a dataset of multi-lingual multi-target stance recognition [14]
- No interaction between the users
- Multilingual: French, German and Italian
- Pretraining our model over our data helps to improve the results for non-English languages

	Intra-target			X-question			X-Topic			X-lingual	
	DE	FR	Mean	DE	FR	Mean	DE	FR	Mean	IT	
M-BERT [14]	76.8	76.6	76.6	68.5	68.4	68.4	68.9	70.9	69.9	70.2	
XLM-R	76.3	78.0	77.1	71.5	72.9	72.2	71.2	73.7	72.4	73.0	
XLM-R <sub>ft</sub>	77.3	79.0	<b>78.1</b>	71.5	74.8	<b>73.1</b>	72.2	74.7	<b>73.4</b>	<b>73.9</b>	

**Table 2:** Results over X-Stance dataset for a binary classification.

## Experiment II: Interactional Context

*Can renewables ever replace fossil fuels 100%?*

*How to avoid an energy crisis ?*

*Should Europeans be encouraged to eat more sustainably?*

...

That would be the ultimate reality as fossil fuels are a non-renewable and antiquated energy resource.

Carmelo A.

...

Hydrogen! Germany is already studying and improving hydrogen as energy for cars. If cars can run...

Vincente S.

...

I agree that the key to influence consumers is through education. I think one major problem that...

Alma

In foreseeable future and without subsidies, not.

Pawel K.

Vicente, obtaining hydrogen from water is an endothermic reaction. I believe approximately -8 kCal/mole....

Jovan I.

What a great idea!

Silvia P.

No , well not the current ones ,and please get rid of those horrible giant wind turbines

Kevin

Well I am not an engineer, but once I saw a documentary about Hydrogen and they were showing a small machine that some...

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## Experience II: Interactional Context

Ctxt	Prec	Rec.	F1	Acc
0	70.7	69.9	70.2	72.1
1	72.1	70.5	<b>71.2</b>	<b>72.7</b>
2	70.7	69.8	70.2	<b>72.7</b>

**Table 3:** Results over DE for different context windows. All the models were pre-trained over XS (XLM-R<sub>ft</sub>)

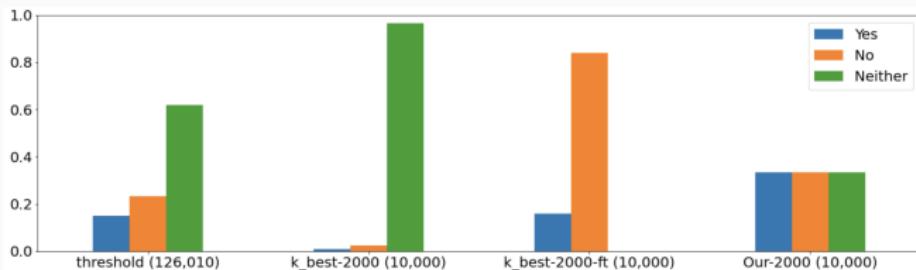
- We tried 3 different size for the context window
- Larger does not necessarily mean better

## Experiment III: Semi-supervised learning

Label	% DE	Unit	$\mu_{com}$	$\mu_{deb}$	$\Sigma$
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**Table 4:** Low-level statistics on the DE dataset, regarding there is label annotation or not.  $\mu_{com}/\mu_{deb}$  is the average mean of the respective units (comments or words) at the comment/debate-level.

**Figure 1:** Distribution of the pseudo-labels



## Experience III: Semi-supervised learning

Unsupervised Method	Threshold	$k_{max}$	Balanced	Model	Prec.	Rec.	F1	Acc
$\times$	$\times$	$\times$	$\times$	XLM-R XLM-R <sub>ft</sub>	68.6 70.7	69.3 69.9	68.9 <b>70.2</b>	70.1 <b>72.1</b>
thresh-0.99	0.99	$\times$	$\times$	XLM-R XLM-R <sub>ft</sub>	68.6 68.9	69.8 69.6	69.1 69.0	70.7 70.9
k-best-2000	$\times$	2000	$\times$	XLM-R XLM-R <sub>ft</sub>	67.5 70.4	68.3 69.9	67.8 69.8	69.3 71.9
k-best-600	$\times$	600	$\times$	XLM-R XLM-R <sub>ft</sub>	69.4 72.5	68.5 70.3	68.0 71.1	69.5 73.3
our-2000	0.99	2000	✓	XLM-R XLM-R <sub>ft</sub>	69.5 70.5	69.4 69.9	69.4 69.3	71.3 71.7
our-600	0.99	600	✓	XLM-R XLM-R <sub>ft</sub>	70.9 71.5	71.6 71.5	71.1 <b>71.4</b>	72.7 <b>73.5</b>

**Table 5:** Results over the Debating Europe dataset for a 3-class classification using SSL

- Debating Europe: A new dataset of online political debates
- Annotation of a subpart of the dataset in stance
- We showed our annotation are useful using multi-lingual transfer learning
- We proposed a simple method to integrate context and show its efficiency
- We proposed a method to take advantage of unlabeled and unbalanced data

### Associated paper

[4]: Debating Europe: A Multilingual Multi-Target Stance Classification Dataset of Online Debates, Valentin Barriere and Alexandra Balahur,  
*Proceedings of the LREC 2022 workshop on Natural Language Processing for Political Sciences*

**CoFE**

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## What is CoFE? TLDR

- We propose a dataset of proposals and comments from the **CoFE** Participatory Democracy platform composed of 4k proposals and 20k comments
- **Intra-multilingual:** Automatic translation helps users to interact in their native languages
- **Multi-target:** 4k targets formulated in natural language
- It contains 7k comments self-annotated in stance by the users + 1.2k externally annotated comments in stance (3 classes)



Conference  
on the **Future**  
of Europe

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- It contains 7k comments self-annotated in stance by the users + 1.2k externally annotated comments in stance (3 classes)
- We propose a shared task @ CLEF 2023



Conference  
on the **Future**  
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# What does a proposal look like?

## Reforesting Europe



Eduardo Rafael Moreira Dos Santos

21/04/2021 00:31

21/04/2021 00:35 ■ 26 comments

168 Endorse

1025 | Follow

Europe is becoming increasingly arid if it is not stopped, it will have disastrous consequences that could lead to the desertification of several southern countries. Planting trees is imperative and we must start this battle, as if a pandemic were being dealt with. Our planet is getting sick and climate changes are killing thousands of people every year. Planting millions of trees a year is possible. We must start now as fast as we can. Recover the Atlantic Mediterranean fauna and flora is one of the most urgent targets to achieve in next 2 years. 300 million trees across Europe , with special care in Portugal, Spain, Italy and Greece. The ecosystem will improve drastically in a short period of time and the weather will get cooler. To improve our climate changes , we must plant trees, without them our world cannot have a life. We need urgent with effort from our world leaders to face this subject as the most urgent matter. The changes we all gonna achieved are so massive that we will see our planet healing and breath again. Everything is in our hands. We need to fight and save our planet

Please, let's make our old continent example and enrich our nations full of biodiversity.

Reference: cofe-PROP-2021-04-834

Version number 2 (of 2) [see other versions](#)

Share

Embed

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# What does a comment thread look like?



Bernd Erbert 21/04/2021 12:10

In favor

Ich finde es wichtig das Wälder, insbesondere Mischwälder, Aufgeforstet werden

▲ 11 ▼ 0



Jan Jelínek 24/04/2021 09:45

U nás je ale běžnou praxí, že než dojde k sázení musí vzniknout rozsáhlá mýtina za použití těžké techniky. Tedy nejprve se zničí podrost, hrabanka a podhoubití a teprve po té přijde někdo se sazenicí. Ta následně uschne nebojí sežere přemnožená hladová zvěř, kterou myslivci v průběhu roku dokrmují, aby měli co střílet.

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 0  0

## Similar datasets

Datasets where the target is reformulated in a **natural question** in order to easily train one multilingual multi-target model on the entire dataset:

### XStance [14]

Answers over one of 150 political issues in 3 languages by Swiss citizen

### Procon [9]

Answers over one of 419 controversial issues in English from an online website

### Debating Europe [4]

Comments in a debate over one of 18 hot topics in 2 languages by European citizen

# Positioning

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- We introduce the concept of **intra-multilinguality**: comments and the propositions in the same discussion can be written in different languages
- **High variability** in targets
- Restricting a dataset to one language could induce nationality or cultural bias

⇒ Lack of an appropriate intra-multilingual multi-target stance-annotated debate dataset

# Some statistics: 10 Designed Topics



Climate change and the environment



Health



A stronger economy, social justice and jobs



EU in the world



Other ideas



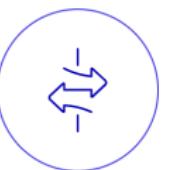
Values and rights, rule of law, security



Digital transformation



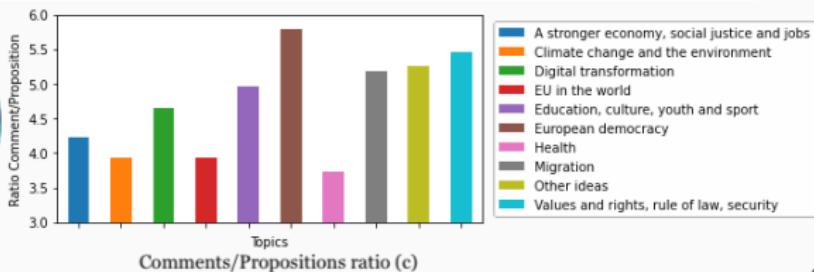
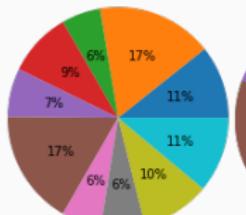
European democracy



Migration

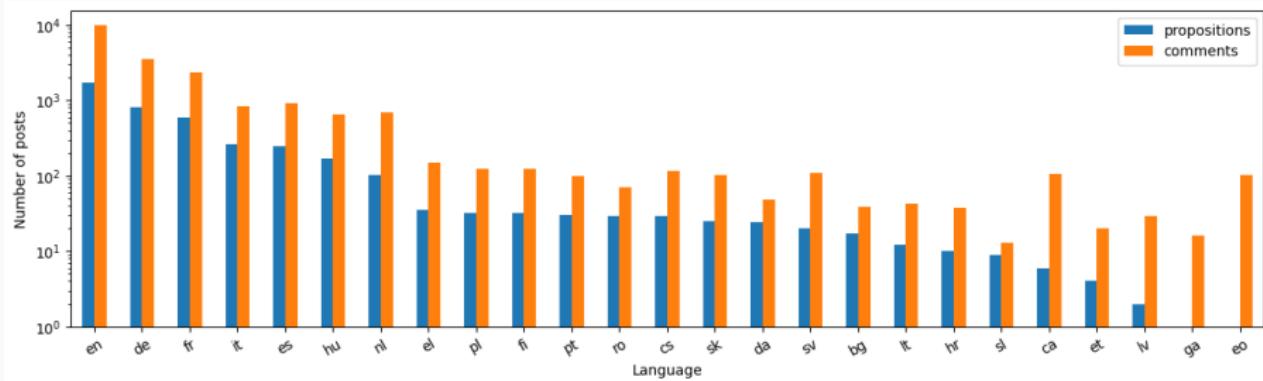


Education, culture, youth and sport



# Some statistics: Variety in languages

25 languages: EU 23 languages + Esperanto and Catalan



- Very unbalanced distribution: English, German, French, Spanish and Italian are the main languages
- **Automatic translation** of every comments in any of the EU 24 languages allows the user to interact in different languages inside the same thread

## Some statistics: Threads of proposal and comments

### Threads size

- 4,247 proposals with at least 1 comment
- 15,961 threads of 1 to 4 comments answering to each other
- 5,085 threads of 2 or more comments

### Multilinguality

- 40% of the proposal/comment pairs, and 46% of the threads include at least two language
- 684 debates contain three or more distinct languages

Length	1	2	3	4	all
Number	10,876	2,365	1,920	800	15,961

**Table 6:** Number of threads regarding their length in term of comments

# Examples

Title	Topic	Proposal	Comment	Stance	url
Focus on Anti-Aging and Longevity research	Health	The EU has presented their green paper on ageing, and correctly named the aging...	The idea of prevention being better than a cure is nothing new or revolutionary. Rejuvenation...	Pro	
Set up a program for returnable food packaging...	Climate change and the environment	The European Union could set up a program for returnable food packaging made from...	Bringing our own packaging to stores could also be a very good option. People would be...	Pro	
Impose an IQ or arithmetic-logic test to immigrants	Migration	We should impose an IQ test or at least several cognitive tests making sure immigrants have...	On ne peut pas trier les migrants par un simple score sur les capacités cognitives. Certains fuient la guerre et vous...	Against	
Un Président de la Commission directement élu...	European democracy	Les élections, qu'elles soient présidentielles ou législatives, sont au coeur du processus...	I prefer sticking with a representative system and have the President of the...	Against	
Europa sí, pero no así	Values and rights, rule of law, security	En los últimos años, las naciones que forman parte de la UE han visto como su soberanía ha sido...	Zdecydowanie nie zgadzam się z pomysłem, aby interesy indywidualnych Państw miały...	Against	

Table 7: Examples of comments and proposals with the associated stance

## 4 CoFE Subdatasets

### **CF<sub>S</sub>: Self-annotations**

A subparts of the comments have been self-annotated by the commenter him/herself. Those annotations are binary: *In favor* or *Against*.

### **CF<sub>U</sub>: Unlabeled**

The subpart of the comments that does not have any annotation

### **CF<sub>E-D</sub> and CF<sub>E-T</sub>: Externally annotated**

We annotated 2400+ comments in a 3-class fashion

- We used the Inception annotation platform [11]
- 6 morphologically different languages: French, German, English, Greek, Italian and Hungarian
- We calculated inter-annotator agreement using Krippendorff  $\alpha$

## 4 CoFE Subdatasets

Dataset	XStance	DE	$CF_S$	$CF_{E-D}$	$CF_{E-T}$	$CF_U$	CF
Classes	2	3	2	3	3	$\emptyset$	$\emptyset$
Languages	3	2	25	21	17	25	25
Targets	150	18	2,731	936	771	2,892	4,247
Comments	67,271	2,523	7,002	1,414	1,228	12,024	20,215
Debate	✗	✓	✓	✓	✓	✓	✓
Intra Mult.	✗	✗	✓	✓	✓	✓	✓

**Table 8:** Comparison with other annotated datasets

## Baselines for scarce annotation regimes

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How to get good results on a 3-class dataset with scarce 3-class annotations?

We calculate some baselines over the **tri-class  $\mathbf{CF}_E - T$  dataset**, using the similar available annotated resources: X-Stance and  $\mathbf{CF}_S$  that are binary annotated and Debating Europe and  $\mathbf{CF}_{E-D}$  that are ternary annotated.

We compared with two SOTA baselines for stance detection:

- [7]: Cross-Domain Label-Adaptive Stance Detection, in English
- [8]: Few-shot Cross-Lingual Stance Detection with Sentiment-Based Pre-Training

## Baselines for scarce annotation regimes

Model	Annotations used			-	~	+	Acc.	M-F1
	CoFE-3	CoFE-2	OODataset					
[7] + MT	X	X	✓	7.7	29.5	61.4	46.3	32.8
[8]	X	X	✓	20.7	19.1	58.9	43.2	32.9
Cross-dataset	X	X	✓	45.3	44.0	62.6	52.7	50.6
All - 1 training	X	✓	✓	56.8	00.6	77.9	62.9	45.1
Cross-debate	X	✓	✓	54.3	41.4	77.3	63.0	57.6
All - 2 trainings	X	✓	✓	52.9	45.0	76.3	63.1	<b>58.1</b>
CF <sub>E-D</sub> - 1 training	✓	✓	X	42.1	39.9	75.6	62.3	52.5
All - 1 training	✓	✓	✓	57.9	30.0	78.5	65.4	55.5
All - 2 trainings	✓	✓	✓	57.3	40.2	80.5	67.3	<b>59.3</b>

**Table 9:** F1, Macro-F1 and Accuracy of the different baselines over CF<sub>E-T</sub>

Pre-training over the dataset that only have 2 labels before fine-tuning over the dataset that has 3 labels helps to obtain the best results.

## Self-Training setting

**Table 10:** Results of the best model over the  $CF_{E-T}$  dataset for a 3-class classification using ST with the unlabeled  $CF_U$  dataset.  $k_{max}$  is the number of examples added at each iteration.

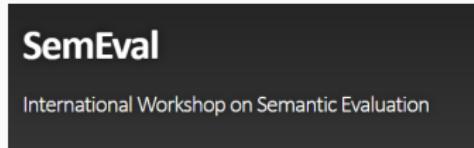
Unsupervised Method	Threshold	$k_{max}$	Balanced	-	$\sim$	+	Acc	M-F1
$\times$	$\times$	$\times$	$\times$	57.3	40.2	80.5	67.3	59.3
thresh-0.99	0.99	$\times$	$\times$	43.6	55.8	77.3	65.2	58.9
k-best-2000		$\times$	2000	$\times$	59.6	42.6	79.9	66.2
k-best-600		$\times$	600	$\times$	51.8	50.4	78.8	66.4
our-2000	0.99	2000	✓	57.6	52.7	79.2	67.8	<b>63.2</b>
our-600	0.99	600	✓	56.8	51.5	76.4	65.1	61.6

# Dataset Availability

- The  $\text{CF}_S$  and  $\text{CF}_U$  datasets will be available on demand
- $\text{CF}_E$  will be used as a test set of one of the Touché Lab @ CLEF23:  
**Intra-Multilingual Multi-Target Stance Classification**



- $\text{CF}_S$  will be used as data for the ValueEval task SemEval 2023:  
**Identification of Human Values behind Arguments**



# CoFE – Conclusion

- New **stance dataset in online debate** on contemporary issues
- 20k **comments** and 4.2k **proposals**
- **Intra-multilingual** interactions between participants
- CF<sub>S</sub>: 7k annotated comments in a **binary** way
- CF<sub>E</sub>: 1.2k annotated comments in a **ternary** way
- **Baselines** proposed on the CF<sub>E</sub> dataset without training over it
- Participate to our **shared task @ CLEF 2023** ([click here!](#))

## Other associated paper

[4]: CoFE: A New Dataset of Intra-Multilingual Multi-target Stance Classification from an Online European Participatory Democracy Platform, Valentin Barriere, Guillaume Jacquet, Léo Hémamou, *Proceedings of ACL-IJCNLP*

# **Touché Lab on Argumentation Mining**

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## What is Touché?

Touché is a series of scientific events and shared tasks on computational argumentation and causality.

NAME	EDITION
Argument Retrieval for Comparative Questions	[2022] [2021] [2020]
Argument Retrieval for Controversial Questions	[2023] [2022] [2021] [2020]
Evidence Retrieval for Causal Questions	[2023]
Human Value Detection	[2023]
Image Retrieval for Arguments	[2023] [2022]
Intra-Multilingual Multi-Target Stance Classification	[2023]

More info at: <https://touche.webis.de/>

## 4 subtasks

- Argument Retrieval for Controversial Questions
- Evidence Retrieval for Causal Questions
- Image Retrieval for Arguments
- **Intra-Multilingual Multi-Target Stance Classification**

Given a proposal on a socially important issue, the task is to classify whether a comment is in favor, against, or neutral towards the proposal. The test set is the one presented earlier:  $CF_{E-T}$ .

## Other associated paper

[5]: Overview of Touché 2023: Argument and Causal Retrieval: Extended Abstract, Bondarenko et al., *Proceedings of ECIR 2023*

**Goal:** Given a textual argument and a human value category, classify whether or not the argument draws on that category.



Security: societal

*It is good to have a secure and stable wider society.*

Contained values and associated arguments (examples):

- Have a safe country: arguments towards a state that can better act on crimes, and defend or care for its citizens, or towards a stronger state in general
- Have a stable society: arguments towards accepting or maintaining the existing social structure or towards preventing chaos and disorder at a societal level

## Other associated paper

[12]: The Touché23-ValueEval Dataset for Identifying Human Values behind Arguments, Mirzakhmedova et al., arXiv

**Goal:** Given a textual argument and a human value category, classify whether or not the argument draws on that category.



Universalism: nature

*It is good to preserve the natural environment.*

Contained values and associated arguments (examples):

- Be protecting the environment: arguments towards avoiding pollution, fostering to care for nature, or promoting programs to restore nature
- Have harmony with nature: arguments towards avoiding chemicals and genetically modified organisms (especially in nutrition), or towards treating animals and plants like having souls, promoting a life in harmony with nature, and resulting in more people reflecting the consequences of their actions towards the environment
- Have a world of beauty: arguments towards allowing people to experience art and stand in awe of nature, or towards promoting the beauty of nature and the fine arts

## Other associated paper

[12]: The Touché23-ValueEval Dataset for Identifying Human Values behind Arguments, Mirzakhmedova et al., arXiv

**Goal:** Given a textual argument and a human value category, classify whether or not the argument draws on that category.



## Hedonism

*It is good to experience pleasure and sensual gratification.*

Contained values and associated arguments (examples):

- Have pleasure: arguments towards making life enjoyable or providing leisure, opportunities to have fun, and sensual gratification

## Other associated paper

[12]: The Touché23-ValueEval Dataset for Identifying Human Values behind Arguments, Mirzakhmedova et al., arXiv

## Conclusion

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## Conclusion and Future Works

- Two new **stance datasets in online debate** on contemporary issues
- Defined the concept of **Intra-multilingual** interactions between participants
- Proposed a 2-step method to train a 3-class stance classifier in a **scarce target domain ternary annotation regime**, showed the usefulness of this approach compared to baselines
- Proposed a **self-training method** to leverage unlabeled and unbalanced dataset from the target domain
- Participate to our **shared task @ CLEF 2023** ([click here!](#))

Thanks for listening!

### Main associated paper

[3]: Multilingual Multi-target Stance Recognition in Online Public Consultations, Valentin Barriere, Guillaume Jacquet, Léo Hémamou, *accepted to MDPI Mathematics, Special issue on Human Language Technology*

## Conclusion and Future Works

- Study stance in a **live debates**, like virtual video-conference meetings to use the real-time interactions between the participants [13]
- Leverage **multimodal data**, by modeling non-verbal language like acoustics, facial expressions or gestures [2]
- **Extract** the span of text related to the stance
- Moderate the debate using a **Conversational Agent** [1]

Thanks for listening!

### Main associated paper

[3]: Multilingual Multi-target Stance Recognition in Online Public Consultations, Valentin Barriere, Guillaume Jacquet, Léo Hémamou, accepted to MDPI Mathematics, Special issue on Human Language Technology

**Questions?**

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