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OBSERVATOIRE DE RECHERCHE SUR LES MÉDIAS ET LE JOURNALISME

Detecting opinion in news:
An automated analysis of linguistic subjectivity in French-language press articles

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fnrs
LA LIBERTÉ DE CHERCHER

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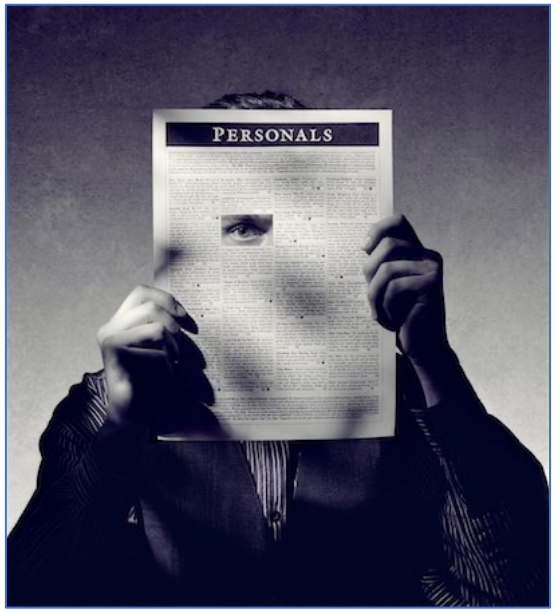
A True and Fair View

State of the art

- **Journalistic objectivity** is altogether a structural norm, a set of editorial practices, and a **writing style**. [Koren, 2004]
- Through a variety of writing techniques (strategic ritual of objectivity), journalists can **mask their enunciative subjectivity** [Tuchman, 1972] :
    - Impersonal verbs and phrases
    - Less adjectives and adverbs
    - More citations and numbers
    - Neutral punctuation
    - …
- Most journalists admit that complete objectivity is an **unattainable ideal** towards which they still must strive. [Lagneau, 2002]



State of the art

- In **linguistics**, a sentence can be considered objective if it does not contain any subjective unit. [Wiebe et al., 2005]
- **Subjective units** are « linguistic cues through which the speaker/writer inscribes him/herself in the statement » [Kerbrat-Orecchioni, 1980]
- They can be morpho-syntactic, lexico-semantic and stylistic. [Krüger et al., 2017]

Morpho-syntactic	Lexico-semantic	Stylistic
• Pronouns : *I, you, we*...	• Words with positive/negative connotation	• Expressive punctuation : *? !* ...
• Negations	• Word complexity	• Sentence length
• More adjectives, less verbs	• ...	• Less citations
• ...		• ...

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Context

- **Opinions** have been shown to be more and more present in North-American news. [Alhindi et al., 2020]
- In Europe, 50% of users (75% of users under 30) inform themselves primarily through **social media**. [Matsa et al., 2018]
- **Recommandation algorithms** tend to favor emotional and polarizing content. [Diakopoulos, 2019]

Objectives :

- Understand the **linguistic mechanisms** of subjectivity in news articles.
- Build an **efficient and explainable algorithm** for automated subjectivity detection.
- Provide **contextualization cues** for readers of online information.

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Experiment n°1

Automated classification of *opinion* vs *information* articles.

- Data : **13.400 French articles** from RTBF (Belgian public service)
  - 6.700 **opinion** pieces (editorials, reviews…)
  - 6.700 **information** pieces (news, press agency dispatches…)
- **30 linguistic features** of subjectivity were extracted from each article. [Krüger et al., 2017]
- A **logistic regression classifier** was trained on the features :
  - Trained on 90% of data (10-fold cross-validation), evaluated on 10%.
  - 18 best features selected in order to build the best classifier.
- Results : **89% accuracy**

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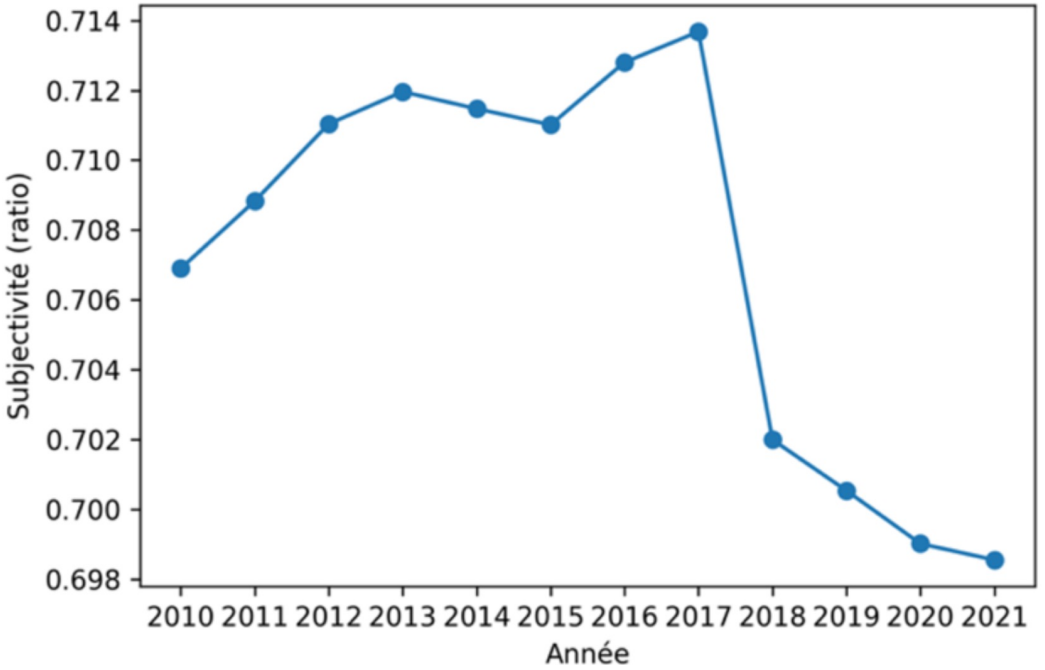
Experiment n°2

How has subjectivity evolved over 12 years?

- Data: **120.000** RTBF ***information*** articles
  - 10.000 articles/year (2010 ➔ 2021)
  - 36 M tokens in total
- A **subjectivity score** was assigned to each article (0 < *score* < 1)

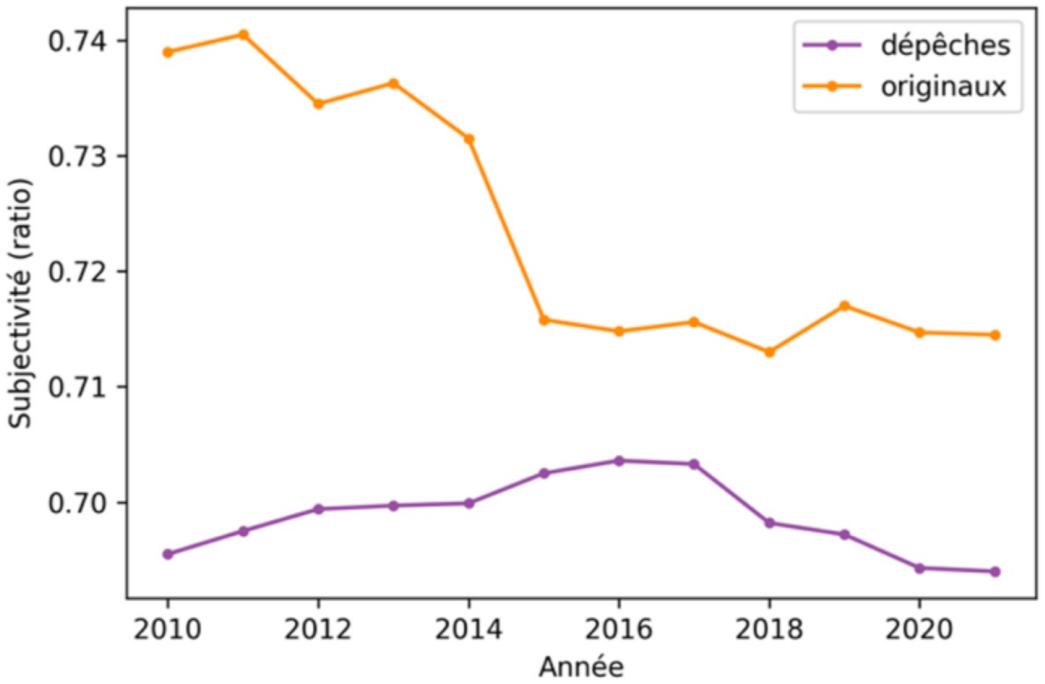
- **Interviews** with 2 chief editors from RTBF to interpret our results:
  - **2017 ➔** complete replacement of the redaction team

  + dispatch publication automated



Mean subjectivity score of RTBF articles between 2010 and 2021

Experiment n°2



Mean subjectivity score of dispatches and original RTBF articles from 2010 to 2021.

Comparative analysis of *dispatches* vs *originals*

- Press agency dispatches are significantly **less subjective** than articles written by RTBF journalists.
- **2014 ➔** all journalists (TV, radio…) need to produce content for the RTBF website.
  - ➢ **Uniformization** of writing (guidelines) and **optimization** for algorithmithic visibility (Google and social media)
  - ➢ Dispatches need to be "**enriched**" before publication.

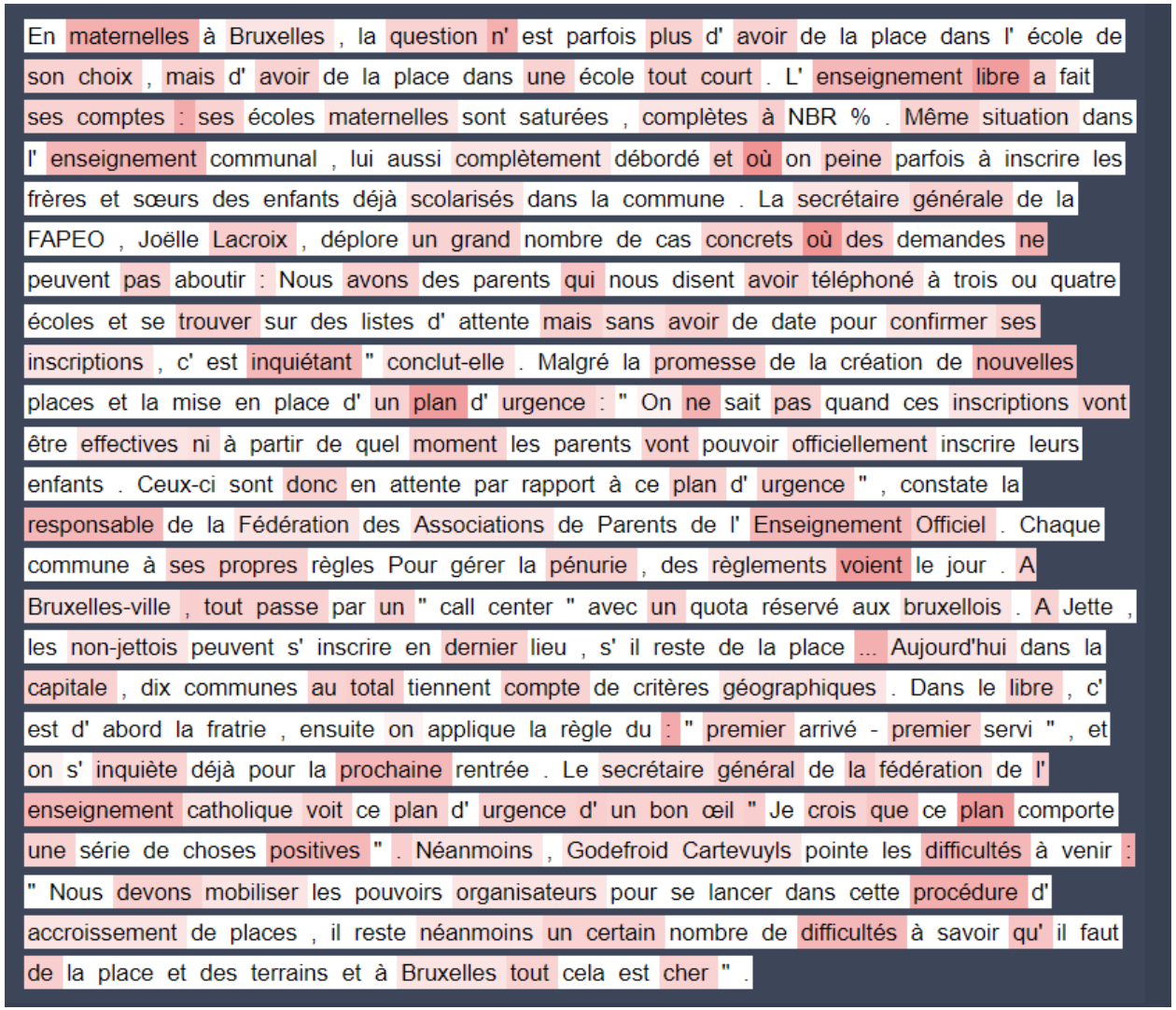
Conclusions and perspectives

- ✓ Our observations **reflect** internal editorial movements, which supports the validity of the score.
- ✓ Recommandation algorithms have **influenced** RTBF's journalistic writing, but **not as expected**.

- ❑ Can this model be used as a **tool** for journalists and readers to improve media literacy?
- ❑ This model was built using linguistic rules. But how and how well do **humans** and **AI** analyze subjectivity?

Further research:

- We built an explainer to **visualize** our linguistic model's decisions.



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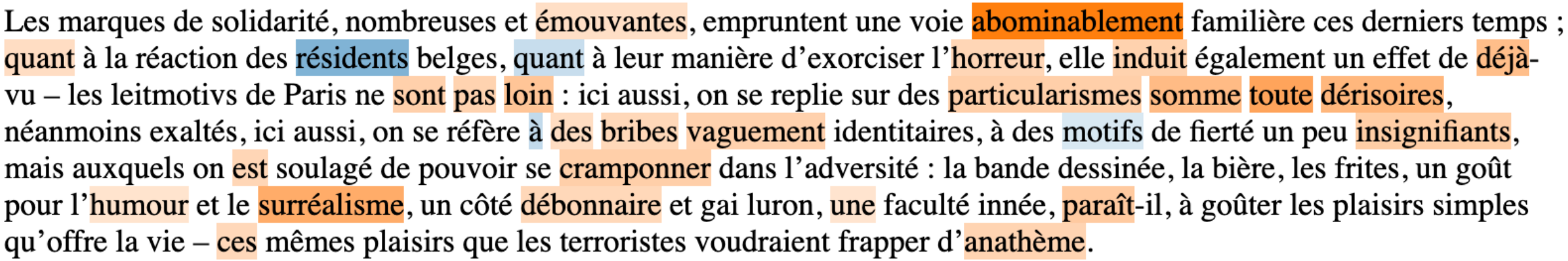
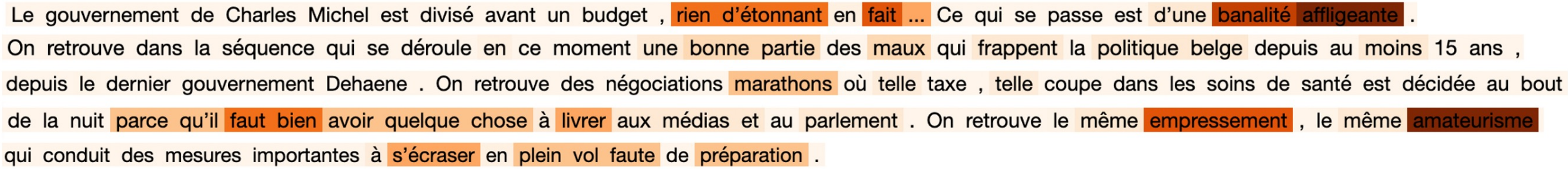
- We built an explainer to **visualize** our linguistic model's decisions.
- We trained a ***deep learning* model** (CamemBERT ; Martin et al., 2019) to classify *information* and *opinion* articles (**97% accuracy**).



Further research:

- We built an explainer to **visualize** our linguistic model's decisions.
- We trained a ***deep learning* model** (CamemBERT ; Martin et al., 2019) to classify *information* and *opinion* articles (**97% accuracy**).
- We asked **40 students** in journalism to highlight the **subjective elements** in 150 RTBF articles.



We are **comparing** the 3 approaches in order to build an efficient and explainable model for automated subjectivity analysis.

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Thank you!

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Opinion			
Mesure	**coef.**	**SE**	***p***
nb_on	101.3	7.32	< 0.001
pron_rel	54.34	4.49	< 0.001
nb_neg	49.51	5.31	< 0.001
nb_adj	22.85	1.62	< 0.001
lexique3_sentiment	16.34	5.78	0.005
nrc_sentiment	10.39	1.71	< 0.001
nb_exclam	9.35	0.76	< 0.001
nb_interrog	6.7	0.63	< 0.001
nb_pointvirg	6.22	0.9	< 0.001
nb_susp	3.90	0.79	< 0.001
nb_deuxpoints	3.74	0.48	< 0.001
blob_sent	2.43	0.59	< 0.001
cttr	1.85	0.04	< 0.001

Information			
Mesure	**coef.**	**SE**	***p***
nb_digits	79.26	3.36	< 0.001
pron_1	46.28	4.95	< 0.001
nb_vb	13.2	1.25	< 0.001
length_words	3.72	0.08	< 0.001
nb_citations	0.37	0.01	< 0.001

Most discriminating indicators

- For ***opinion***:

  Pronoun *on* (= *we/one*), relative pronouns, negations, adjectives, sentiment words, expressive punctuation...

- For ***information***:

  Use of numbers, first person pronouns, verbs, long words, citations.

Experiment n°1