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GeNRe: A French Gender-Neutral Rewriting System Using Collective Nouns

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📖 Outline

I. Purpose and Objectives

II. Methodology and Models

III. Results

I. Purpose and Objectives

French language and masculine generics

In French, grammatical gender matches the referent's for humans:

un dans<u>eur</u> (*a dancer*$^{\text{male}}$); une dans<u>euse</u> (*a dancer*$^{\text{female}}$)

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Masculine gender considered as default (**masculine generics**; MG) when referring to groups of both men and women:

> « **Les étudiants**$^{\text{MG}}$ ont été invités à participer à l'atelier. »
> (***Students***^{MG} *were invited to participate to the workshop.*)

Masculine generics and bias

Psycholinguistics studies in French and other languages with masculine generics show they bias towards male-centric mental representations **(Stahlberg et al., 2001; Gygax et al., 2008; Gygax et al., 2012; Harris Interactive, 2017; Körner et al., 2022)**.

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Why is this important for NLP?

- **in machine translation systems**, potential **gender bias** when translating from/to languages with different gender systems **(Prates et al., 2020; Savoldi et al., 2021; Vanmassenhove, 2024)**
- **in text generation models/LLMs**, increased male representation **at the expense of women and non-binary people** **(Doyen & Todirascu, 2025)**

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Definition: generating one or more alternative sentences that either neutralize gender, adopt inclusive forms, or switch to a different gender

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- User-Centric (M → F / F → M) Rewriting (Arabic: **Alhafni et al. (2022a); (2022b); Habash et al. (2019)**);
- Inclusive Rewriting (German: **Pomerenke (2022)**; Portuguese: **Veloso et al. (2023)**; French: **Lerner et Grouin (2024)**);
- Neutral Rewriting (English: **Sun et al. (2021); Vanmassenhove et al. (2021)**).

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No French neutral rewriting system, and collective nouns unexploited for gender-neutralization in French

Neutral Rewriting for French

Our work uses **human collective nouns** **(Lecolle, 2019)** for neutralizing gender, as their grammatical gender does not depend upon the referent's.

Examples: personnel (*staff*), jury, police, armée (*army*)...

Masculine generics		**Collective noun**
Tous les anciens **employés**^{MG} sont invités au gala. (*All former* ***employees***^{MG} *are invited to the gala*.)	→	L'ancien **personnel** est invité au gala. (*Former* ***staff*** *is invited to the gala*.)

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Masculine generics

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(*All former* ***employees***^{MG} *are invited to the gala.*)

→

Collective noun

L'ancien **personnel** est invité au gala.

DET ADJ VERB

(*Ø Former* ***staff*** *is invited to the gala.*)

II. Methodology and Models

Methodology

1. Creating a dictionary with French collective nouns and their masculine generics member nouns counterparts, gathering **315 entries**.

Member noun (MG)	Collective noun
employés (*employees*)	personnel (*staff*)
jurés (*jury members*)	jury
policiers (*police officers*)	police
soldats (*soldiers*)	armée (*army*)
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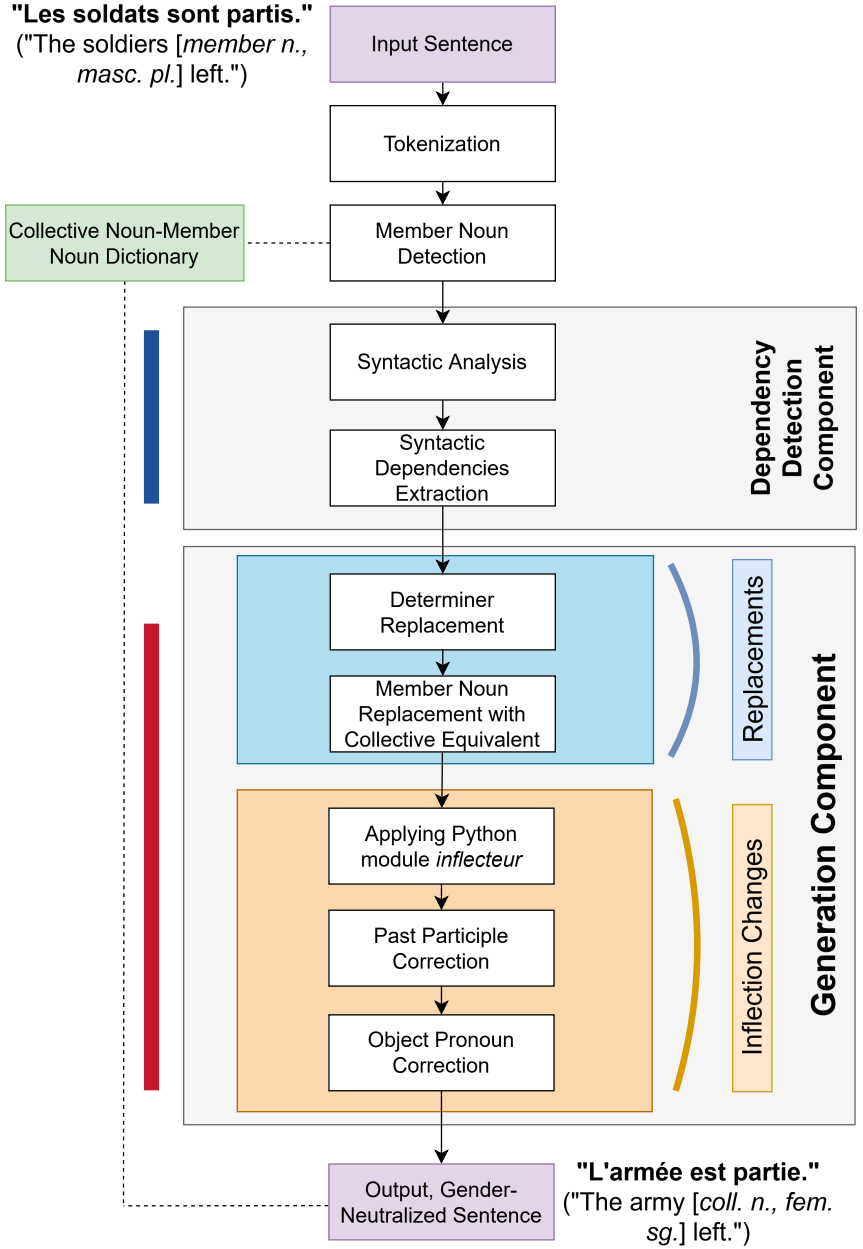
2. Extracting sentences containing member nouns from a French Wikipedia corpus **(graelo, 2023)** and Europarl **(Koehn, 2005)**, got **398,954 sentences**.
3. Developing **three different models for rewriting**: a rule-based system (RBS), fine-tuned models and an instruct-based model.

Rule-based system (RBS)

- Tokenizing input with *spaCy* v.3.7.4 **(Montani et al., 2024)**, detecting member nouns using our member noun-collective noun dictionary
- Using **two main components**:
  - **dependency detection component** to find member noun syntactic dependencies (determiners, adjectives, verbs…);
  - **generation component** to replace member nouns with their collective equivalents and reinflect using Python library *inflecteur* **(Chuttarsing, 2021)**: **73.42% acc.** on our data
    - additional changes by our RBS: **+2.34 acc.**



Fine-tuned models

- Finetuned T5-small **(Raffel et al., 2020)** & M2M100 **(Fan et al., 2020)** on 60,000 RBS-converted sentences (Wikipedia/Europarl). Used 6,000 (10%) for eval. Hypothetical 0.27 WER improv. shown by **Vanmassenhove et al. (2021)**.

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Instruct-based model

- Model type not used in other works for this specific task. Using Claude 3 Opus **(Anthropic, 2024)** with few-shot prompting.

Instruction Type	Description
BASE	Asking to replace member nouns with their collective noun equivalents, without specifying replacements
DICT	Asking to replace member nouns with their collective noun equivalents, specifying replacements using the dictionary
CORR	Asking to correct RBS-converted sentence

III. Results

Dependency Detection Results (RBS)

- Manually annotated dependencies from 500 sentences (250 Wikipedia; 250 Europarl)
- **Objective**: evaluate correct detection of syntactic dependencies of the member noun to be modified
- **Baseline**: default spaCy-detected member noun's dependencies (excluding punctuation)

	Wikipedia			Europarl			Avg.		
	Precision	**Recall**	**F1**	**Precision**	**Recall**	**F1**	**Precision**	**Recall**	**F1**
Baseline	0.096	0.723	0.169	0.115	0.689	0.197	0.1055	0.706	0.183
GeNRe-RBS	0.773	0.855	0.812	0.758	0.813	0.785	0.7655	0.834	0.7985

Generation Results (RBS/fine-tuned/instruct-based)

- Manually gender-neutralized 500 sentences (250 Wikipedia; 250 Europarl) using collective nouns
- **Objective**: evaluate correct conversion of sentences
- **Baseline**: original, unconverted sentence (as per previous works)

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Metrics:

- **WER** (word difference between reference and converted sentence)
- **BLEU** (n-gram overlap between reference and converted sentence, $n = 4$)
- **cosine similarity** (sentence-level embeddings comparison with SBERT **(Reimers & Gurevych, 2019)** and model `Sentence-CamemBERT-Large`)

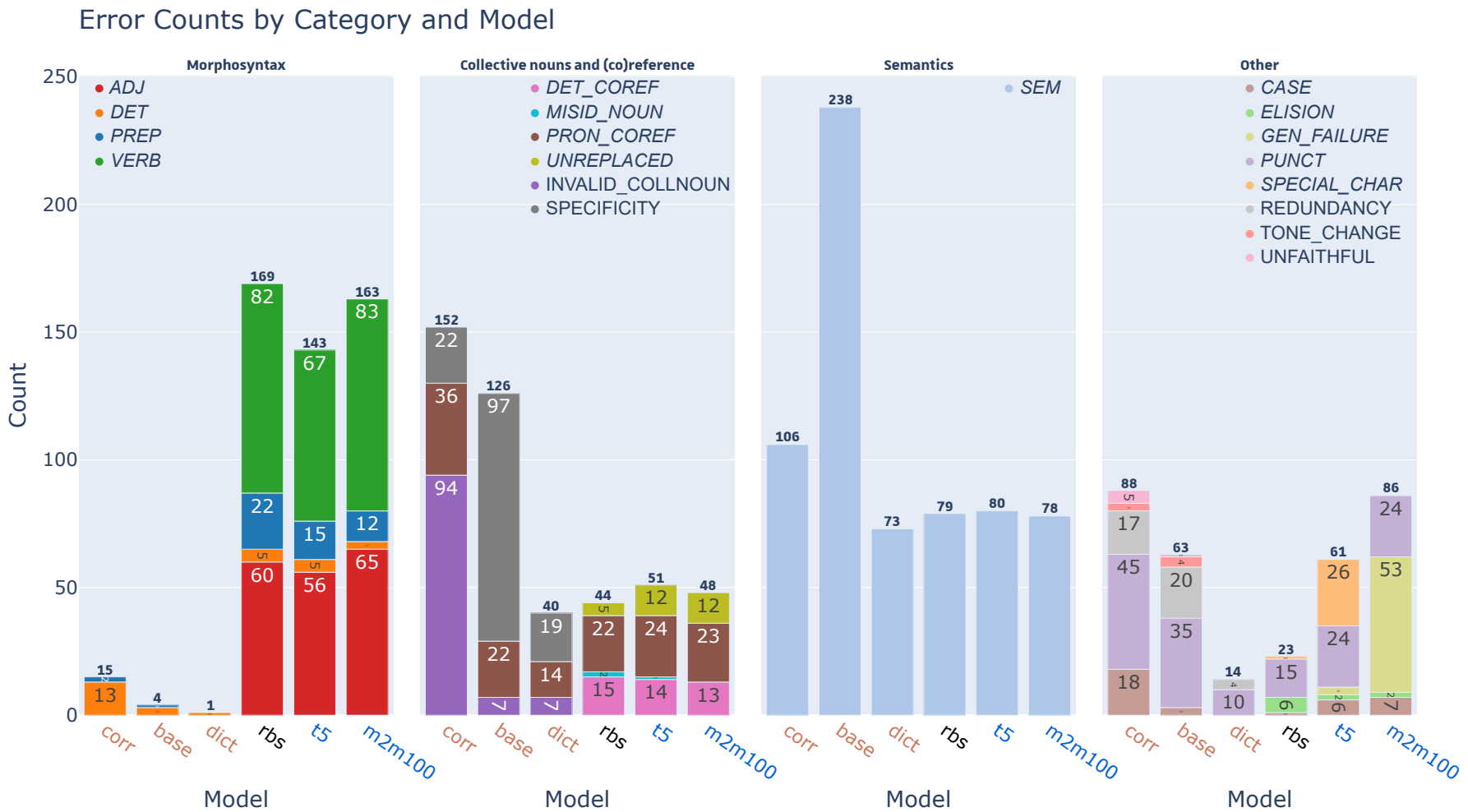
Generation Results

System	WER (↓)	BLEU (↑)
GeNRe-RBS (ours)	-8,449% **(avg.)**	+11,10 **(avg.)**
Sun et al. (2021, English)	-11,77%	+9,63
Vanmassenhove et al. (2021, English)	-10,947 % (avg.)	—

	Wikipedia			Europarl			Avg.		
	WER (↓)	**BLEU (↑)**	**Cosine (↑)**	**WER (↓)**	**BLEU (↑)**	**Cosine (↑)**	**WER (↓)**	**BLEU (↑)**	**Cosine (↑)**
Baseline	12.611%	80.688	97.436	12.446%	82.871	97.008	12.529%	81.779	97.222
GeNRe-RBS	**4.03%**	92.096	**98.88**	**3.814%**	93.707	99.22	**3.81%**	92.887	**99.05**
GeNRe-T5	6.726%	87.358	98.508	4.259%	93.111	99.1	5.492%	90.234	98.804
GeNRe-M2M100	6.566%	88.186	97.232	4.247%	93.197	98.992	5.406%	90.692	98.112
Claude-BASE	13.87%	80.205	96.532	10.713%	85.313	97.128	12.291%	82.759	96.83
Claude-DICT	4.702%	**92.79**	98.812	4.197%	**94.247**	**99.264**	4.45%	**93.519**	99.038
Claude-CORR	11.282%	84.954	98.092	8.992%	85.257	98.056	10.137%	85.25	98.074

RBS/Baseline difference comparison with other gender-neutralization systems (**Table 1**) and Global results (**Table 2**)

Error Counts and Types



Conclusion

Contributions

- Dictionary of French collective nouns and their member noun equivalents
- Dataset of gender-neutralized and non-gender-neutralized sentences
- First automatic gender-neutralization system for French
- Highlighted potentiality of instruct-based models combined with pre-created resources for this task

Limits

- Specific semantics of collective nouns (making them unusable in some contexts)
- Limits of LLM-as-a-judge approach for instruct-based model error analysis **(Gu et al., 2025)**

Our work will be presented in-person in Vienna.
Looking forward to having a chat there!

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