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# The Evolution of the Idiolect over the Lifetime: A Quantitative and Qualitative Study of French 19th Century Literature

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# The Evolution of the Idiolect over the Lifetime: A Quantitative and Qualitative Study of French 19th Century Literature

## Abstract

We propose new methods to identify, quantify and describe the grammatical-stylistic changes that take place during the lifetime of an author. To examine the strength of the chronological signal of change, we first developed a method to calculate if a distance matrix of literary works contains a stronger chronological signal than expected by chance. 10 out of 11 corpora showed a higher than chance chronological signal. Second, we proposed a machine learning task: predicting the year in which a work was written. The accuracy and the amount of variance that is explained by the model were high for most authors we studied. After applying a feature selection algorithm, we examined the most important ones, i.e. patterns that have the greatest influence on idiolectal evolution.

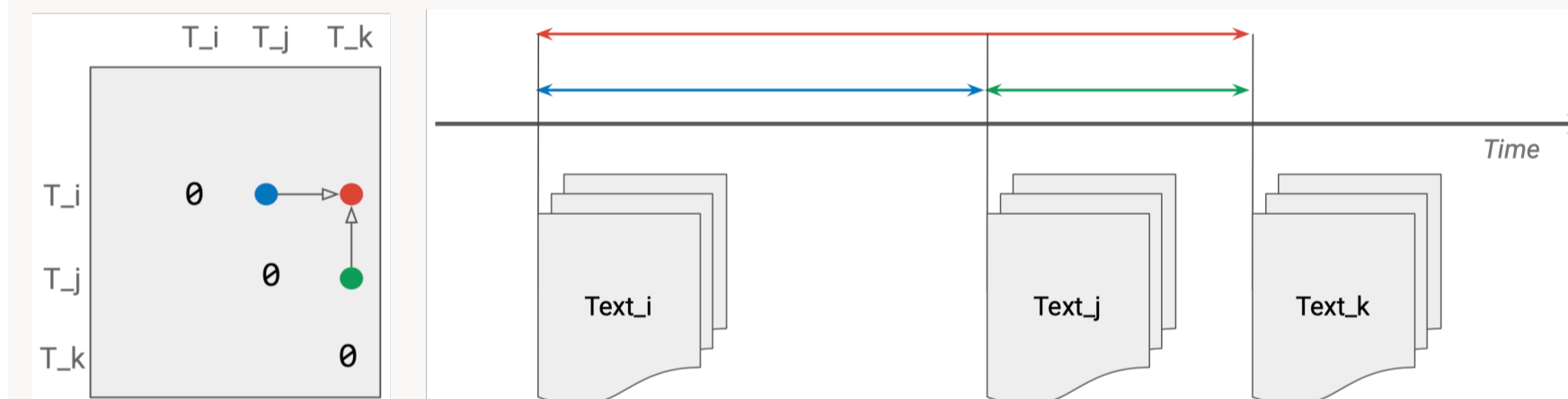
## Corpus



- ▶ 37 million words
- ▶ > 400 books dated by year of writing
- ▶ 11 prolific French 19th Century Writers
- ▶ Download: <https://github.com/oseminck/cidre/tree/v2.0>

## Robinsonian Score

- ▶ If there is a chronological signal, we expect that two books that are closer in time are more similar than two books further away in time.
- ▶ With stylo R, we calculated a distance matrix ( $\delta$ ) of the works of an author.
- ▶ We say that  $\delta$  is Robinsonian if for any set of three distinct texts  $text_i$ ,  $text_j$  and  $text_k$  such that  $date(text_i) < date(text_j) < date(text_k)$ ,  $\max(\delta(text_i, text_j), \delta(text_j, text_k)) \leq \delta(text_i, text_k)$ .
- ▶ We calculate the rate of cells that are Robinsonian and the probability (P-value) that this rate is found by chance.
- ▶ A chronological evolution was found in 10 of the 11 corpora.

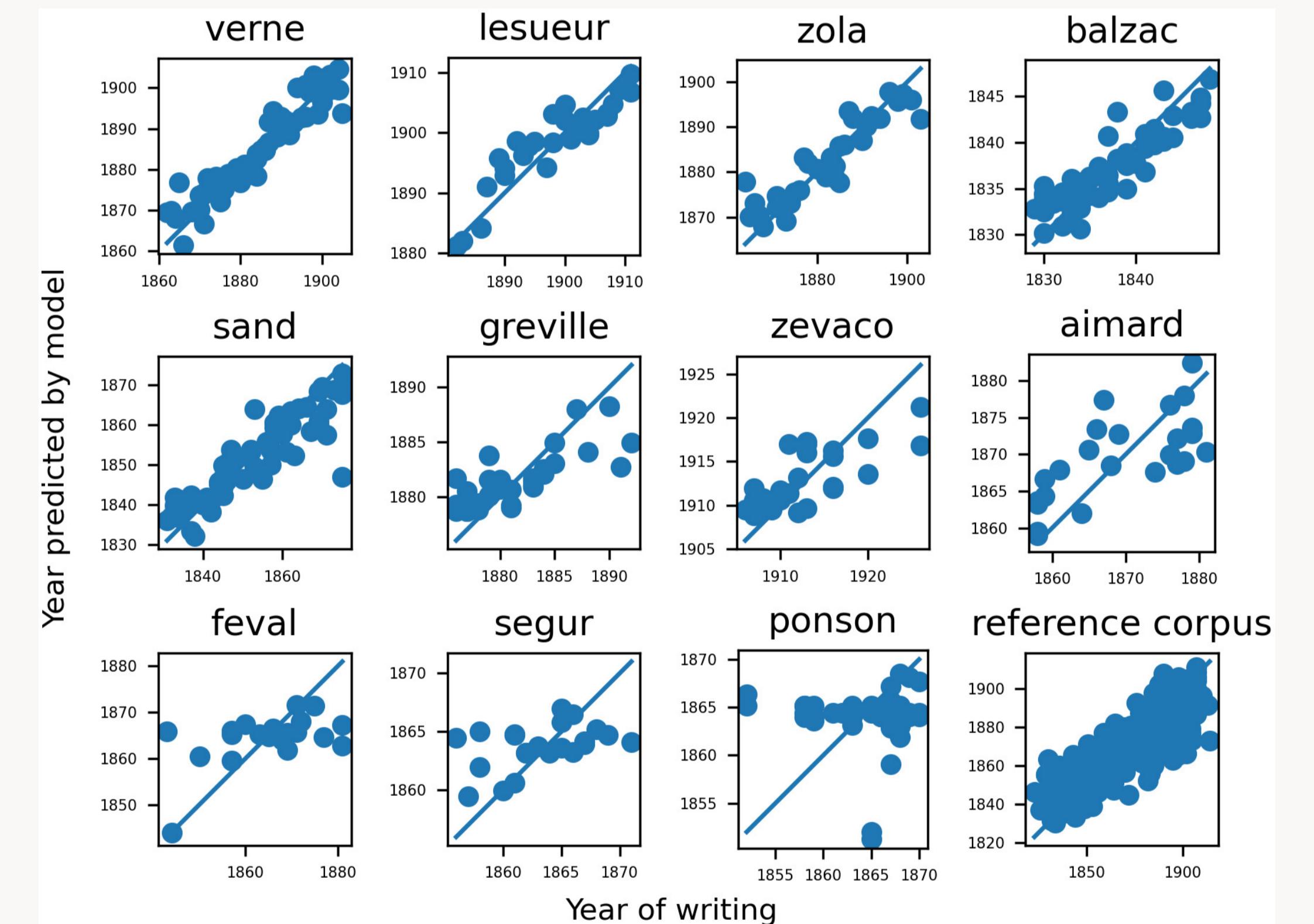


Author	Robinsonian Score	P-value
Comtesse de Ségur	0.38	0.14
Daniel Lesueur	0.41	0.00
Pierre-Alexis Ponson du Terrail	0.41	0.00
Gustave Aimard	0.42	0.01
Honoré de Balzac	0.44	0
Michel Zévaco	0.46	0
Jules Verne	0.47	0
George Sand	0.49	0
Paul Féval	0.49	0.00
Henry Gréville	0.62	0
Émile Zola	0.63	0
Reference Corpus	0.34	0

**Table:** Rates of number of Robinsonian cells

## Predicting Year of Writing with Regression Models

- ▶ Goal: predict the year of writing of the books of an author.
- ▶ Regression model and feature selection using Lasso Lars, resulting in 10 to 61 stylistic/linguistic patterns per author.
- ▶ For example, the increasing pattern "...\_DETPOSS\_NC\_..." in the work of Daniel-Lesueur:
  - Ah ! ma mère ... ma mère ... pensait Hervé, [...]  
Ah ! my mother ... my mother... thought Hervé, [...]
  - Je suis perdue ! ... Perdue ! ... Ma chérie ... Invente quelque chose ! ... Ah !  
I'm lost! ... Lost! ... My darling... Think of something! ... Ah!
- ▶ Most models were successful.



## Reference

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