

Monash University Malaysia
Literary AI: Computational Writing and the Media of Language
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Wherefore Art Thou Critique?

From Literary Criticism to Critical Formalism in the Age of AI

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1. The internal critique of AI is disarmingly poor
2. The contemporary critical matrix is broken
3. Critique found refuge in literary criticism
4. Literary approaches relegate critique to a passive role
5. Formal thought can enables critique to take an active stance
6. Formalism is a realization, not a betrayal of critique
7. A critical formalism defines a new form of literacy

1. The internal critique of AI is disarmingly poor

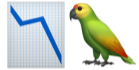
1.1 The theoretical debate has organized around the AGI-Stochastic Parrots axis

1.2 Critical perspectives have not been able to change the terms of the debate

Stochastic parrots vs. AGI



LLMs have a relation
to natural language,
therefore they are like us



LLMs are not like us,
therefore they do not
and can not have any
relation to natural language

The internal critique of AI is disarmingly poor

- ◇ Kirschenbaum (2023):
Bender et al.'s (2021) paper “offers a **disarmingly linear account of how language, communication, intention, and meaning work**, one that would seem to sidestep decades of scholarship around these same issues in literary theory [...] the passage would be **red meat for a graduate critical-theory seminar.**”
- ◇ Underwood (2023):
“The beautiful **irony** of this situation [...] is that a generation of **humanists trained on Foucault** have now rallied around “On the Dangers of Stochastic Parrots” to **oppose a theory of language that their own disciplines invented**, just at the moment when computer scientists are reluctantly beginning to accept it.”

2. The contemporary critical matrix is broken

2.1 The root of the critical program goes back to Kant

2.2 The contemporary critical matrix goes back to Nietzsche

2.3 Formal approaches to language disrupted the critical matrix

What is critique?

Non-dogmaticity

Knowledge does not bear on substances,
but on phenomena

Conditionality

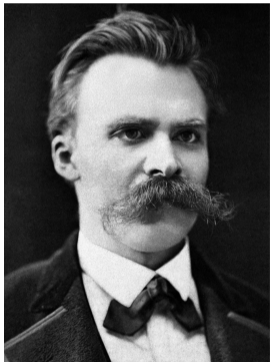
Knowledge is not absolute,
but relative to very precise conditions

Limitedness

The legitimacy of knowledge is not unbounded,
but circumscribed within fairly precise limits



The birth of contemporary critique



“In some remote corner of the universe, flickering in the light of the countless solar systems into which it had been poured, there was once a planet on which **clever animals invented cognition**. It was the most **arrogant** and most **mendacious** minute in the ‘history of the world’...”

“On Truth and Lying in a Non-Moral Sense”
(Nietzsche, 1873)

The critical argumentative matrix

Knowledge depends on language

The critical argumentative matrix

Knowledge depends on language



The relation between language and the world is essentially arbitrary

The critical argumentative matrix

Knowledge depends on language



The relation between language and the world is essentially arbitrary



Any regularity in language/knowledge is not natural but cultural/social/political

The critical argumentative matrix

Knowledge depends on language



The relation between language and the world is essentially arbitrary



Any regularity in language/knowledge is not natural but cultural/social/political



We should resist existing regularities and create new ones

The critical argumentative matrix

Knowledge depends on language
(Epistemological)



The relation between language and the world is essentially arbitrary



Any regularity in language/knowledge is not natural but cultural/social/political
(Political)



We should resist existing regularities and create new ones
(Aesthetic)

The critical argumentative matrix

Knowledge depends on language
(Epistemological)



[The relation between language and the world is essentially arbitrary?]



Any regularity in language/knowledge is not natural but cultural/social/political
(Political)



We should resist existing regularities and create new ones
(Aesthetic)

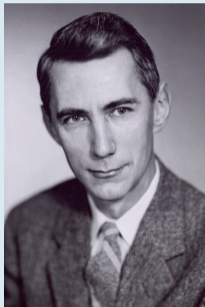
The formalization of language theory

Logical Syntax of Language (1934)



Logic
↓
Semantics

Information Theory (1948)



Mathematics
↓
Pragmatics

Generative Linguistics (1957)



Computer Science
↓
Syntax

Formal vs. Arbitrary

Formal vs. Material

Formal vs. Historical

3. Critique found refuge in literary criticism

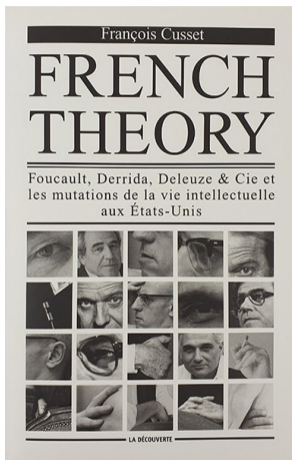
3.1 Political and aesthetic orientation of poststructuralism after 1968

3.2 Externalist philosophy and history of science through STS

3.3 American reception of French theory

3.4 Sokal affaire

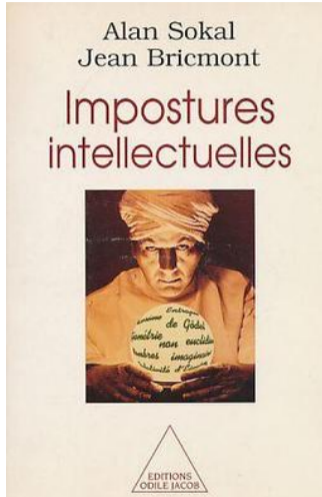
American reception of French theory



(Cusset, 2003)

- ◇ Importation from philosophy to literature departments
- ◇ “Narrative relativism” as main recontextualisation operator
- ◇ Publishing strategy articulating a unified corpus
- ◇ “Theory” becomes an intransitive activity

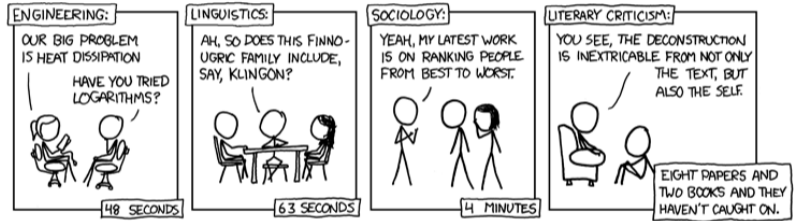
The Sokal Affair



(Sokal & Bricmont, 1997)

MY HOBBY:

SITTING DOWN WITH GRAD STUDENTS AND TIMING
HOW LONG IT TAKES THEM TO FIGURE OUT THAT
I'M NOT ACTUALLY AN EXPERT IN THEIR FIELD.



(credit: xkcd.com)

4. Literary approaches relegate critique to a passive role

4.1 Literary criticism considers the text as given

4.2 Passive attitude: Interpretation and Effects

4.3 The GenAI revolution is concerned with generativity

Textuality and passivity

Barthes (1977)

In this way is revealed the whole being of writing: a text consists of multiple writings, issuing from several cultures and entering into dialogue with each other [...]; but **there is one place where this multiplicity is collected**, united, and this place is **not the author**, [...] **but the reader**: the reader is the very space in which are inscribed, without any being lost, all the citations a writing consists of; the unity of a text is not in its origin, it is in its destination [...]

Derrida (1976)

That the “imprint” is irreducible means also that **speech is originally passive**, but in a sense of passivity that all intramundane metaphors would only betray. This passivity is also the relationship to a past, to an **always-already-there** that no reactivation of the origin could fully master and awaken to presence.

Foucault (1981)

I should have preferred to become aware that a nameless voice was already speaking long before me, so that I should **only have needed to join in, to continue the sentence it had started** and lodge myself, without really being noticed, in its interstices, if it had signalled to me by pausing, for an instant, in suspense. Thus there would be no beginning, and **instead of being the one from whom discourse proceeded, I should be at the mercy of its chance unfolding**, a slender gap, the point of its possible disappearance.

“**Literary AI as a critical site** for analysing this transformation. It examines how **literary elements** — writing, reading, textual form, style, and language — **have historically conditioned** the formation of AI systems, and how **AI, once operational, reshapes** these literary regimes in turn.”

Passive attitude

Effects

Social
Political
Environmental
Economical
Psychological
...

Prompting

Co-writing
Vibe coding
AI slop
...

Interpreting

Latent spaces
Mechanistic interpretability
Computational hermeneutics
...

Generative revolutions



Generativist Program

- ◇ Description of performance is not enough
- ◇ Account of generative competence is needed
- ◇ Natural language's generative power is beyond probabilistic data processing
- ◇ Generative mechanisms must be innate
- ◇ Generative devices have cognitive import

Generative AI

- ◇ Descriptive statistics of text is not enough
- ◇ Inferential capacities are needed
- ◇ **Natural language's generation is a form of probabilistic inference**
- ◇ **Generative mechanisms can be learned**
- ◇ Generative devices are intelligent

5. Formal thought can enables critique to take an active stance

5.1 Formalism can ground an epistemological critique

5.1.1 From a formal perspective, LLMs are just computable functions

5.1.2 Empirical methods are ineffective to determine what a computable function computes

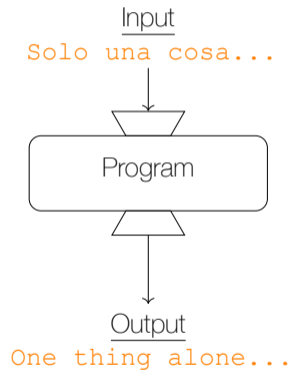
5.1.3 The right object of study is not the model, but the formal structures implicit in the data

5.2 Formalism can inform a theoretical critique

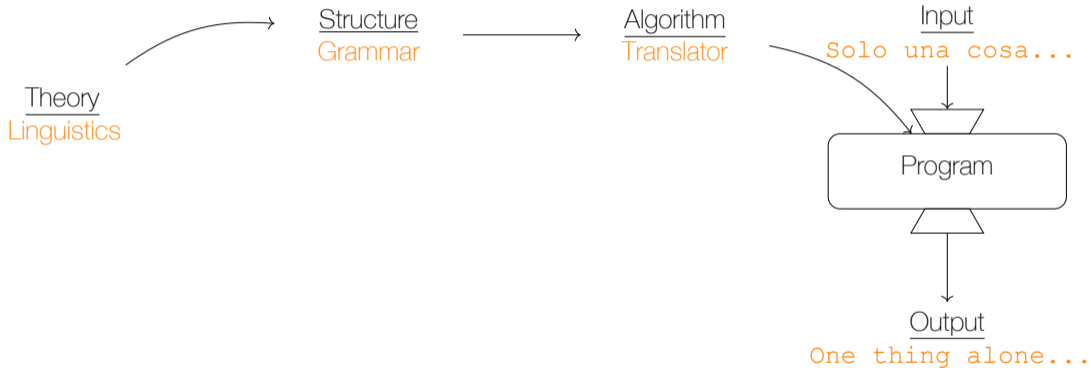
5.2.1 Neural embedding models hide rich algebraic structures

5.2.2 The implicit structure can be radically generalized

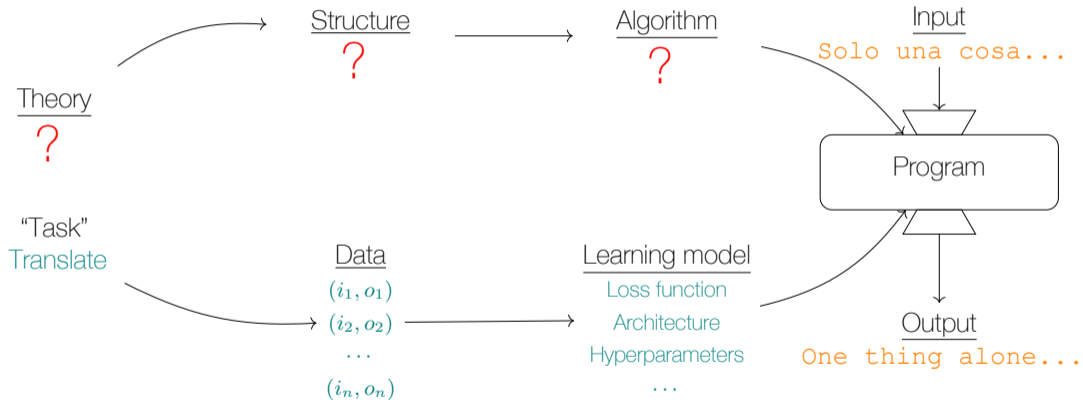
The implicit structure of data



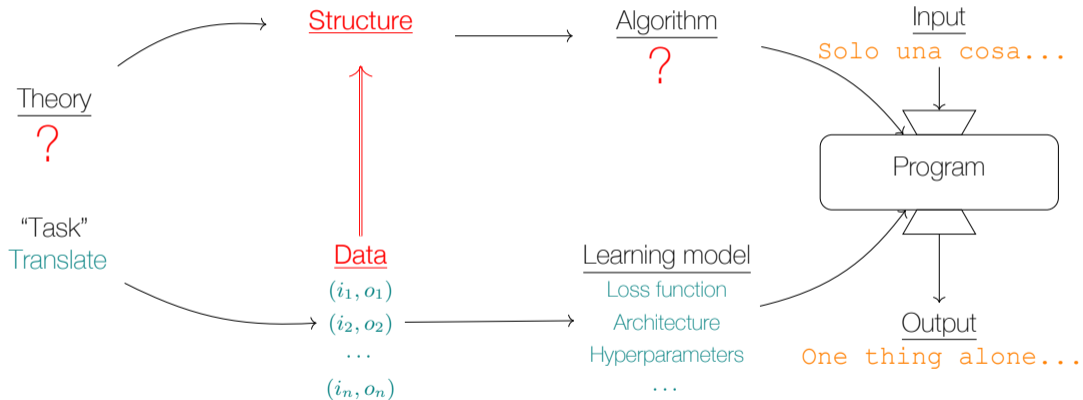
The implicit structure of data



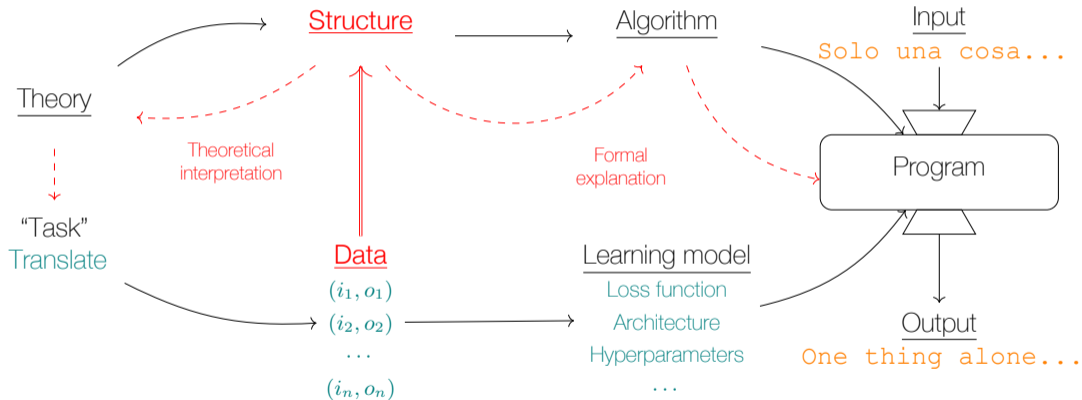
The implicit structure of data



The implicit structure of data



The implicit structure of data



The structure of embeddings

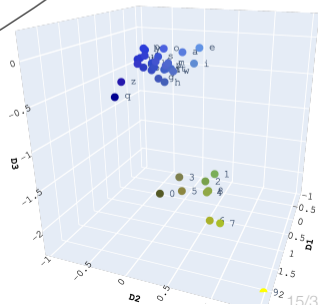
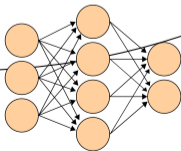
Structure

?

{-, /, 0, 1, 2, ..., 8, 9, =,
a, b, c, ..., w, x, y, z, é}

Embedding

Données



word2vec explained (Levy and Goldberg, 2014)

$$\ell = \sum_{w \in V_w} \sum_{c \in V_c} \#(w, c) (\log \sigma(\vec{w} \cdot \vec{c}) + k \cdot \mathbb{E}_{c_N \sim P_D} [\log \sigma(-\vec{w} \cdot \vec{c}_N)])$$

$$\begin{aligned} \frac{\partial \ell}{\partial (\vec{w} \cdot \vec{c})} = 0 \quad \text{when} \quad \vec{w} \cdot \vec{c} &= \log \left(\frac{\#(w, c) \cdot |D|}{\#(w) \cdot \#(c)} \right) - \log k \\ &= \text{PMI}(w, c) - \log k \end{aligned}$$

Additional constraint: \vec{w} and \vec{c} should be **low dimensional**

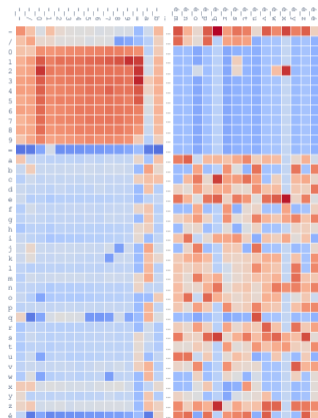
The **Singular Value Decomposition (SVD)** provides an **exact solution** to this optimization problem.

Example: Characters in Wikipedia

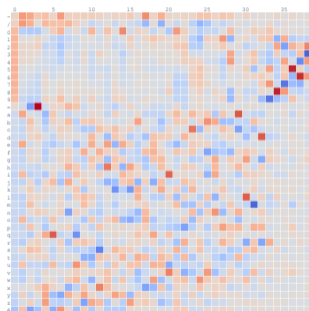
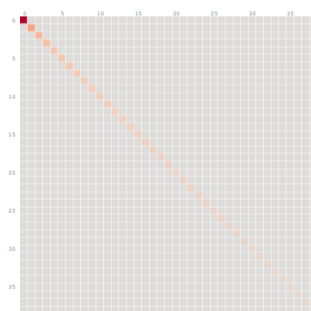
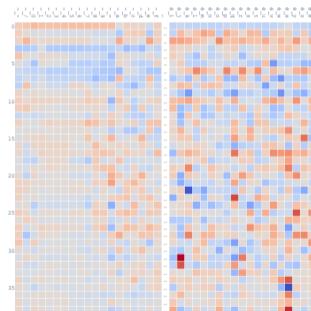
$W = \{-, /, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, =, a, b, c, \dots, w, x, y, z, \acute{e}\}$

$C = X \times X = \{(-, -), (-, /), (-, 0), \dots, (\acute{e}, z), (\acute{e}, \acute{e})\}$

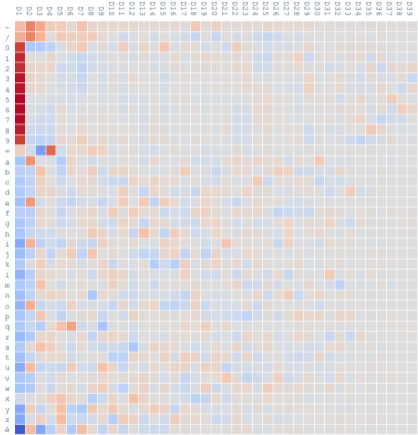
$$\begin{aligned}M_{wc} &= \text{pmi}(w, c) \\ &= \log \frac{p(w, c)}{p(w)p(c)}\end{aligned}$$



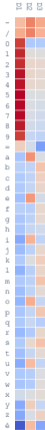
SVD of a PMI matrix

 U  Σ  V^T 

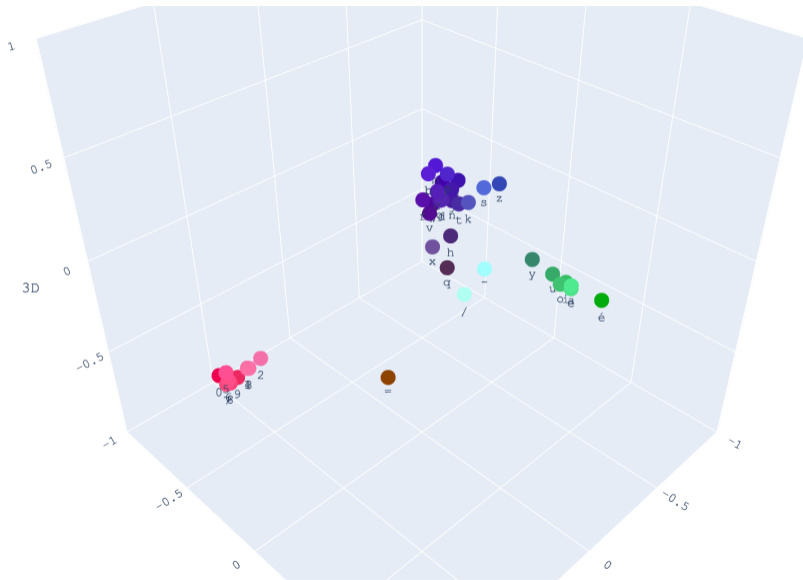
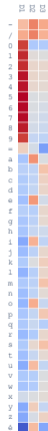
$$U \times \Sigma$$



$$\hat{U} \times \hat{\Sigma}$$



$$\hat{U} \times \hat{\Sigma}$$



The structure of embeddings

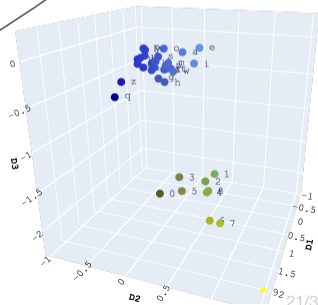
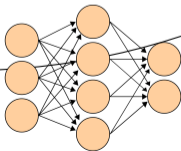
Structure

?

{-, /, 0, 1, 2, ..., 8, 9, =,
a, b, c, ..., w, x, y, z, é}

Embedding

Données



The structure of embeddings

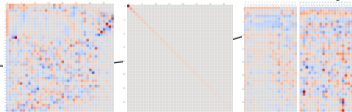
Structure

?

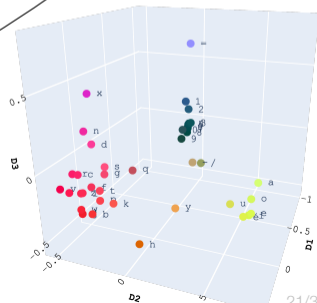
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Embedding

Données



SVD



The structure of embeddings

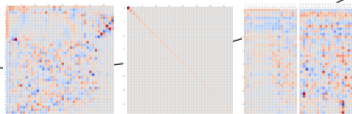
Structure

?

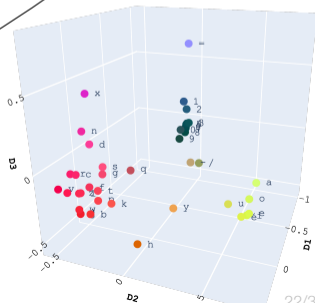
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Embedding

Données



SVD

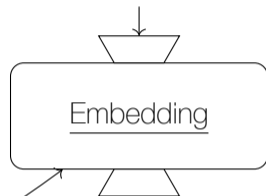


The structure of embeddings

Structure

?

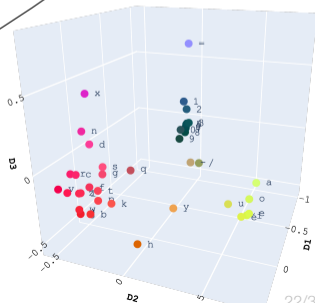
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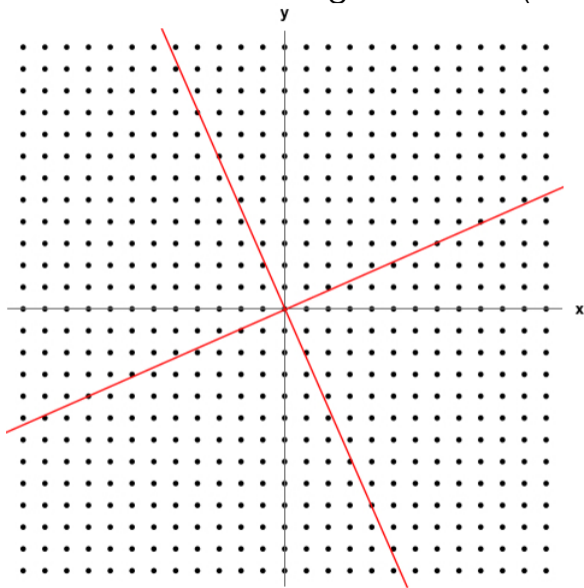
Données



$$C^{\text{op}} \times D \rightarrow \mathbb{R}^i$$



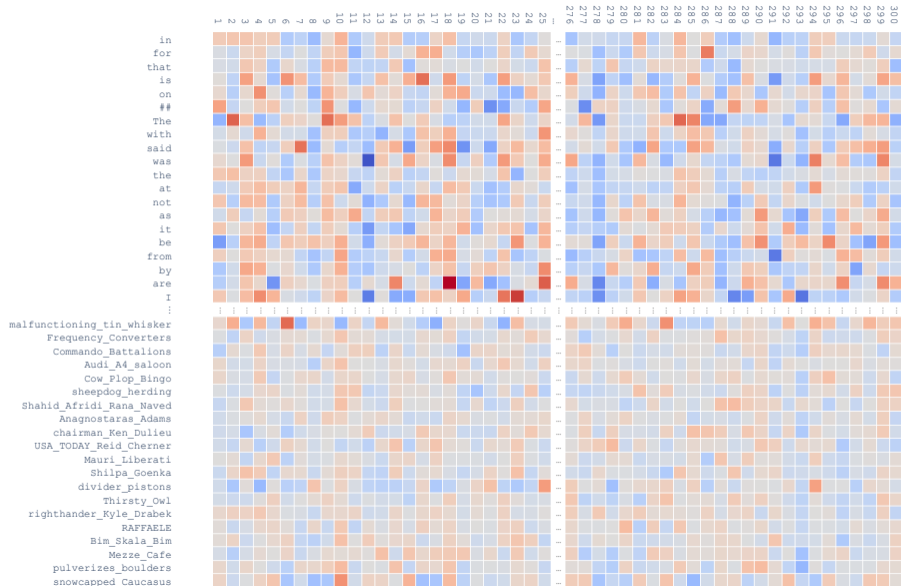
Eigenvectors (linear fixed points)



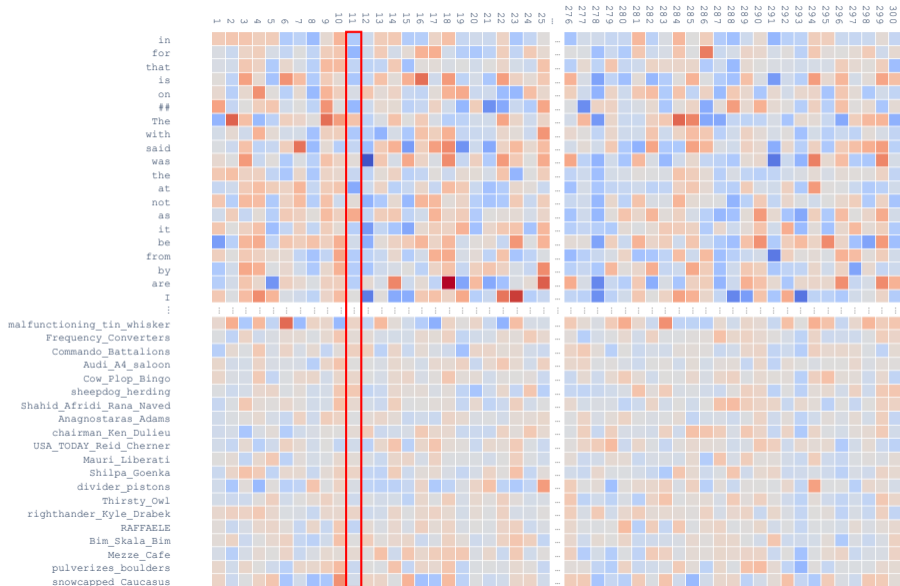
Embedding dimensions as fixed points



Embedding dimensions as fixed points



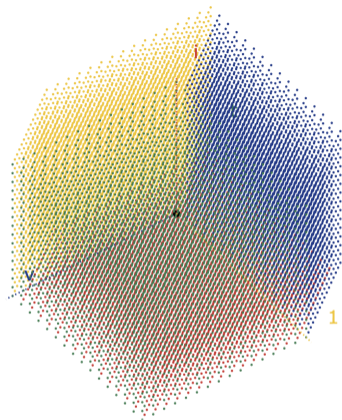
Embedding dimensions as fixed points



Profunctor and nucleus structures

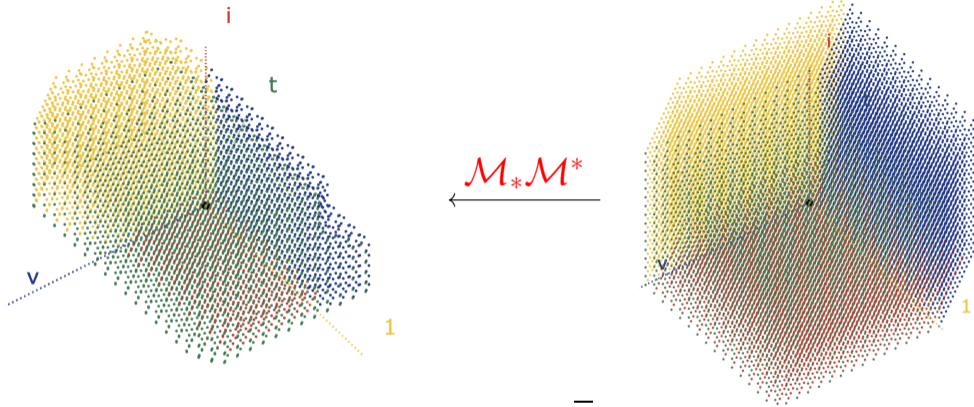
$$\begin{array}{ccc} e_i & s_i & \text{measure} \\ \downarrow & \downarrow & \swarrow \\ \mathbb{C}^{\text{op}} \times \mathbb{D} & \rightarrow & \bar{\mathbb{R}} \\ \Downarrow & & \\ \mathcal{M}^* : \bar{\mathbb{R}}^{\mathbb{C}^{\text{op}}} & \rightleftharpoons & (\bar{\mathbb{R}}^{\mathbb{D}})^{\text{op}} : \mathcal{M}_* \end{array}$$

Profunctor and nucleus structures



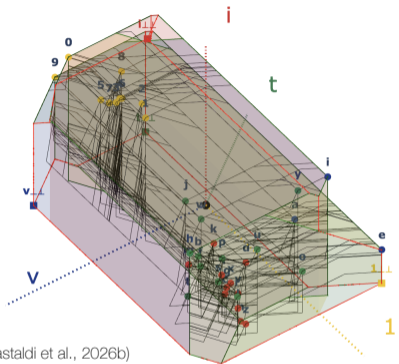
$$\begin{array}{ccc} \mathbf{C}^{\text{op}} \times \mathbf{D} & \rightarrow & \bar{\mathbb{R}} \\ & \Downarrow & \\ \mathcal{M}^* : \bar{\mathbb{R}}^{\mathbf{C}^{\text{op}}} & \rightleftarrows & (\bar{\mathbb{R}}^{\mathbf{D}})^{\text{op}} : \mathcal{M}_* \end{array}$$

Profunctor and nucleus structures



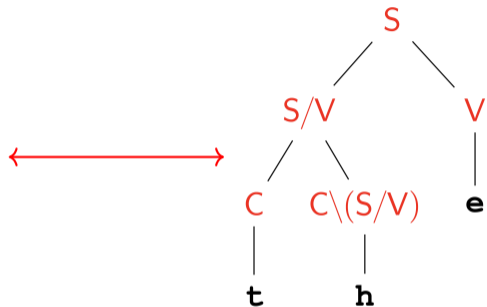
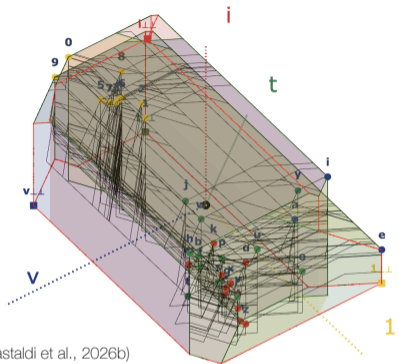
$$\begin{array}{c}
 \mathbb{C}^{\text{op}} \times \mathbb{D} \rightarrow \bar{\mathbb{R}} \\
 \Downarrow \\
 \mathcal{M}^* : \bar{\mathbb{R}}^{\mathbb{C}^{\text{op}}} \rightleftarrows (\bar{\mathbb{R}}^{\mathbb{D}})^{\text{op}} : \mathcal{M}_*
 \end{array}$$

Profunctor and nucleus structures



$$\begin{array}{ccc} \mathbf{C}^{\text{op}} \times \mathbf{D} & \rightarrow & \bar{\mathbb{R}} \\ & \Downarrow & \\ \mathcal{M}^* : \bar{\mathbb{R}}^{\mathbf{C}^{\text{op}}} & \Longleftrightarrow & (\bar{\mathbb{R}}^{\mathbf{D}})^{\text{op}} : \mathcal{M}_* \end{array}$$

Profunctor and nucleus structures



$$\begin{array}{c}
 \mathbb{C}^{\text{op}} \times \mathbb{D} \rightarrow \bar{\mathbb{R}} \\
 \Downarrow \\
 \mathcal{M}^* : \bar{\mathbb{R}}^{\mathbb{C}^{\text{op}}} \iff (\bar{\mathbb{R}}^{\mathbb{D}})^{\text{op}} : \mathcal{M}_*
 \end{array}$$

Red curved arrows indicate a correspondence between the 3D diagram and the top equation, and between the tree diagram and the bottom equation.

Critical effects of a formal perspective

Non-dogmaticity

AI performance does not rely on any substantive property of the models, but only on the formal objects models implicitly approximate

Conditionality

Those formal objects establish the strict conditions under which models can operate

Limitedness

A formal analysis of current implicit conditions can show in which way they are limited, and how they can be changed

6. Formalism is a realization, not a betrayal of critique

6.1 Lévi-Strauss and the mathematics of man

6.2 Foucault, Deleuze, Derrida and the power of the formal

6.3 Structuralism is a formalism

6.4 Russian formalism as a generative device

6.5 Bourdieu in embedding space

6.6 Structuralist mathematics

Lévi-Strauss and the mathematics of man

In the past, the great difficulty has arisen from the **qualitative nature of our studies**. If they were to be treated quantitatively, it was either necessary to do a certain amount of juggling with them or to simplify to an excessive degree. Today, however, there are **many branches of mathematics** — **set theory, group theory, topology, etc.** — which are concerned with establishing exact relationships between classes of individuals distinguished from one another by **discontinuous values**, and this very discontinuity is **one of the essential characteristics of qualitative sets** in relation to one another and was **the feature, in which their alleged 'incommensurability', 'inexpressibility', etc., consisted.**

Lévi-Strauss (1954)

INTRODUCTION
THE MATHEMATICS OF MAN
CL. LÉVI-STRAUSS



The power of the formal

Derrida (1976)



“Within cultures practicing so-called phonetic writing, **mathematics is not just an enclave**. [...] This enclave is also the place where the practice of scientific language **challenges** intrinsically and with increasing profundity **the ideal of phonetic writing** and all its implicit metaphysics (**metaphysics itself**)”

Deleuze (1994)



“**Differential calculus** is not the unimaginative calculus of the utilitarian, the crude arithmetic calculus which subordinates thought to other things or to other ends, but **the algebra of pure thought, the superior irony of problems themselves — the only calculus ‘beyond good and evil’**”.

Foucault (2002)



“There is perhaps **only one science** for which one can neither distinguish these different thresholds, nor describe a similar set of shifts: **mathematics** [...] Hence the fact that their establishment is both **so enigmatic** [...] and **so valid** [...]”

Structuralism is a formalism

I am not sure how interesting it would be to attempt a redefinition of what was known, at the time, as **structuralism**. It would be interesting, though, to **study formal thought** and the **different kinds of formalism** that ran through Western culture during the 20th century. When we consider the extraordinary destiny of formalism in painting or formal research in music, or the importance of formalism in the analysis of folklore and legend, in architecture, or its application to theoretical thought, it is clear that **formalism in general has probably been one of the strongest and at the same time one of the most varied currents in 20th century Europe**. And it is worth pointing out that formalism has very often been associated with political situations and even political movements. It would certainly be worth examining more closely the relation of Russian formalism to the Russian Revolution. [...] **That is how I would situate the structuralist phenomenon: by relocating it within the broad current of formal thought.**

(Foucault, in Raulet, 1983)

Russian formalism as a generative device

“The purpose of art, then, is to lead us to a knowledge of a thing through the organ of sight instead of recognition. By “enstranging” objects and complicating form, the device of art makes perception long and “laborious.” The perceptual process in art has a purpose all its own and ought to be extended to the fullest. *Art is a means of experiencing the process of creativity. The artifact itself is quite unimportant.*”

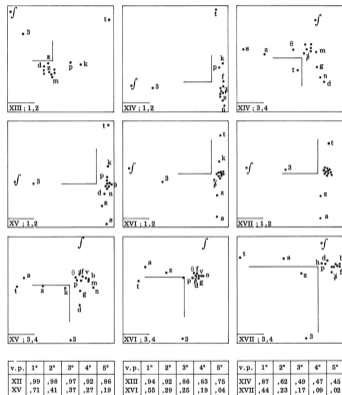
Shklovsky (1990)



(khlebnikov1921zangezi)

Structuralist mathematics

Organigramme



(Benzécri, 1976)

1) une voyelle neutre (amorphe), caractérisée par l'absence de chacune des propriétés $\beta, \varphi, \chi, \lambda$: [a] ;

2) quatre types élémentaires de voyelles, chacun caractérisé par une seule propriété :

$$[e] = \varphi, [a] = \beta, [v] = \chi, [ɔ] = \lambda$$

3) six voyelles distinctes, chacune caractérisée par deux propriétés :

$$[o] = \varphi\beta, [i] = \chi\varphi, [u] = \chi\beta, [e] = \lambda\varphi, [o] = \lambda\beta, [\varepsilon] = \chi\lambda;$$

4) quatre voyelles combinées, chacune caractérisée par trois propriétés :

$$[ɛ] = \chi\lambda\varphi, [o] = \chi\lambda\beta, [\varepsilon] = \varphi\beta\chi, [\varepsilon] = \varphi\beta\lambda;$$

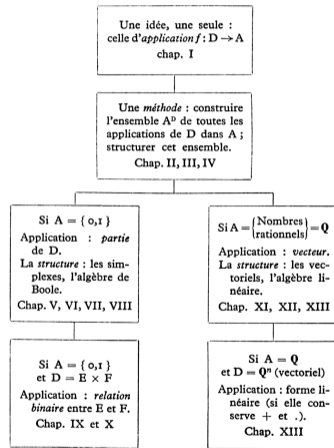
5) une voyelle polymorphe, caractérisée par les quatre propriétés considérées : la voyelle russe [ɤ] = $\varphi\beta\chi\lambda$.

On obtient alors le diagramme de la figure 2.



FIG. 2.

(Marcus, 1967)



(Barbut, 1967)

7. A critical formalism defines a new form of literacy



No intenso agora

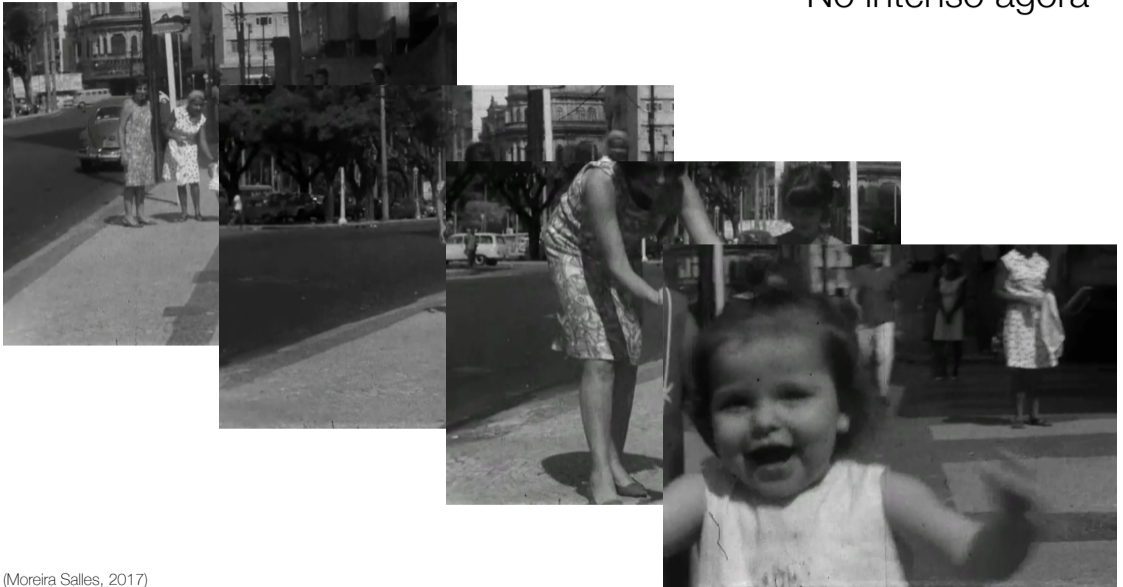
No intenso agora



No intenso agora



No intenso agora



(Moreira Salles, 2017)

Reference Papers

- ◇ Gastaldi, J. L. (2021). Why Can Computers Understand Natural Language? *Philosophy & Technology*, 34(1), 149–214
- ◇ Gastaldi, J. L., & Pellissier, L. (2021). The Calculus of Language: Explicit Representation of Emergent Linguistic Structure through Type-Theoretical Paradigms. *Interdisciplinary Science Reviews*, 46(4), 569–590
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- ◇ Gastaldi, J. L., Jarvis, S., Seiller, T., & Terilla, J. (2026b). Projective metric geometry of tropical nuclei: Gap matrices, event loci, and order chambers.
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