Analyser le mediascape : retour sur un projet pluridisciplinaire

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Outline of my talk

1) Exploring the informational landscape
2) Topic modeling as a major tool in NLP
3) Studying the mediascape
4) A « user in the loop » perspective
5) Conclusion in a DH point of view

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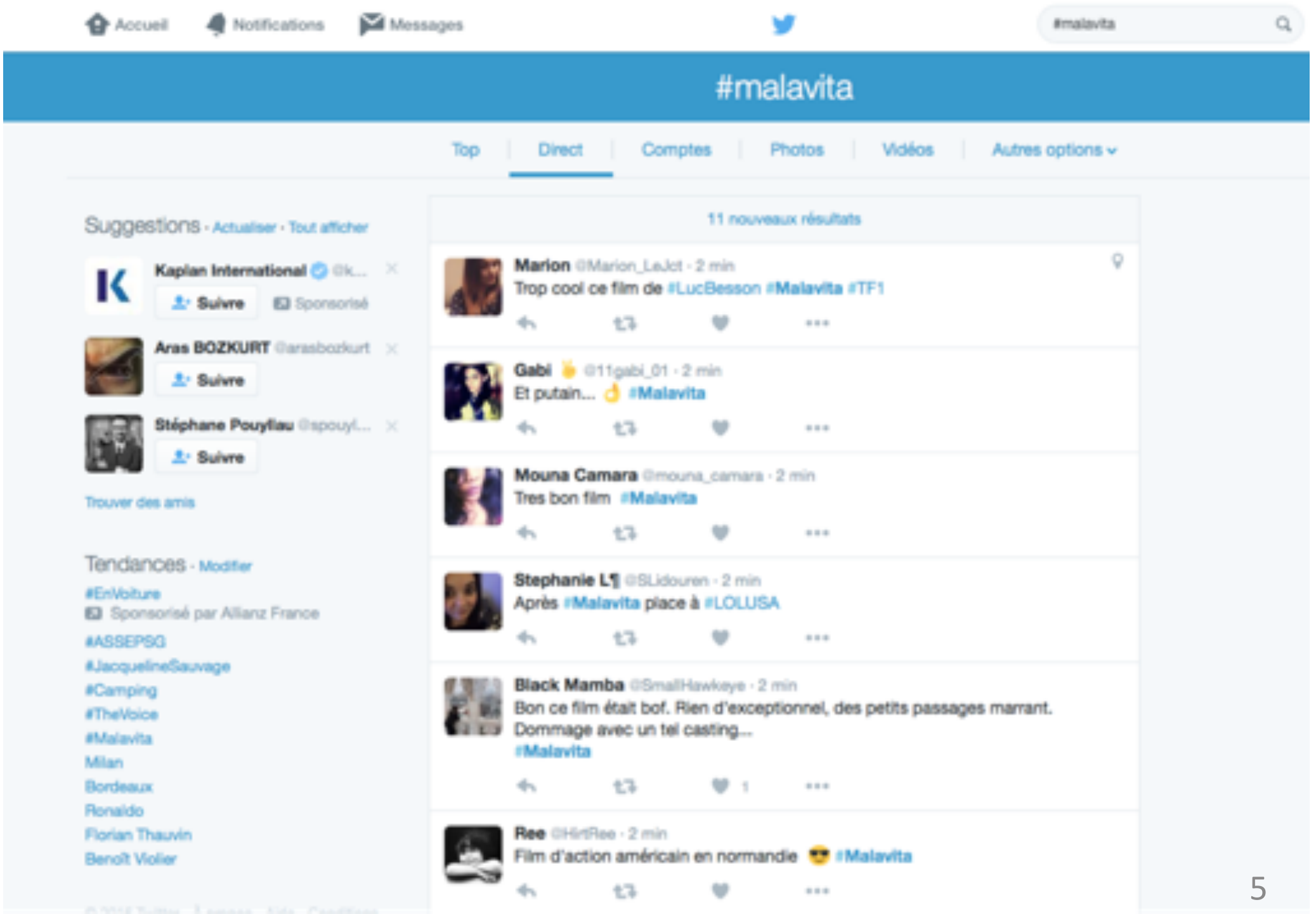
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#TheVoice
#Malavita
Milan
Bordeaux
Ronaldo
Florian Thauvin
Benoît Violier
11 nouveaux résultats
Marion @Marion_LeJct · 2 min
Trop cool ce film de #LucBesson #Malavita #TF1
Gabi @11gabi_01 · 2 min
Et putain... #Malavita
Mouna Camara @mouna_camara · 2 min
Tres bon film #Malavita
Stephanie L¶ @SLidouren · 2 min
Après #Malavita place à #LOLUSA
Black Mamba @SmallHawkeye · 2 min
Bon ce film était bof. Rien d'exceptionnel, des petits passages marrant.
Dommage avec un tel casting...
#Malavita
Ree @HirtRee · 2 min
Film d'action américain en normandie #Malavita

Exploring textual corpora

- Top-down approaches
  - regexp (e.g., “terror[a-z]*”)
  - keyword-based queries
  - (supervised) classification schemas
- Bottom-up approaches
  - basic statistics
  - projection to low-level spaces (e.g., PCA)
  - structuration by (co-)clustering or topic modeling
  - More advanced summarization techniques (e.g., metromaps)
- Mixed approaches
  - weakly-supervised clustering
  - active learning schemas

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Some background

- Bag-of-words assumption
- Usual preprocessing
  - remove numbers and punctuation
  - remove stopwords
- Classic input:

	Docs																			
Terms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
data	1	1	0	0	2	0	0	0	0	0	1	2	1	1	1	0	1	0	0	0
examples	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
introduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
mining	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0
network	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
package	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

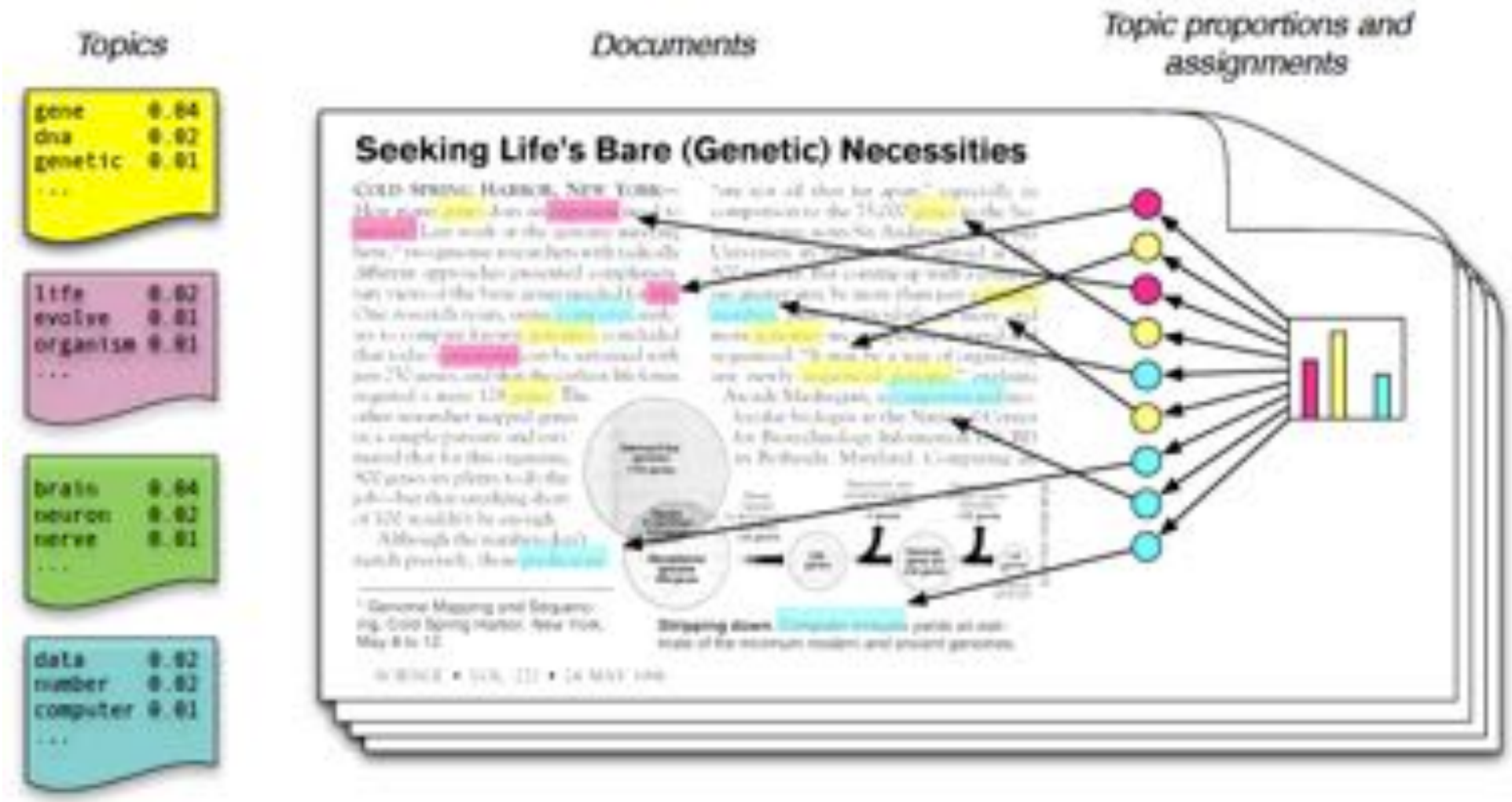
Why topic learning?

Topic modeling provides methods for automatically organizing, understanding, searching, and summarizing large electronic archives:

- discover the **hidden themes** that pervade the collection
- **annotate** the documents according to those themes
- use annotations to organize, summarize, and **search** the texts

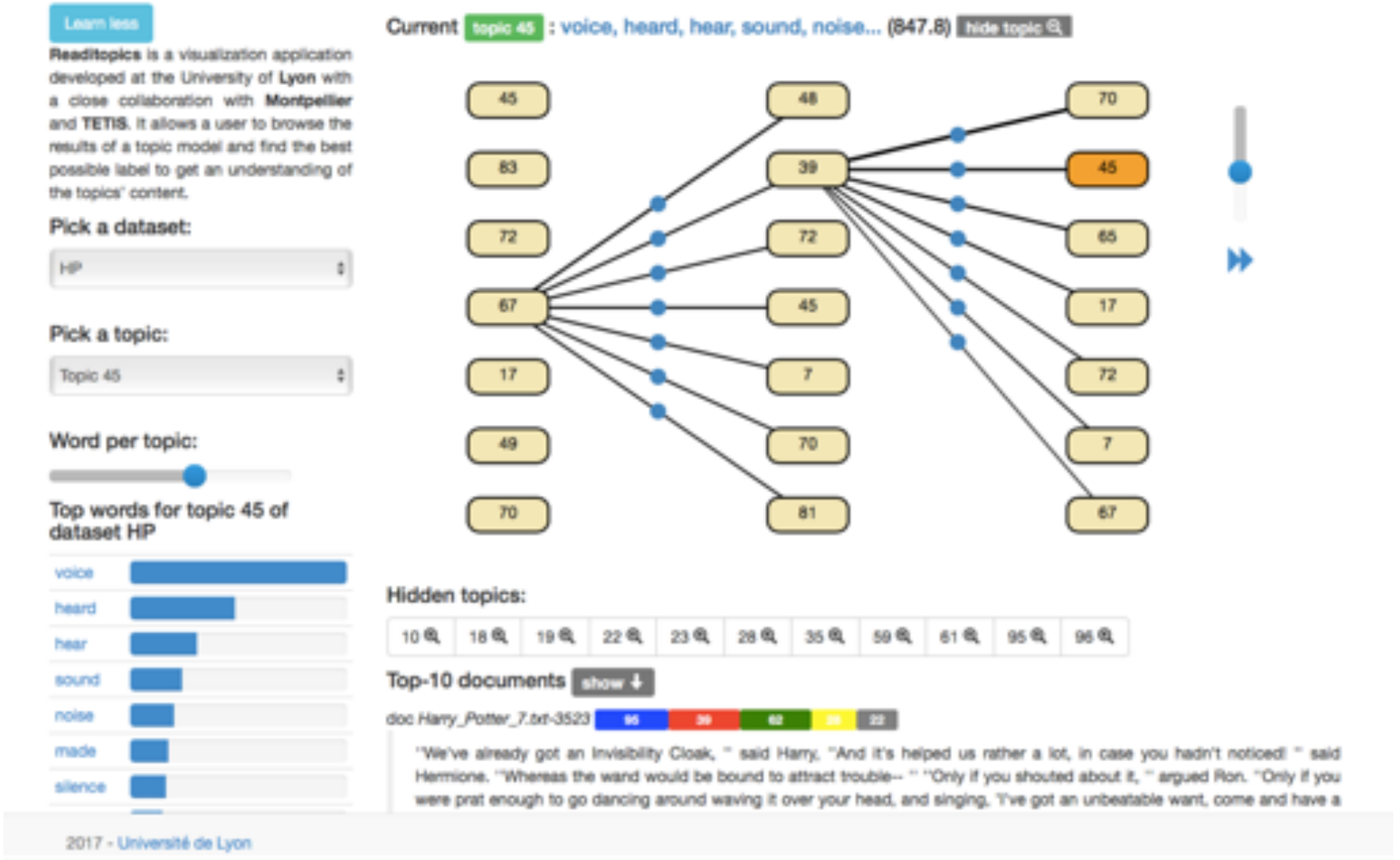
(some slides are taken from the talk of D. Blei for KDD 2011)

Discovering latent structures



(Blei et al., 2003)

ReadiTopics (Velcin et al., 2018)



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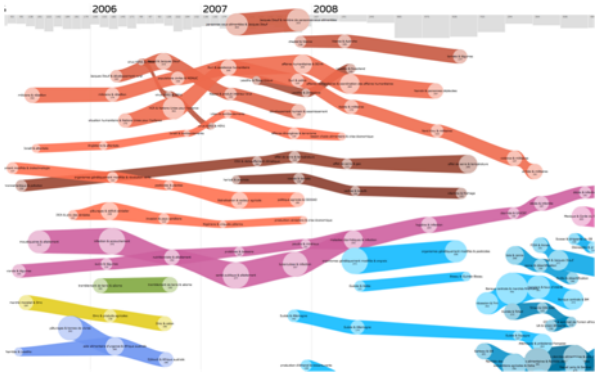
What’s a « mediascape »?

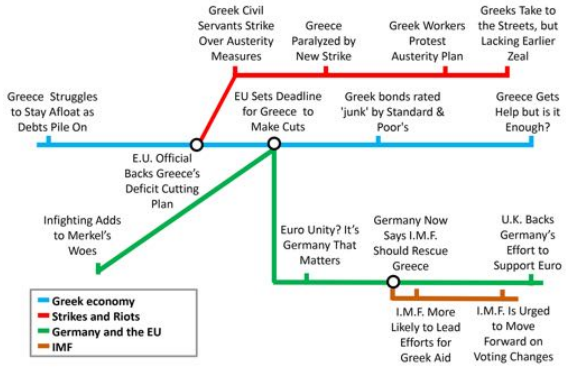
Appadurai A.: Disjuncture and Difference in the Global Cultural Economy, Theory Culture Society 1990; 7; 295

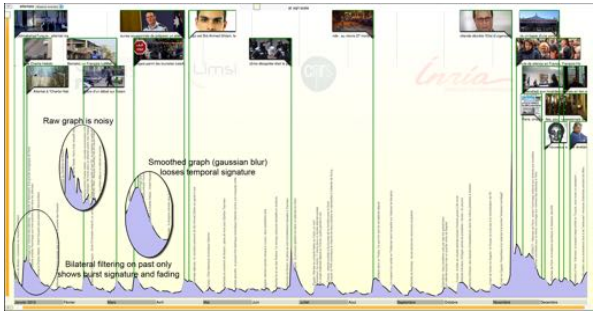


Projet Pulseweb
(Cointet, Chavalarias…)

http://pulseweb.cortext.net

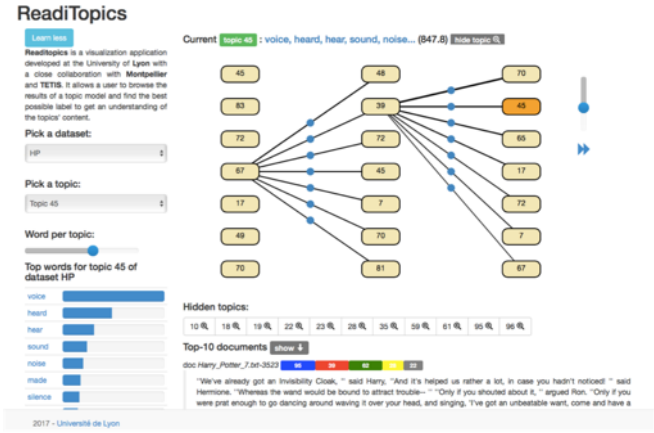
Metromaps
(Shahaf et al., 2015)





Chronolines
(Nguyen et al., 2014)

Readitopics
(Velcin et al., 2018)



https://github.com/Erwangf/readitopics

What we did

- Joint work with a sociologist (J.C. Soulages, Max Weber lab), in a project related to data journalism (Velcin et al., workshop @EGC 2017)
- As input: a collection of documents (here, newspapers from the **Huffington Post**)
- As output: distribution over topic categories
- Two levels of categories:
  - basic level, found by the topic model (here, LDA)
  - high level, labeled by experts (here, J.C. Soulages and partners from Brazil)

Comparing news media

- Usual preprocessing (tokenisation, stopwords…)
- Three versions of the same media (HuffPost):

Version	langue	#articles	longueur	#mots
US	anglais	12 067	454.4	5 482 661
FR	français	4 133	369.6	1 527 416
BR	portugais	2 355	429.5	1 011 373

- How to compare those three versions by using LDA?

  -> associate each topic with one **given** category (e.g., sport or media)

  -> up to now, this is manual!

- Estimate the **importance** of every category (here, volume of words tagged by the covered topics)

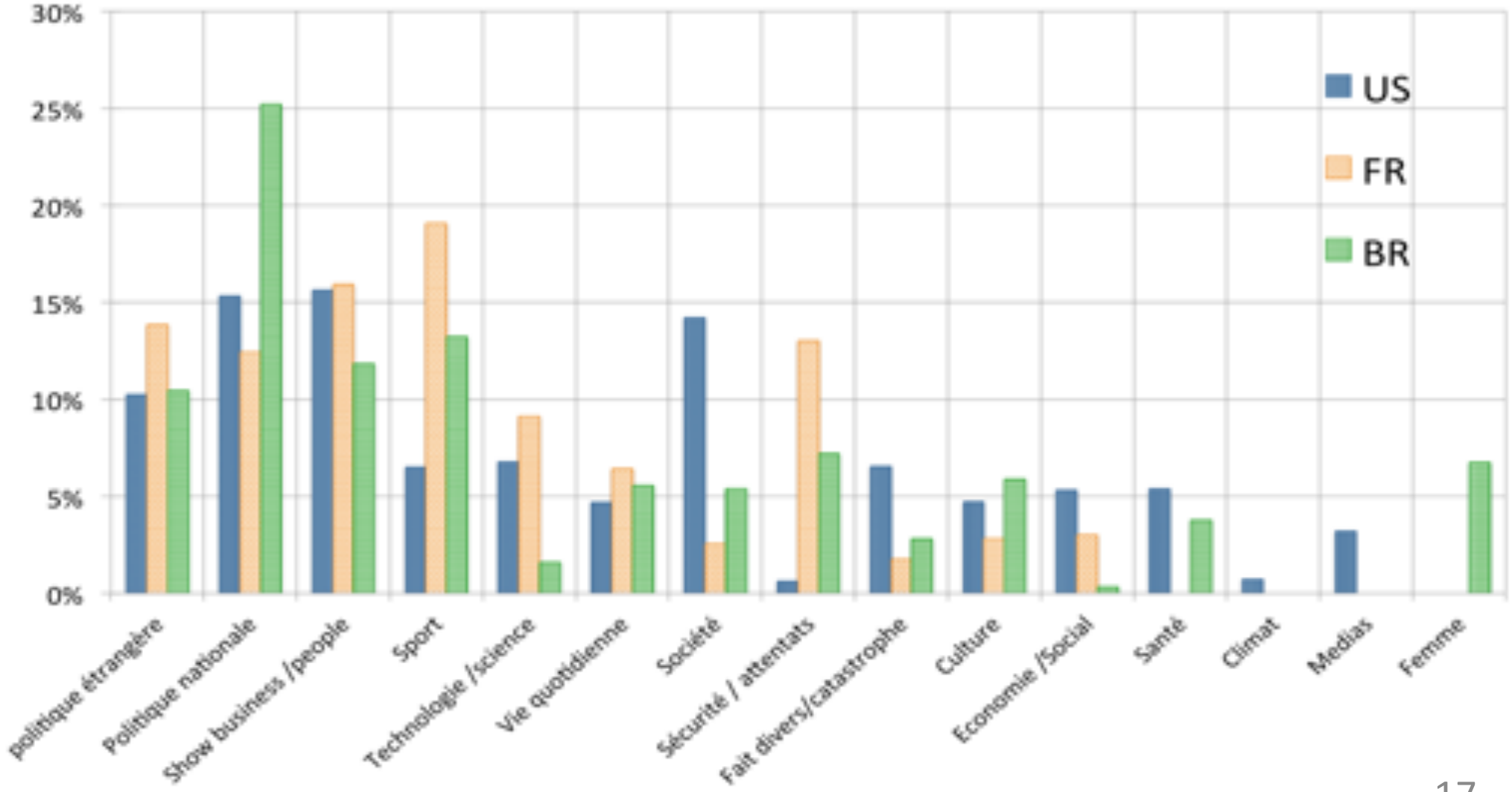
Some topics extracted by LDA

topic	#doc	cat.	mots les plus probables
			en français (sur 4133 articles) :
z_{18}	28	1	manifestation, paris, police, travail, loi, contre, syndicats, place, bastille, 2016
z_{19}	36	1	loi, travail, gouvernement, l'état, texte, l'assemblée, d'urgence, mois, projet, conseil
z_{25}	39	2	jeux, rio, olympiques, olympique, août, jo, athlètes, 2016, brésil, cérémonie
z_{47}	18	3	morandini, jean-marc, inrocks, catherine, l'animateur, lui, qu'il, europe, comédiens, plainte
z_{73}	47	4	nice, 14, l'attentat, anglais, promenade, camion, attentat, police, soir, christian
			en anglais (sur 12067 articles) :
z_{14}	92	5	refugees, children, refugee, people, countries, world, syrian, rights, million, year
z_{21}	74	2	gymnastics, biles, olympic, team, simone, olympics, gymnast, gold, rio, hernandez
z_{3}	46	6	pokemon, game, pokémon, playing, players, catch, «pokemon, go», pizza, play
z_{50}	56	7	muslim, religious, muslims, faith, church, god, christian, religion, hate, american
z_{27}	140	8	clinton, voters, trump, poll, polls, americans, election, support, vote, relationships
			en portugais (sur 2355 articles) :
z_{44}	52	8	dilma, presidente, impeachment, senado, senadores, processo, senador, rousseff, julgamento, defesa
z_{58}	7	9	sexo, menstruação, durante, rao, mccane, comédia, realmente, corpo, riso, menstruada
z_{71}	11	7	negros, brancos, negras, pessoas, racial, negra, racismo, país, movimento, black
z_{37}	57	2	brasil, vôlei, jogo, medalha, vitória, ouro, seleção, set, brasileiras, torcida
z_{99}	20	7	lgbt, gay, preconceito, violência, sexual, direitos, família, orgulho, estupro, aborto

Les catégories attribuées ici (cat.) correspondent à : 1- Economie / Social, 2- Sport / JO, 3- Show business / people, 4- Sécurité / attentats, 5- Politique étrangère, 6- Technologie / science, 7- Société, 8- Politique nationale, 9- Santé.

Compared results

Normalized distribution over the 15 categories
(*remember that* each category can be associated to **multiple** topics)



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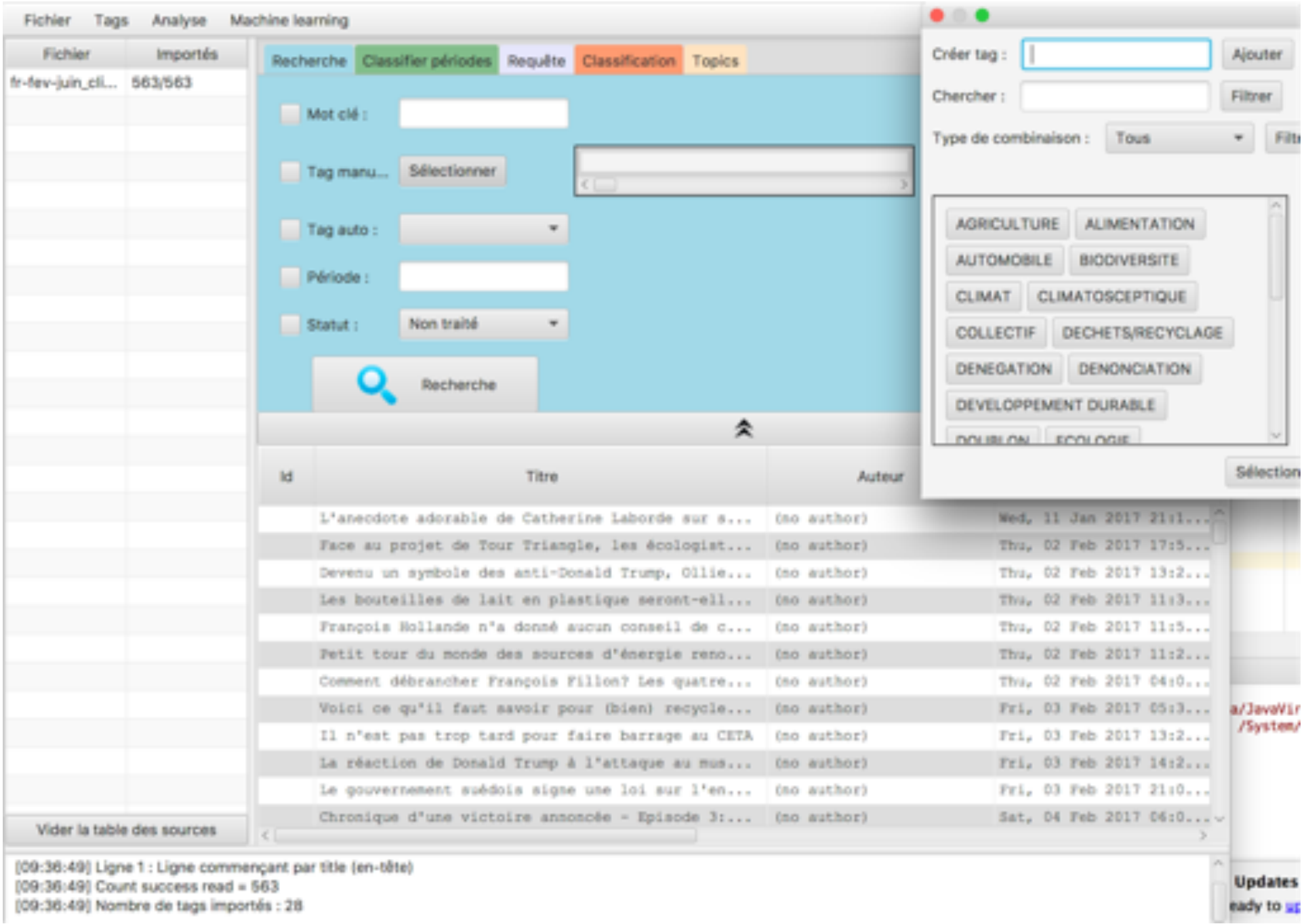
Human in the loop for topic models

- Give more insight about the produced structure
  - work on topic coherence (Röder et al., 2015)
  - topic labeling (Mei et al., 2007) (Gourru et al., 2018)
- Let the user interfere with the model
  - interactive topic modeling (Hu et al., 2014)
  - make the model selection easer
- **Towards learning the (meta) categories**
  - **semi-supervised, active learning techniques**
  - **refine the categorical structure with humans!**

Newsbrowsers



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Take-home message

- For studying the informational landscape:
  - semi-supervised / active learning is the key
  - clear idea of the targeted application
  - lots of engineering work (needs funding)
- Collaboration with LLSSH needs:
  - mutual understanding
  - trust
  - time
- And by the way…
  - life-cycle of information (Davidson et al., 2020)

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