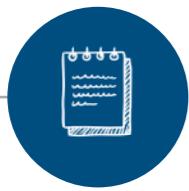


GETTING A WHIFF OF THE PAST THROUGH THE ANALYSIS OF HISTORICAL DOCUMENTS

Sara Tonelli
satonelli@fbk.eu



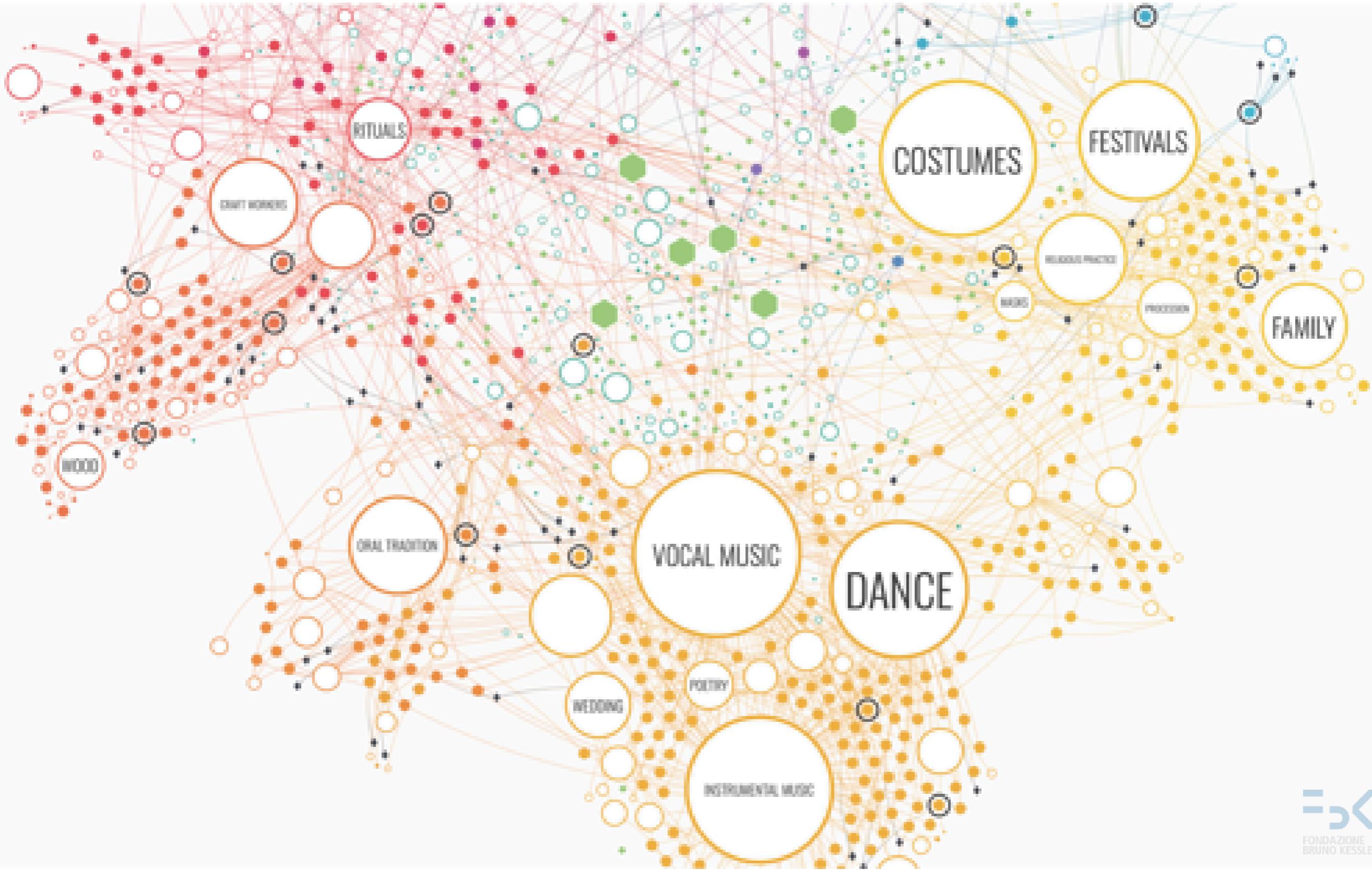
The Language of Odours

- Among five senses, smell is linked directly to **emotions and memories**
- Smells are **intangible** and difficult to preserve although they are an important part of our current and past **cultural heritage**





UNESCO Intangible Cultural Heritage





Smell & The City



Source: Getty

- Odours contribute to the construction of a place's **socio-economic identity**, e.g. clone towns as effects of urbanisation & globalisation
- How can we capture the smells of places, people and events? How can we use existing digital means?



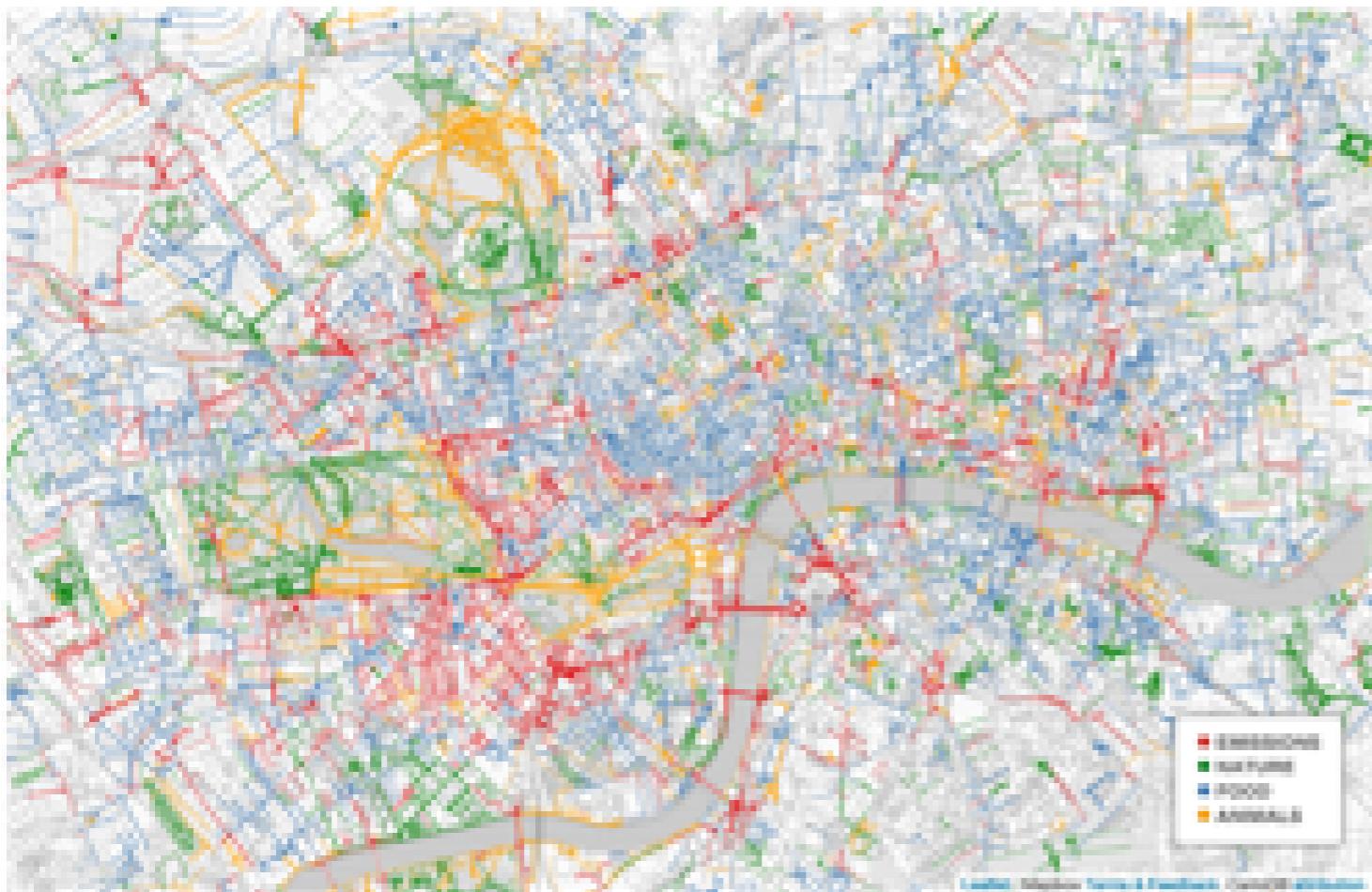
Urban Smellscapes



Smelly maps (Quercia et al., 2015): smell walks + dictionary of urban smells + information from Flickr, Instagram and Twitter



Urban Smellscapes



(a) London



D. Quercia, L. M. Aiello, R. Schifanella (2016) “*The Emotional and Chromatic Layers of Urban Smells*” In Proceedings of ICWSM 2016.



Odours from the Past

- Results on contemporary smellscape can be verified and to some extent reproduced
- What about smells from the past? Where can we get this information from?



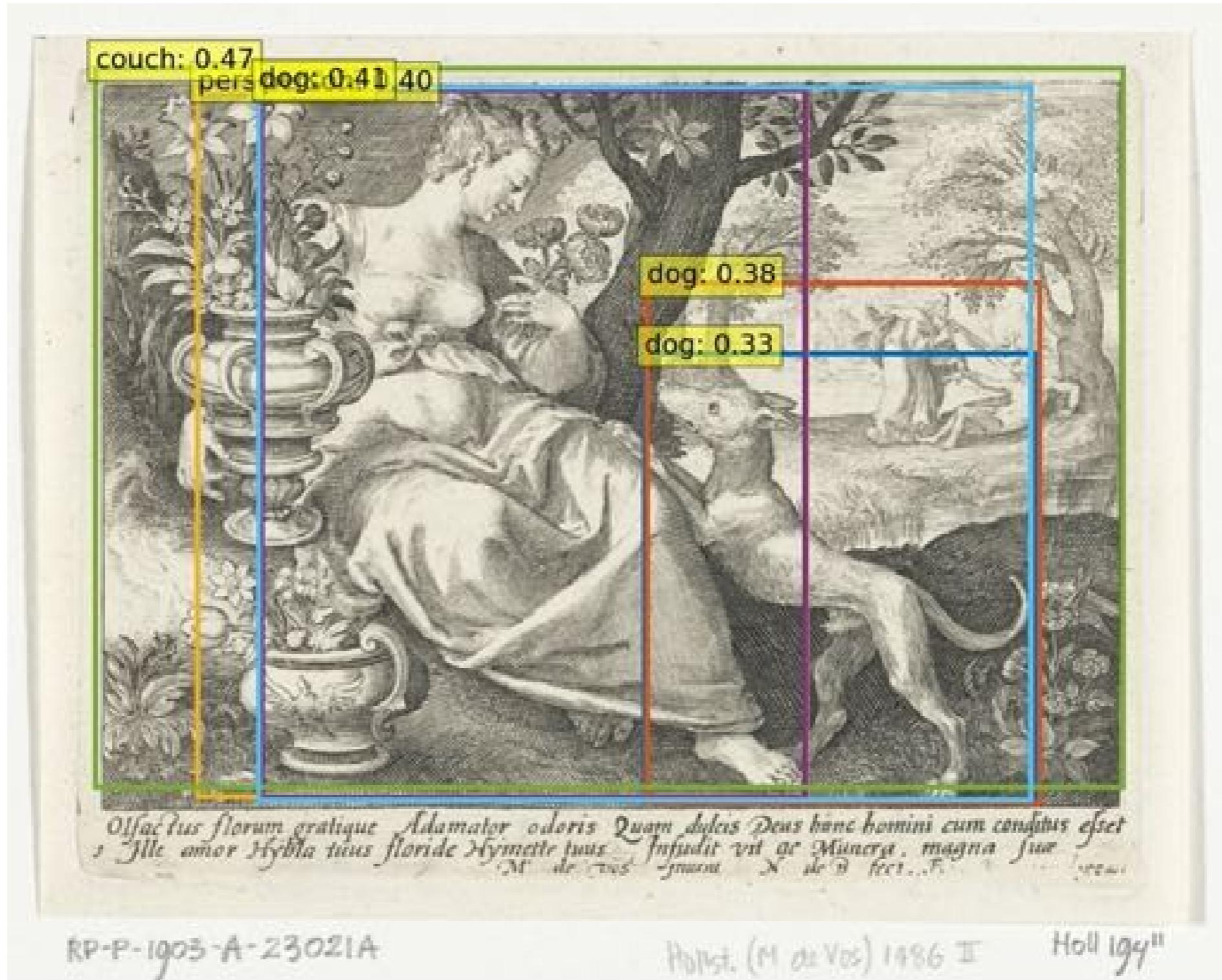


Odours from the Past in Paintings





Odours from the Past in Paintings



Smell (1581-1656) by Nicolaes de Bruyn, Rijksmuseum in Amsterdam.



Odours from the Past in Paintings

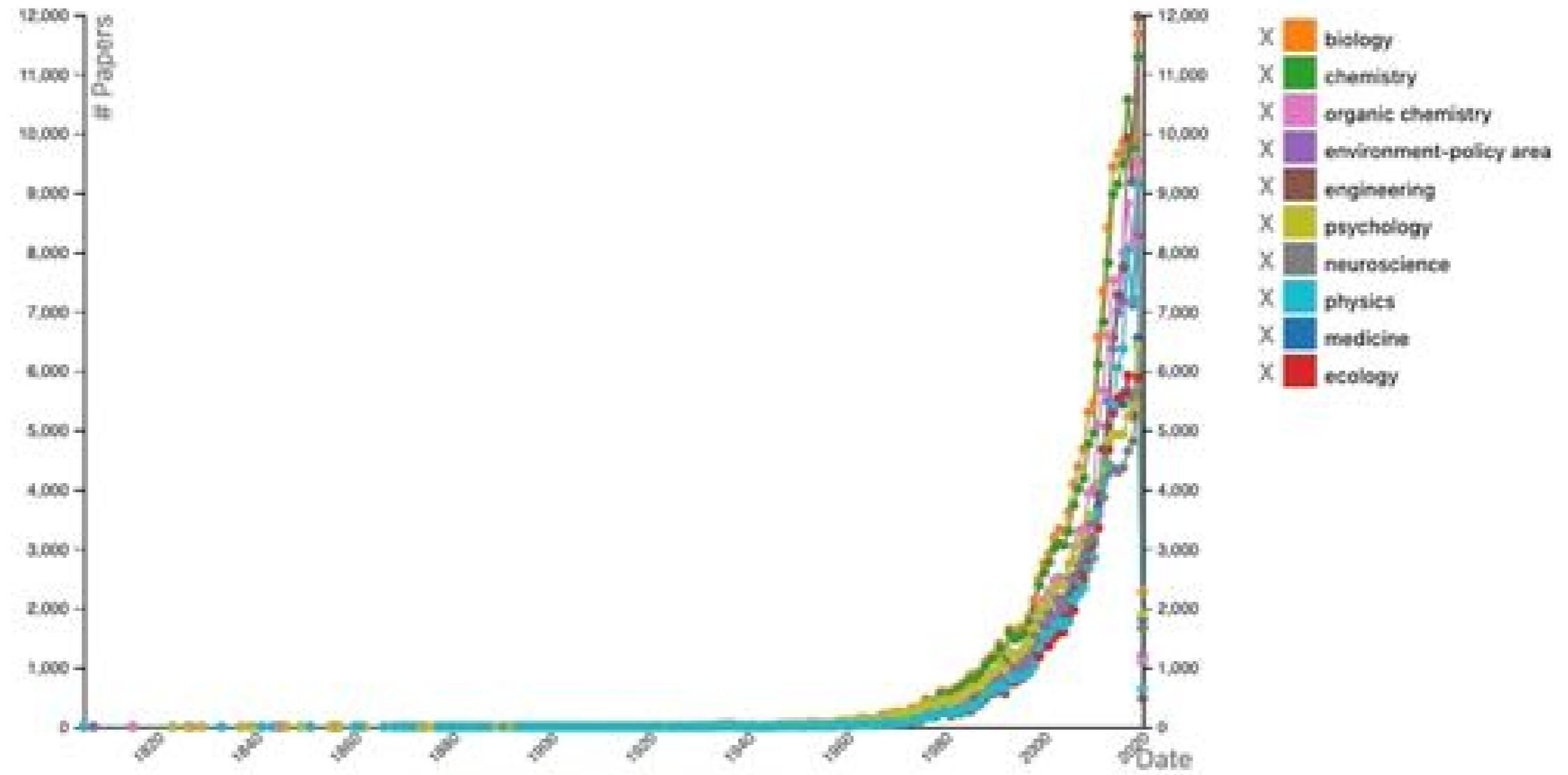


Arnolfini Portrait (1434) by Jan van Eyck



Odour Observatory

<https://odeuropa.ijs.si/>

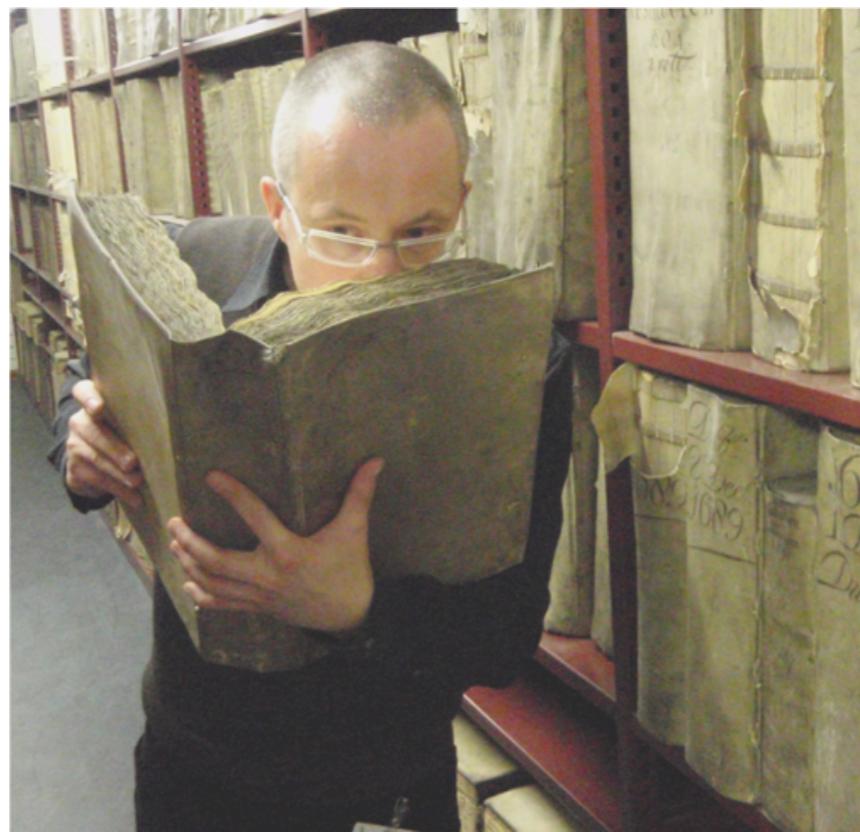


Novalija et al. (2021) «*Observing Odor-related Information in the Academic Domain*». Proceedings of Slovenian KDD Conference.



Extracting Odours from Texts

Develop methods for identifying and **tracing olfactory references** in large-scale text collections across multiple European regions and languages from 17th to 20th Century





Challenges

- Most Western cultures have **poor smell vocabularies**. Smell mostly addressed in terms of its causes (*the smell of roses*) or its effects (*a horrifying smell*)
- Smell mentions less frequent than mentions of other senses, also less unique word types (**visual concepts are predominant**)



A. Majid (2020) “Human Olfaction at the Intersection of Language, Culture and Body”, Trends in Cognitive Science.

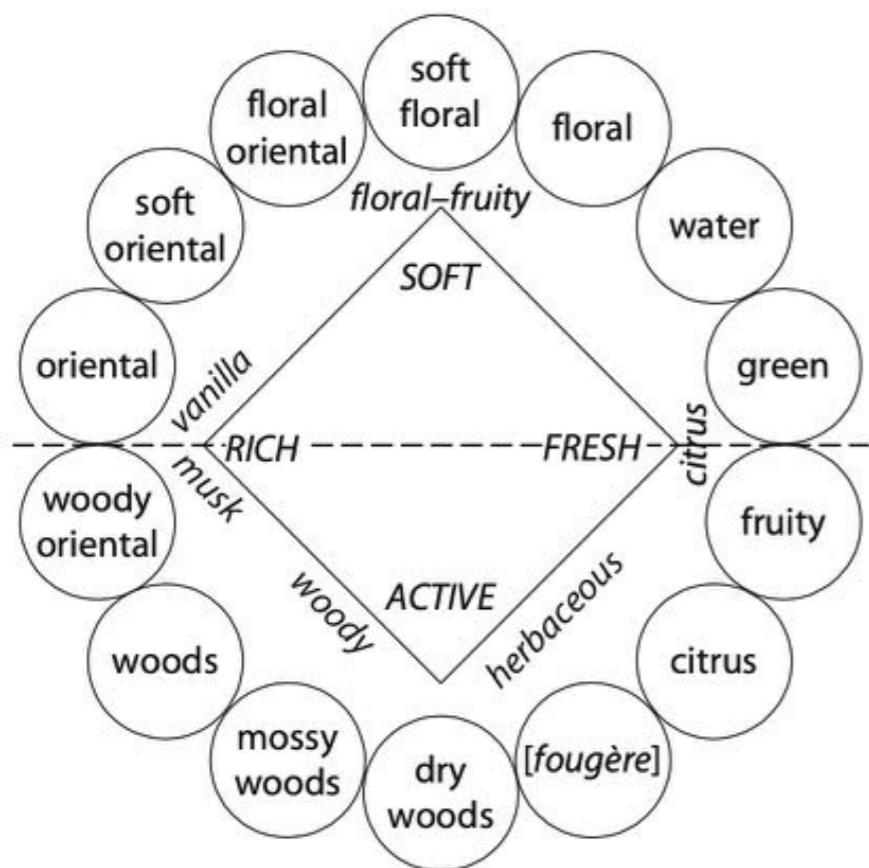
B. Winter (2019), “Sensory Linguistics: Language, perception and metaphor”. Converging Evidence in Language and Communication Research, vol. 20, John Benjamins.

F. Strik Lievers (2021) “Smelling over time. The lexicon of Olfaction from Latin to Italian”, The Linguistics of Olfaction. Typological and Diachronic Approaches to Synchronic Diversity. John Benjamins.



Challenges

- Smell **intensity** is hard to measure (cf. decibels of sounds). Hard to recognize & classify scents. No independent **taxonomy**, various classification schemes



- Discourses on smell reflect '*a maze of fascinating taboos and mysterious attractions*' (Corbin 1994: 8) [e.g. about health, morality, otherness, physiology, seduction, sexuality, ..]

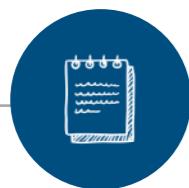
Fragrance wheel (Zarzo and Stanton, 2008)



Our Objectives

Extract and process relevant olfactory information from unstructured texts in the project languages: English, German, Italian, Dutch, Latin, French, Slovene

- Which **contexts, places and events** were mentioned in relation to olfactory information
- Which **terminology** was used
- How this information changed over **time** and across **languages**



Starting Point: Definition of Seed Terms

Italian: lezzo.n,
fragranza.n,
zaffata.n,
aromatico.a,
appestare.v,...

Dutch:
aromatisieren.v,
aromatisch.a,
geur.n, aroma.n,
miasma.n, ...

Slovenian:
vonjava.n, smrad.n,
umazan.a, postan.a,
zaduhteti.v,
ovohati.v, ...

French: déodorant.n,
fragrance.n,
empester.v,
malodorant.a,
olfactif.a, ...

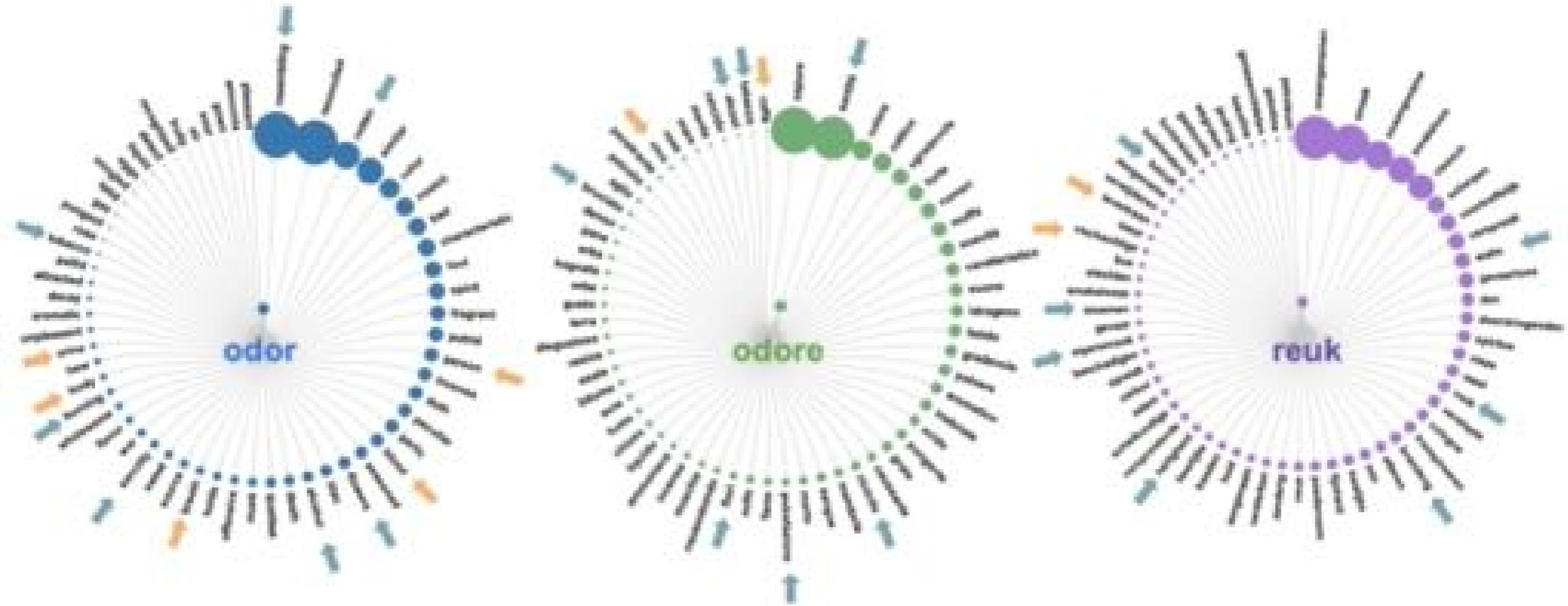
English: stink.n,
fragrance.n,
odoriferous.a,
reek.v, sniff.v,
scentless.a ...

Latin: fetor.n,
odor.n, fragrantia.n,
olfacio.v, puteo.v,
fetidus.a,
beneolens.a, ...

German: Geruch.n,
Gestank.n,
riechen.v, stinken.v,
wohlriechend.a,
stinkend.a, ...



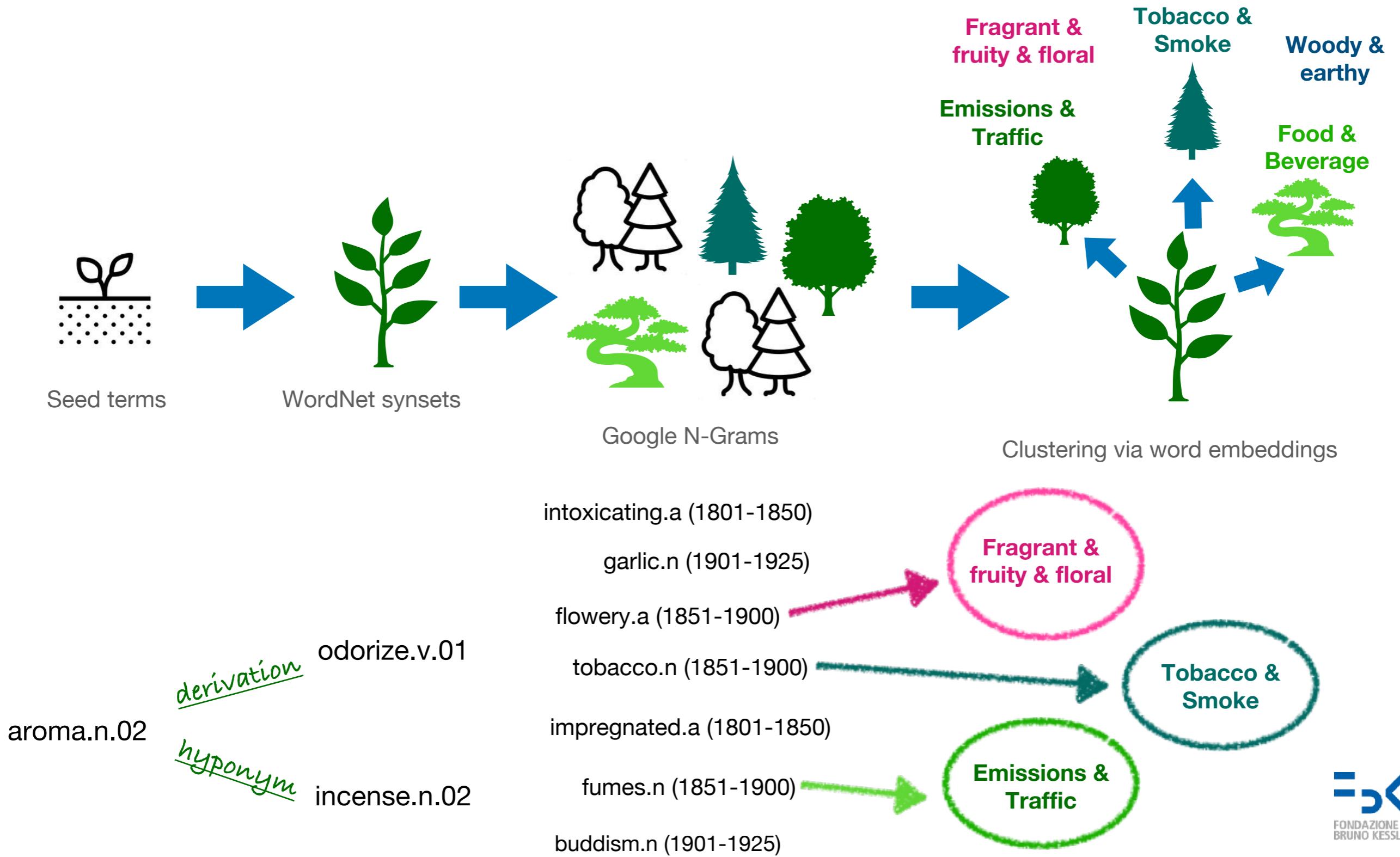
Co-occurrence Extraction from Google N-Grams



Lang	1650-1700		1701-1750		1751-1800		1801-1850		1851-1900		1901-1925		Total	
	Seeds	Coocs	Seeds	Coocs										
EN	29	316	51	1989	64	4805	68	8519	73	9963	74	9581	76	10365
IT	3	9	5	17	19	165	35	636	46	1367	46	1603	48	1783
DE	2	3	4	7	12	321	22	1111	30	1451	34	1568	35	1692
FR	26	420	32	941	48	3335	54	6029	56	6878	55	6270	57	7776
NL	-	-	-	-	-	-	26	905	49	3904	47	3878	57	6579
SL	-	-	-	-	-	-	-	-	-	-	-	-	48	4897



Development of a Multilingual Olfactory Taxonomy





Multilingual Olfactory Taxonomy

Smell-Source	EN	IT	DE	FR
animal, people	147	42	41	241
cleaning, medicinal	87	32	43	195
emissions, traffic, fuel, dust	35	21	20	114
food, beverage	200	42	20	187
industry	67	24	14	194
nature, flowers, plant, tree, soil	248	71	55	274
synthetic	17	4	0	2
tobacco, smoke	27	5	6	26
waste, garbage, excrement, rotten	83	23	13	63
Quality	EN	IT	DE	FR
chemical, hydro-carbons, synthetic	16	10	3	38
decayed	34	15	1	28
fragrant, fruity, floral	42	26	13	71
fresh	8	5	2	1
pungent	42	10	13	33
smoky, toasted, burnt, fatty	16	4	2	8
sweet, spicy	19	5	0	20
woody, earthy, mouldy	42	4	9	22



Manual Annotation of Olfactory Information

Annotation scheme for olfactory information and data annotation

- Definition of annotation guidelines: starting from smell-related words, mark in text all elements participating in the “olfactory event”

Perceiver → [The waiter] smelled [something foul] [in the kitchen]

Smell source → [The waiter] smelled [something foul] [in the kitchen]

Location → [The waiter] smelled [something foul] [in the kitchen]

Sara Tonelli and Stefano Menini (2021) *FrameNet-like Annotation of Olfactory Information in Texts*. Proceedings of the 5th Joint SIGHUM Workshop on Computational Linguistics for Cultural Heritage, Social Sciences, Humanities and Literature



Multilingual aspect

“Now the cook has only the natural odor of the unspoiled fish to deal with, which, being agreeable, is carefully preserved in the cooking.”

“L'odore acuto delle zuppe di pesce si propagava nell'aria dalle cantine aperte. Lentamente alle finestre, alle porte, nelle vie i lumi apparivano.”

“Ein nur 15-30 cm lang werdendes, stark silberglänzendes Fischchen mit tief gespaltenem Maul ist der sehr variable Stint, seines üblen Geruches halber auch »Stinkfisch« benannt.”



Manual Annotation of Olfactory Information

Dutch:
aromatisieren.v,
aromatisch.a,
geur.n, aroma.n,
miasma.n, ...

English: stink.n,
fragrance.n,
odoriferous.a,
reek.v, sniff.v,
scentless.a ...

German: Geruch.n,
Gestank.n,
riechen.v, stinken.v,
wohlriechend.a,
stinkend.a, ...

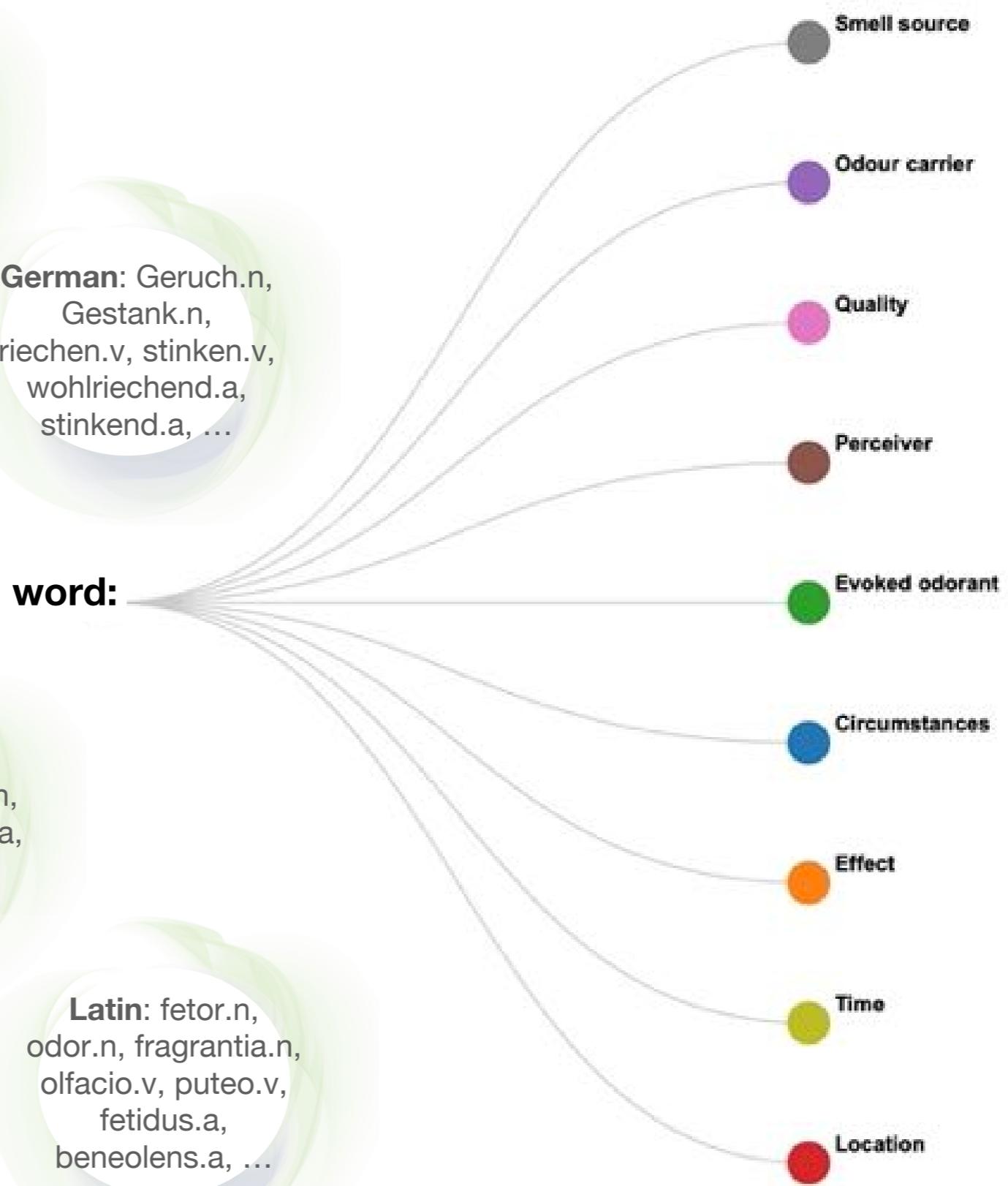
Italian: lezzo.n,
fragranza.n,
zaffata.n,
aromatico.a,
appestare.v,...

Slovenian:
vonjava.n, smrad.n,
umazan.a, postan.a,
zaduhteti.v,
ovohati.v, ...

French: déodorant.n,
fragrance.n,
empester.v,
malodorant.a,
olfactif.a, ...

Latin: fetor.n,
odor.n, fragrantia.n,
olfacio.v, puteo.v,
fetidus.a,
beneolens.a, ...

Smell word:





Annotation Interface

Section: Oldtown Benchmark EN/0210 Thomas Tomkis 1607 Lingua et the battle of the sexes_26_THE.txt
1-26 / 63 sentences (Doc 25 / 64)

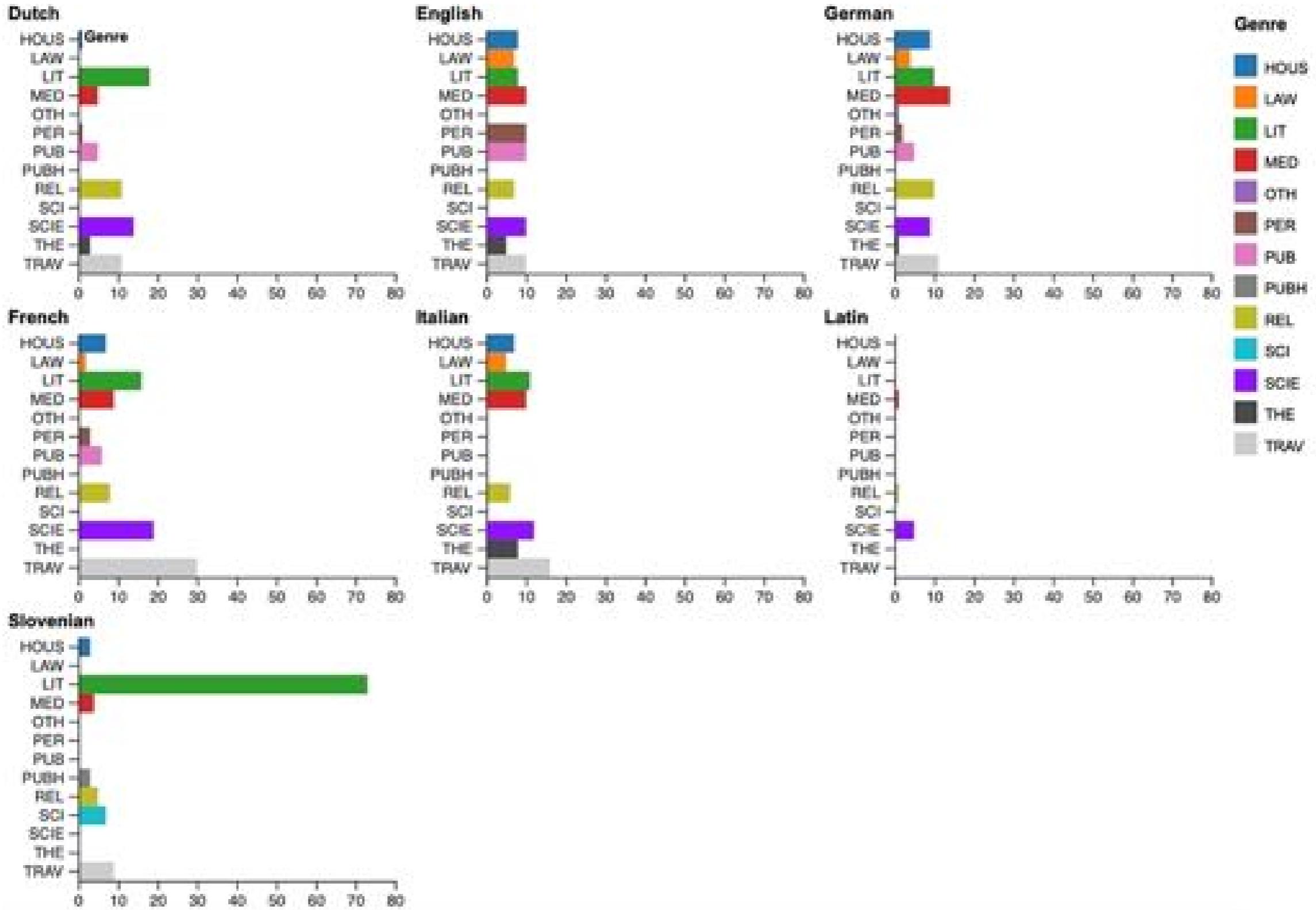
16.	ODOR .				
17.	I do my Lord, and haue at my command, The smell Of oynments sweete, and excellent perfumes, And Court-like waters, which if once you You in your heart would wish as I suppose: That all your Body were transformed to Nose.				
18.	PHA.				
19.	Olfactus of all the Senses, your objects have the worst luck, they are alwaies larryng with their contraries, for none can weare Cloet , but they are suspected of a proper badge hee smelleth best , that doth of nothing				
20.	ACT. 4.				
21.	SCENA 4.				
22.	The bench and Olfactus as before, Tobacco apparellled in a taffata mantle, his armes browne and naked, buskins made of the pilling of Osiers, his necke bare, hung with Indian leanes, his face browne painted with blewe stripes, in his nose swines teeth, on his head a painted wicker crowne, with Tobacco pipes set in it, plumes of Tobacco leaves, lead by two Indian boyes naked, with tapers in their hands, Tobacco boxes and pipes lighted.				
23.	PHA.				
24.	Foh, foh, what a smell is heare?				
25.	is this one of your delightfull objects?				

Layer Smell

Annotation	Delete	Clear
Text		
smell		
-# Relation		
of flowers		
-# Relation		
Odoriferous drugs		
-# Relation		
Of ointments sweete		
-# Relation		
excellent perfumes		
-# Relation		
Court-like waters		
-# Relation		
Frame Element		
Smell_Word	X	



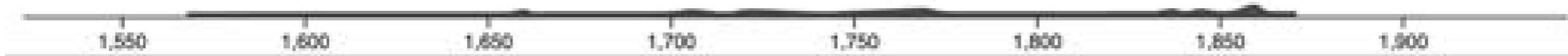
Genre distribution





Temporal distribution

Dutch



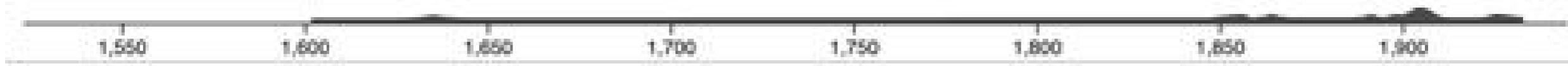
Slovenian



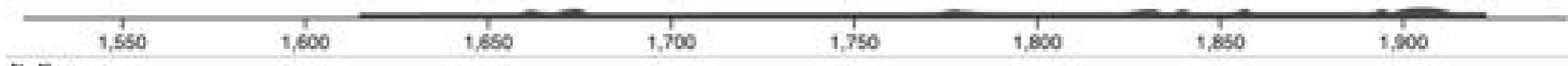
French



English



German



Italian





Annotation so far

	Dutch	English	French	German	Italian	Latin	Slovene
Smell events	1,929	1,530	664	1,493	1,228	1,199	1,1917

Top event patterns in all languages are:

Smell word + [Smell source] + [Quality]

Smell word + [Smell source]

Smell word + [Quality]

Smell word

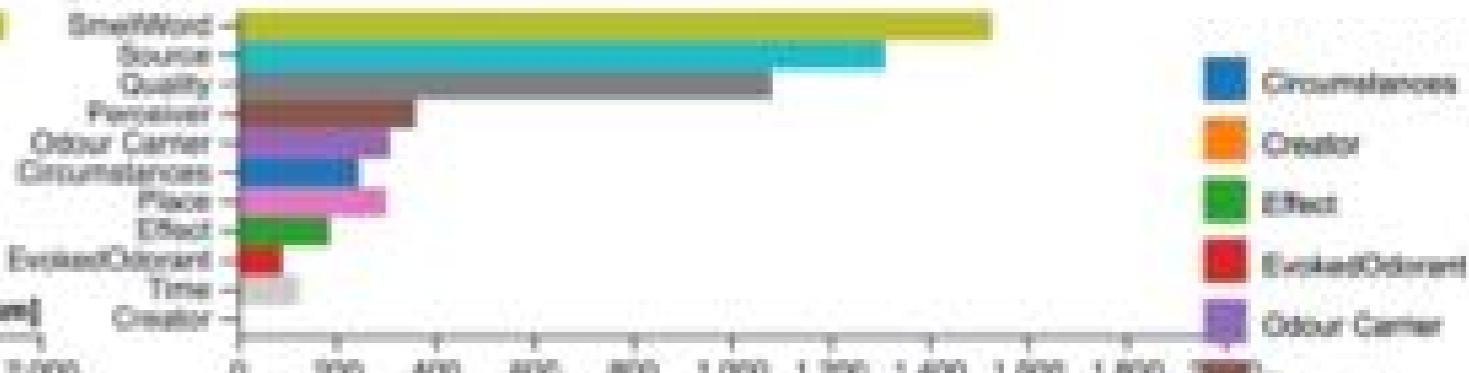


Frame Annotation

Dutch



English



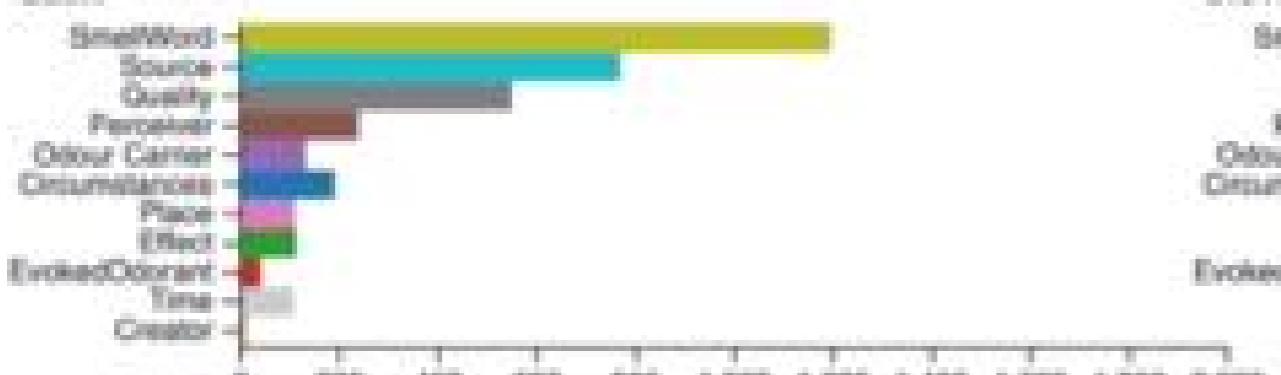
French



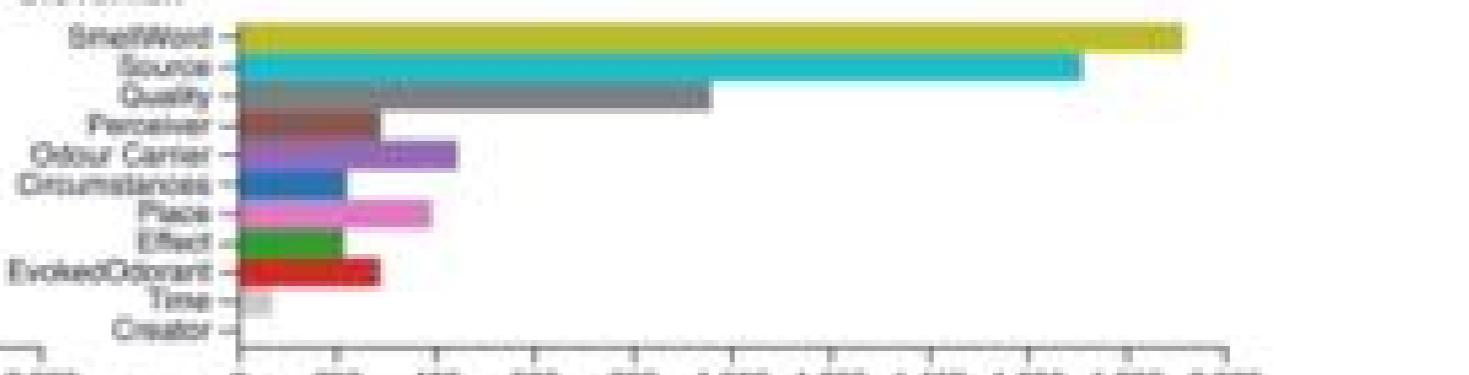
Italian



Latin

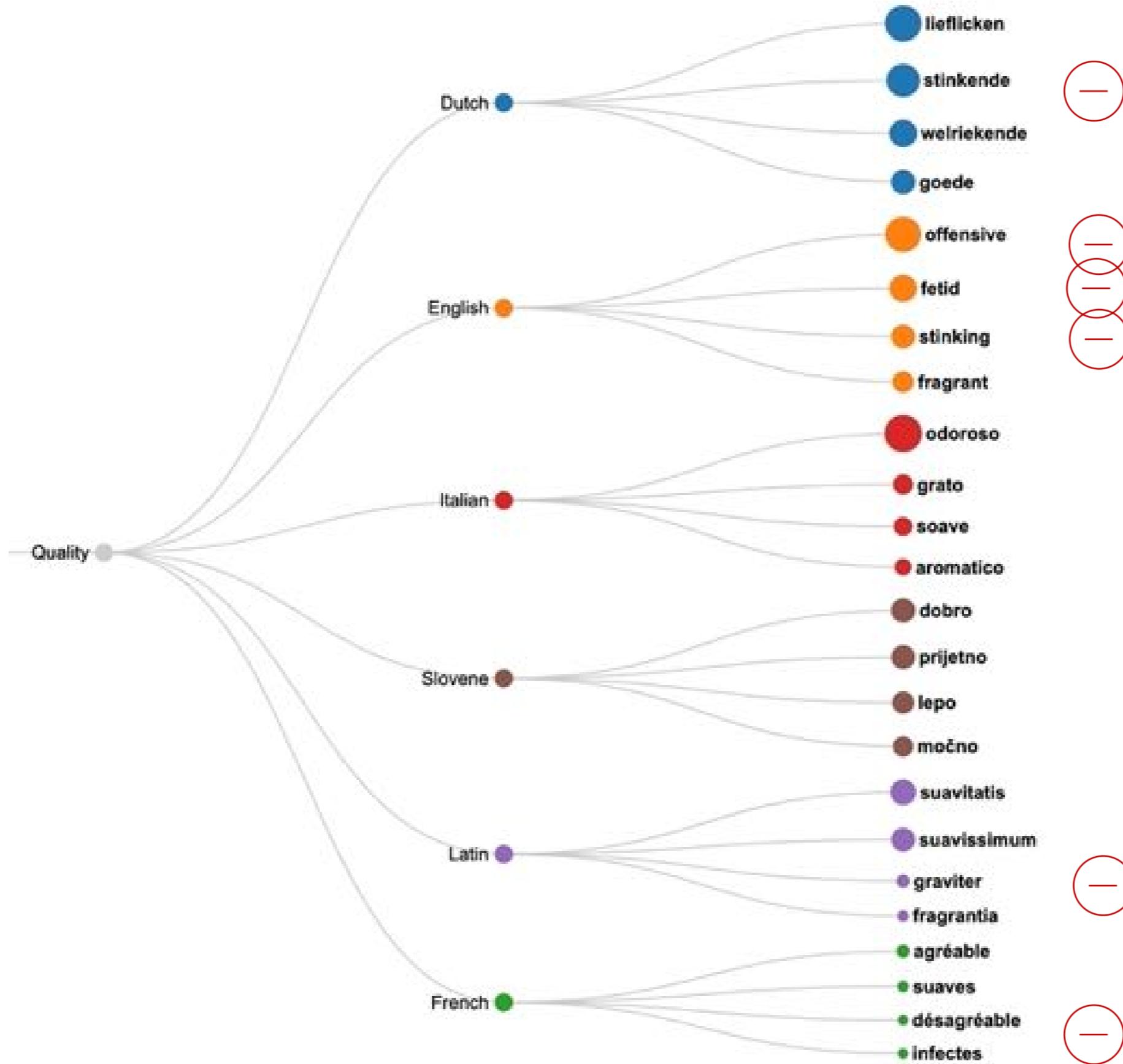


Slovenian



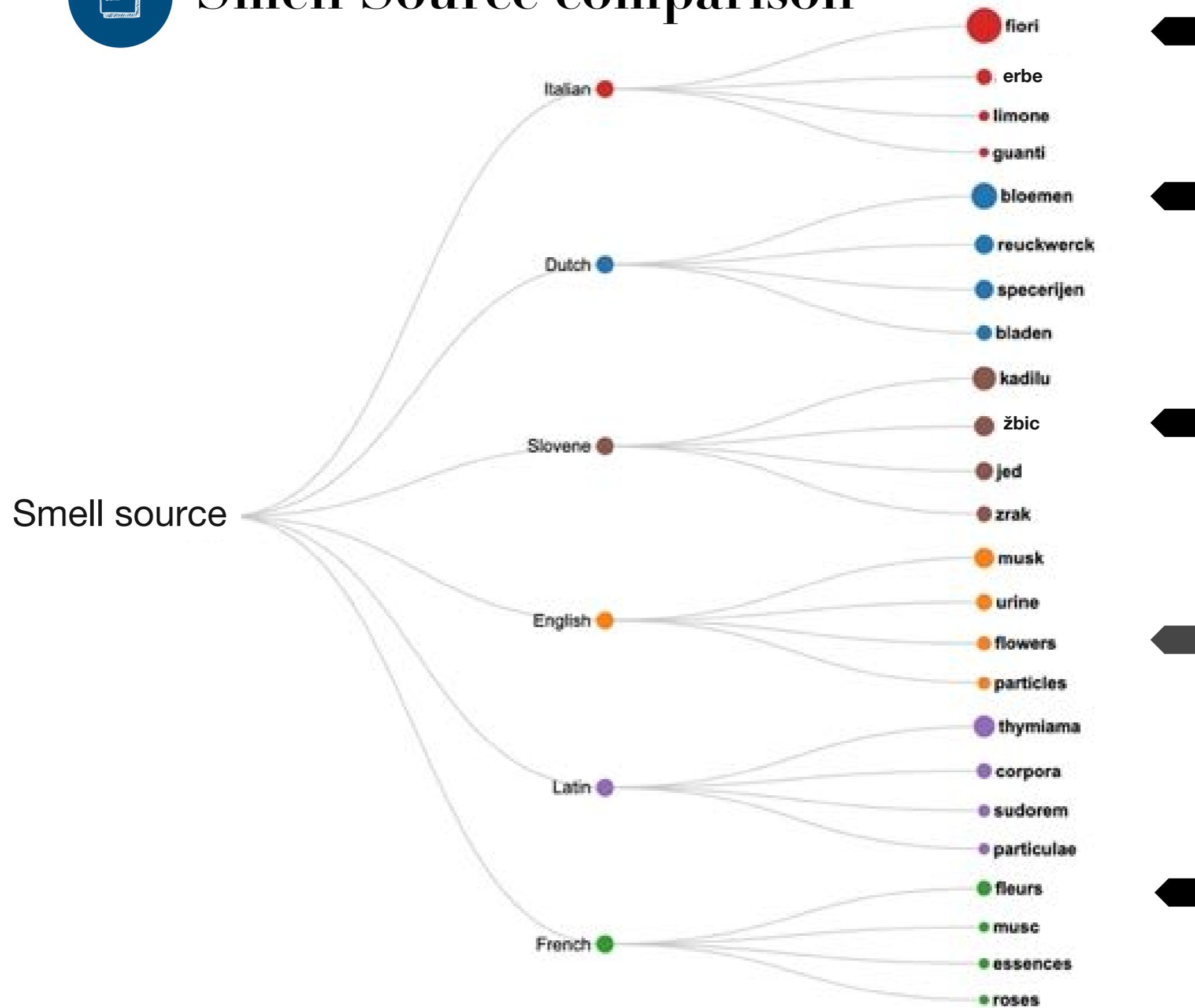


Smell Quality comparison



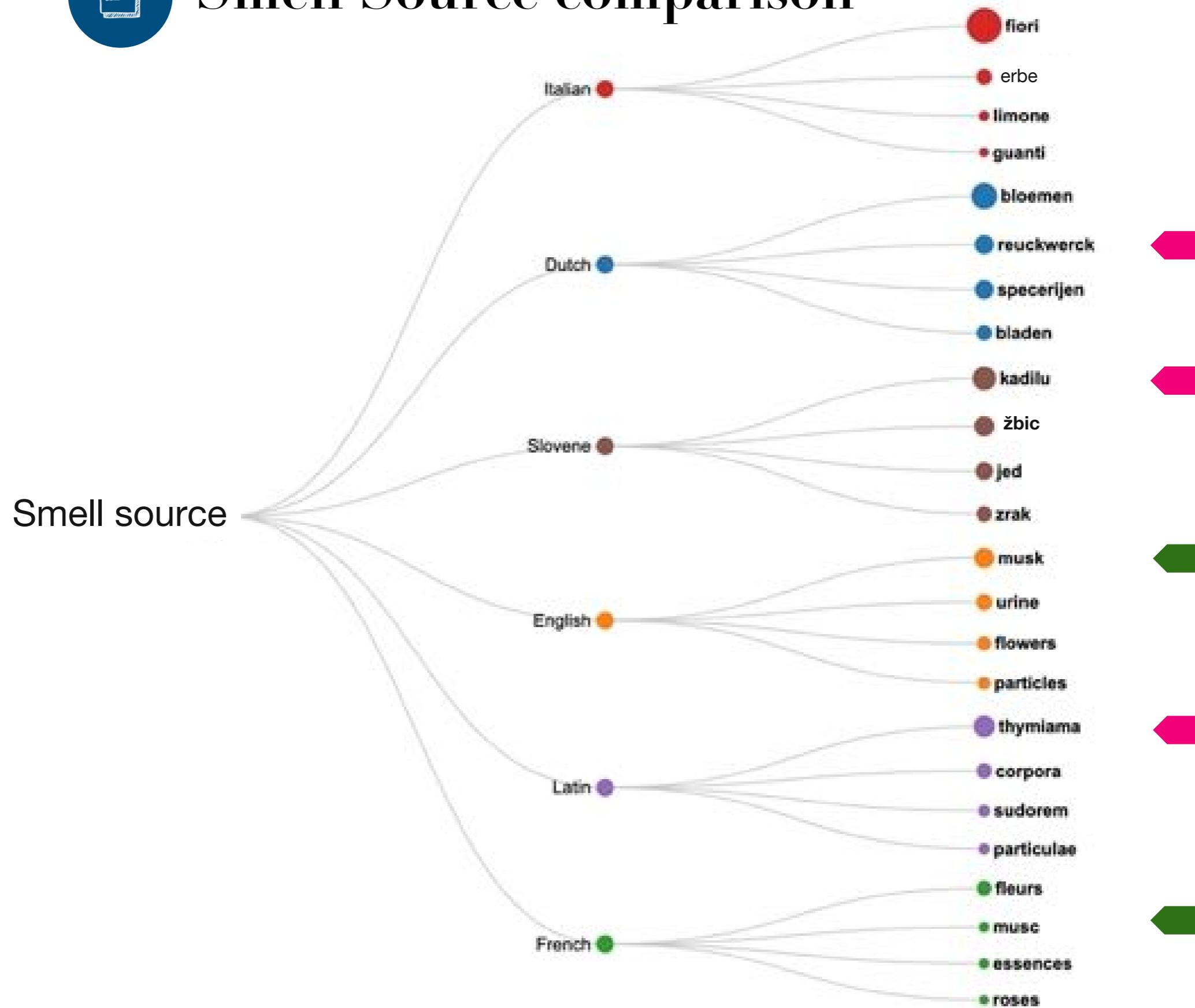


Smell Source comparison



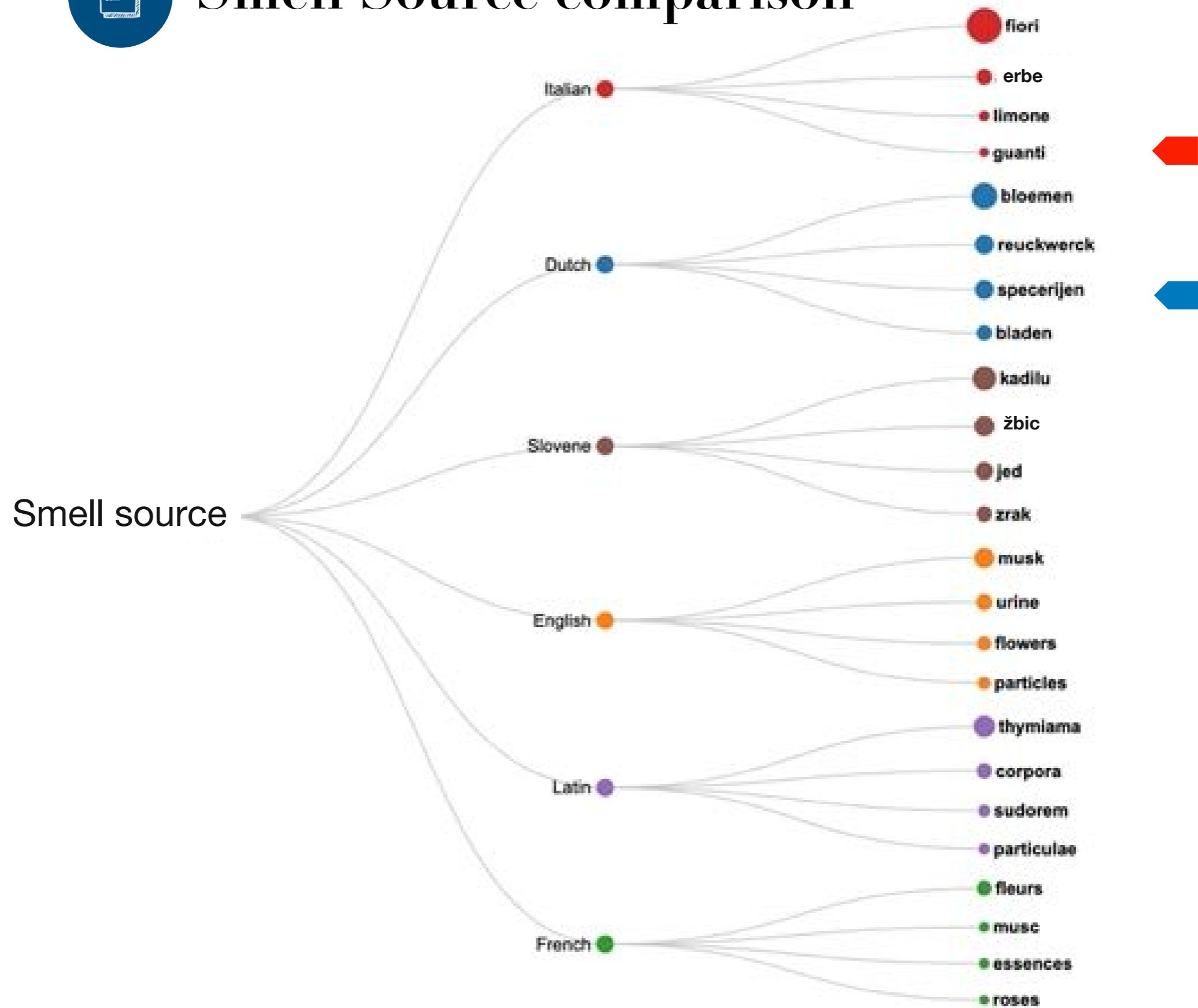


Smell Source comparison





Smell Source comparison





Temporal aspects

Temporal aspects concern not only the language but also the historical background.

From early modern humoral system to attempts to deal with subjectivity as well as to develop a science of smells

Fig. 11.



Bestimmung der Reaktionszeit für gemessene Geruchsreize.
Der Apparat vergrößert gezeichnet.





From Smell events to Storylines

- Shape sensory references into culturally and historically contextualised stories
- Create narrative descriptions related to smell in the form of **sensory storylines**, to be used as interactive tools to explore digital texts and images
- Support also multi-sensory storytelling with GLAM institutions to improve **memorability and knowledge of heritage objects**



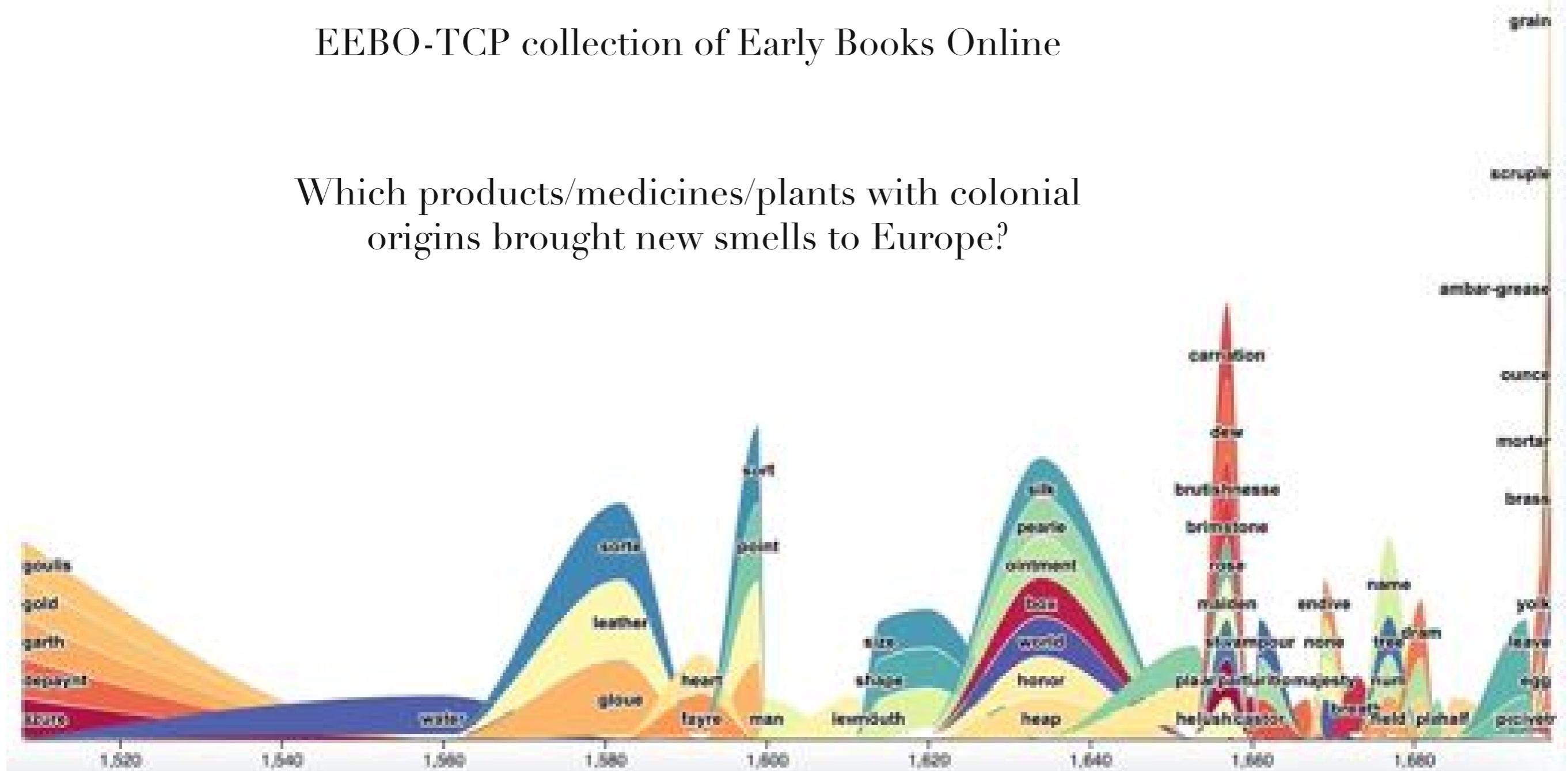
Questions around **key odours**, **smell identities**, **fragrant sites**, **smell emotions**, **odour practices and techniques**, **«noses»** (e.g. physicians, perfumers, merchants, ...)



Case Study 1: Colonialism and Trade

EEBO-TCP collection of Early Books Online

Which products/medicines/plants with colonial origins brought new smells to Europe?





Case Study 2: Travel Narratives

Corpus including 51 documents on travels to Italy (travel narratives and guidebooks), published between XIX and XX Century and freely available*

Around 600 mentions of smell-related events, manually annotated with all participants' roles

*R. Sprugnoli, S. Tonelli, G. Moretti and S. Menini (2017) “*A little bit of bella pianura: Detecting Code-Mixing in Historical English Travel Writing*”, In Proceedings of the Fourth Italian Conference on Computational Linguistics (CLiC-it 2017). Rome.



Examples

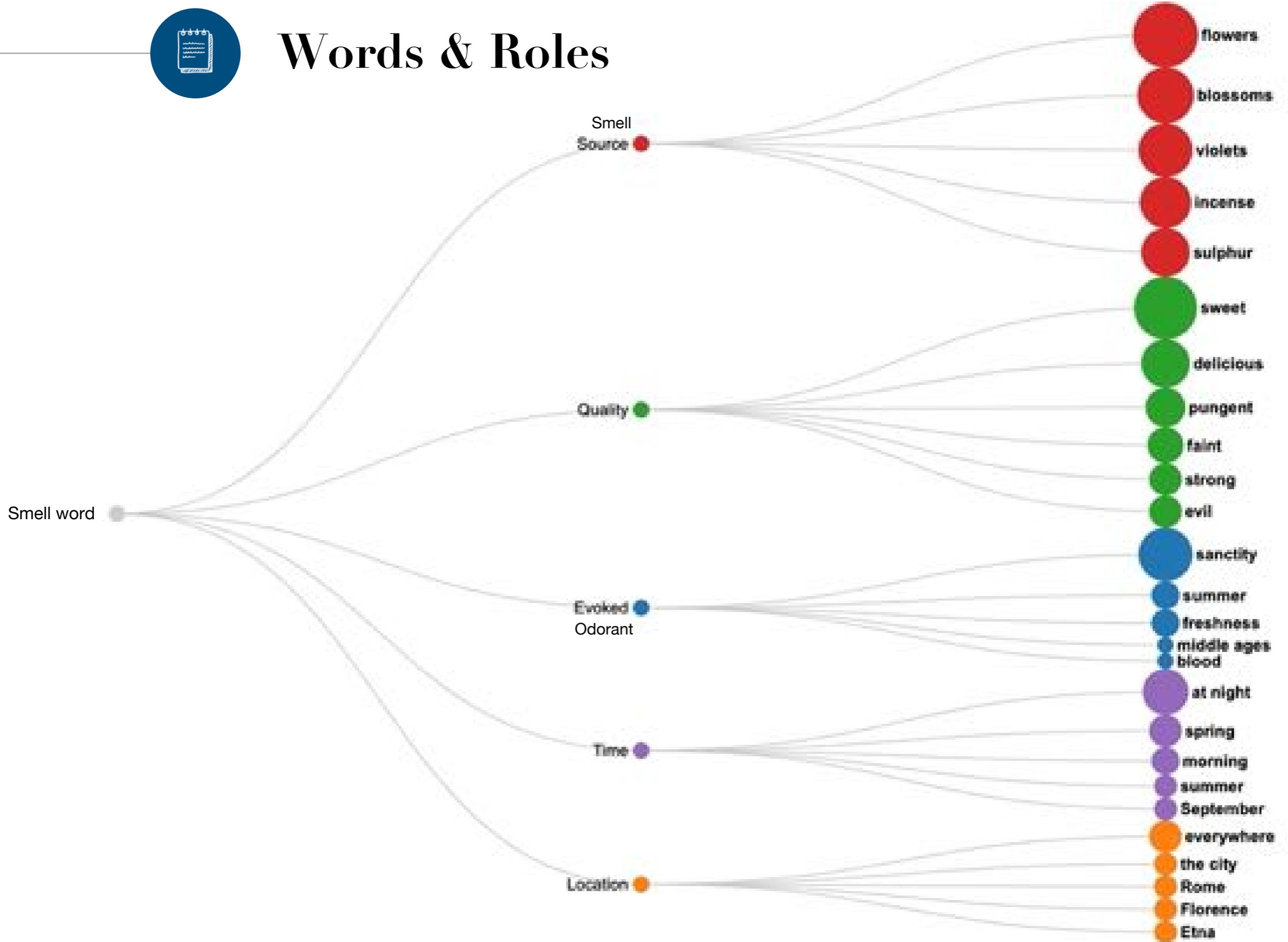
“Evil odour, odour of fallen nature” “Rusty aged houses, evil smelling, a kind of place that would be intolerably dismal in cloudy England...”

“It is when one climbs the hill on the Salerno road beyond Majori that these sweet sights and odours are encountered”.

“The whole place is violently hot and bright, all odorous and noisy”



Words & Roles





Olfactory Domains

Nature

“ *narcissus, groves or orange and lemon, rosemary, primroses, tall asphodel, white roses, withered plants, vegetation of the hillsides, wild myrtle and lentisk, cistus, cyclamens, cypress-woods* ”



Olfactory Domains

Ancient Past and Memory

“Tall, rusty, aged houses, catacomb, Capri caverns, courtiers and warriors, the Doria, the Medici, the tower of Castrovillari, ancient kerosene tins, hundreds of musty antiquities, the past”

Antiquity and nature coexist in a creative way, process of organic generation in which antique remains are reassimilated by nature



Olfactory Domains

Religion

“*the venerable Sister Serafina di Dio, so many holy persons, stale incense, myrrh and incense and rare ointments, Sunday incense, Fra Egidio, living monks, the usual Roman church, cathedral, evaporation of a sinful soul*”



Olfactory Domains

Food

“ Garlic and onions, roast apples, boiled beans, cabbage, potatoes, some ham fried in a batter of eggs, spilt wine, spaghetti and eels on gridirons, olive oil in preparation, garlic-eating humanity, frying oil, fried fish, cheese and wine, broiling and roasting, frittura, leg of lamb, a number of eating-houses, dinner ”



Olfactory Domains



Poor sanitation

“*corpse, filth, filthy streets, rags and dirt, pretty rubbish people, mud, dirt and stale things, malaria, people closely packed, thousand of unburied corpses, sex-problem*”



Italy as a Sensual Experience

“load of immense oranges, all soaked with the sun, ripe and fragrant, and more tempting than lumps of gold”

“The whole place is violently hot and bright, all odorous and noisy”

“Pines whose boughs are full of music and sweet odors”

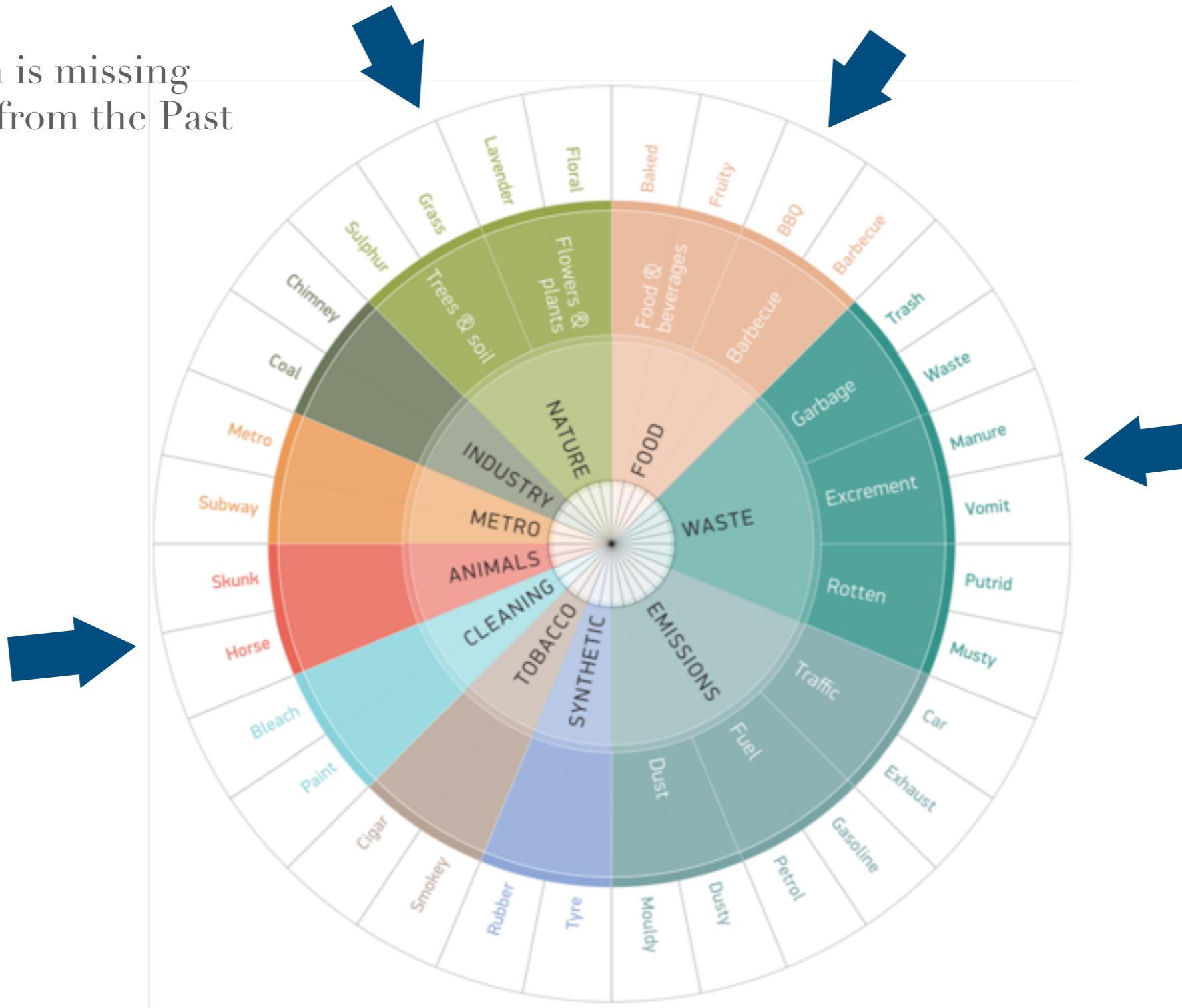
“Gubbio is very fragrant and of a rich ruby colour”

“All the air is musical with streams and fragrant with the scent of fresh-sawn wood”



Comparison with contemporary Smellscape

Religion is missing
No smells from the Past





Conclusions

*“The act of naming a smell is a part of the act of sensing and directly informs the way individuals and communities sense”**

Discovery of new knowledge about olfactory experiences requires **close and distant reading**.

NLP tools can support the exploration of digitised document collections and the extraction of olfactory information.

Challenges: volatility of smells, subjectivity, change in perspective, odor-related metaphors

W. Tullet (2019) *Smell in Eighteenth Century England. A Social Sense.*
Oxford University Press



Thank you!



Inger
Leemans



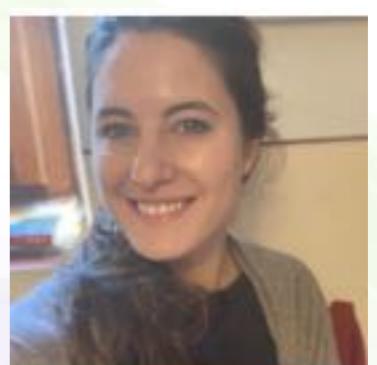
Elisa
Leonardelli



Stefano
Menini



William Tullett



Teresa
Paccosi

“

*By reading these documents, 'tis my intent,
Of the soot of corruption to give you the scent,
The scent of corruption is lasting and strong;
If we follow our noses we cannot go wrong ,,*