

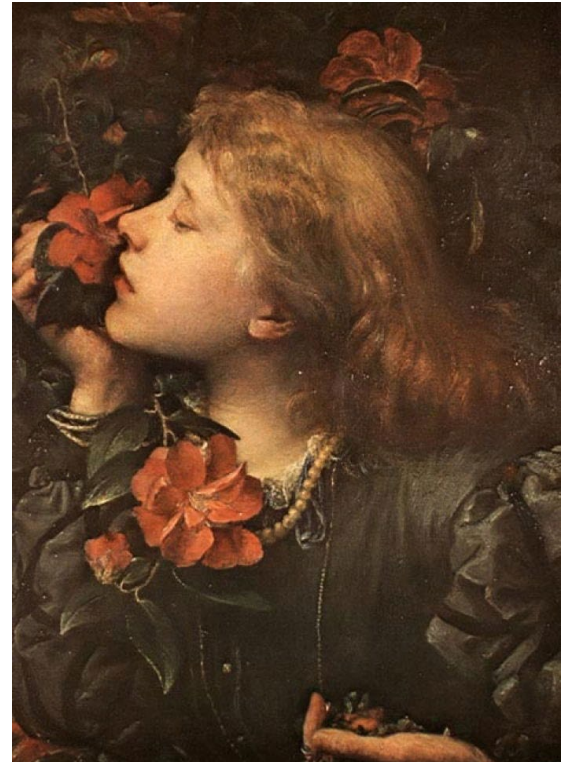
# Observing Odor-Related Information in Academic Domain

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# Introduction

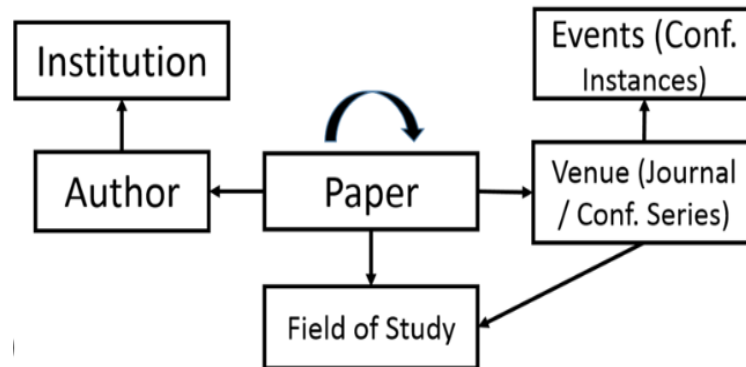
- **Olfaction**, or the **sense of smell**, is the sense through which smells (or odors) are perceived.
- The **Odeuropa** project gathers and integrates expertise in sensory mining and olfactory heritage. The project partners are developing novel methods to collect information about smell from (digital) text and image collections.
- **Odor Observatory tool** allows exploring olfactory related papers from the MAG over time, and along with current data, provides historical information starting with the early XIX century.



George Frederic Watts (1817–1904),  
Choosing, A Portrait of Ellen Terry  
(1864)

# Data Sources

- The **Microsoft Academic Graph (MAG)** is a heterogeneous graph containing **scientific publication records, citation relationships** between those publications, as well as authors, institutions, journals, conferences, and fields of study.
- The Odeuropa project is **interested** in particular in the **data available up to 1925**.



The Conceptual Schema for MAG

**Odor**

An odor (American English) or odour (British English; see spelling differences) is caused by one or more volatilized chemical compounds that are generally found in low concentrations that humans and animals can perceive by their sense of smell. An odor is also called a "smell" or a "scent", which ca...  
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**PARENT TOPICS**

- Organic chemistry
- Neuroscience

**CHILD TOPICS**

- Antennal lobe
- Olfactory Learning
- Geosmin [View More \(42+\) ▼](#)

**RELATED TOPICS**

- Olfaction
- Taste
- Aroma compound

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Odor in the MAG Taxonomy



# Methodology

## Main steps:

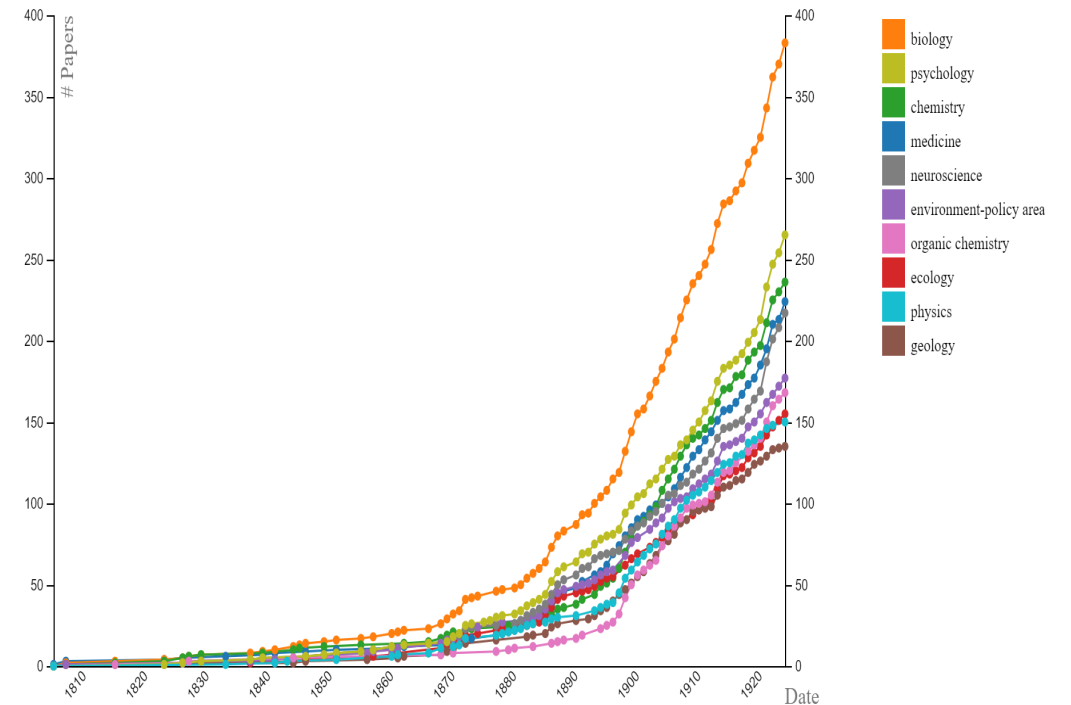
- Using the MAG taxonomy, **obtain the list of research papers** that corresponds to odor-related topics;
- Ingest the extracted corpus into the **Elastic Search tool**;
- Provide **visualization functionalities**, such as MAG time series per term.

## Key challenges:

- Interpretability and explainability of the results;
- Given the large scale of the incoming data streams, it is essential that building visualizations are scalable.

# Usage Scenarios: Historical Trends In Odor-Related Publications

- This scenario assumes **observing trends in different olfactory topics** throughout a time interval.
- It is possible to observe that the **highest number of publications** are in the domains of **biology and psychology**.

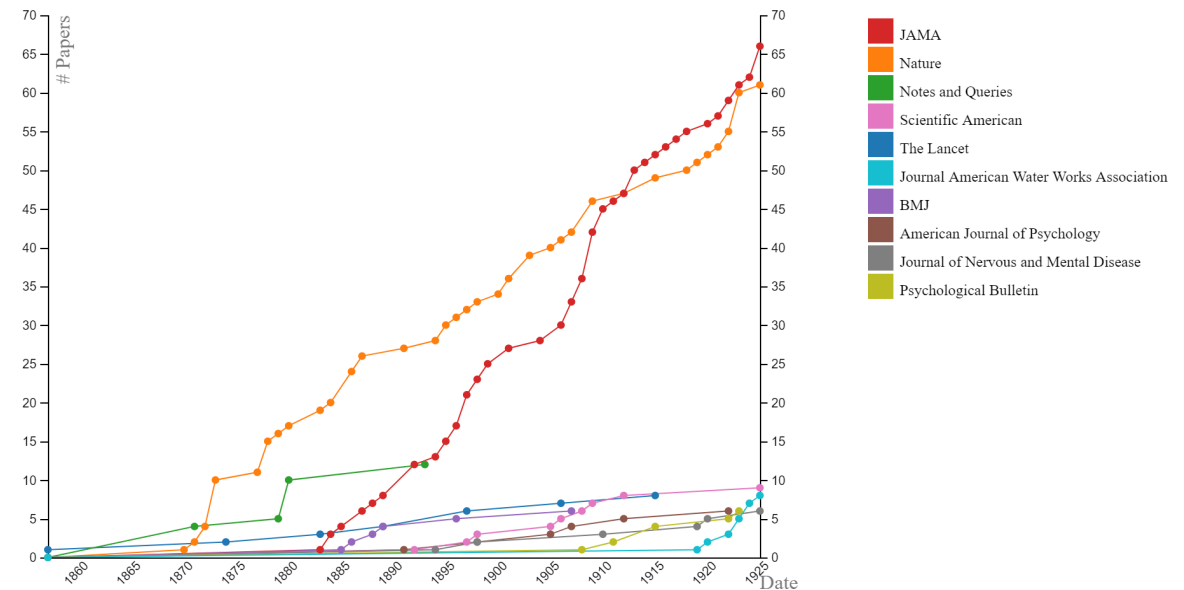


Odor-related Publications in MAG (from year 1800 until year 1925, cumulative) by topic



# Usage Scenarios: Popular Venues

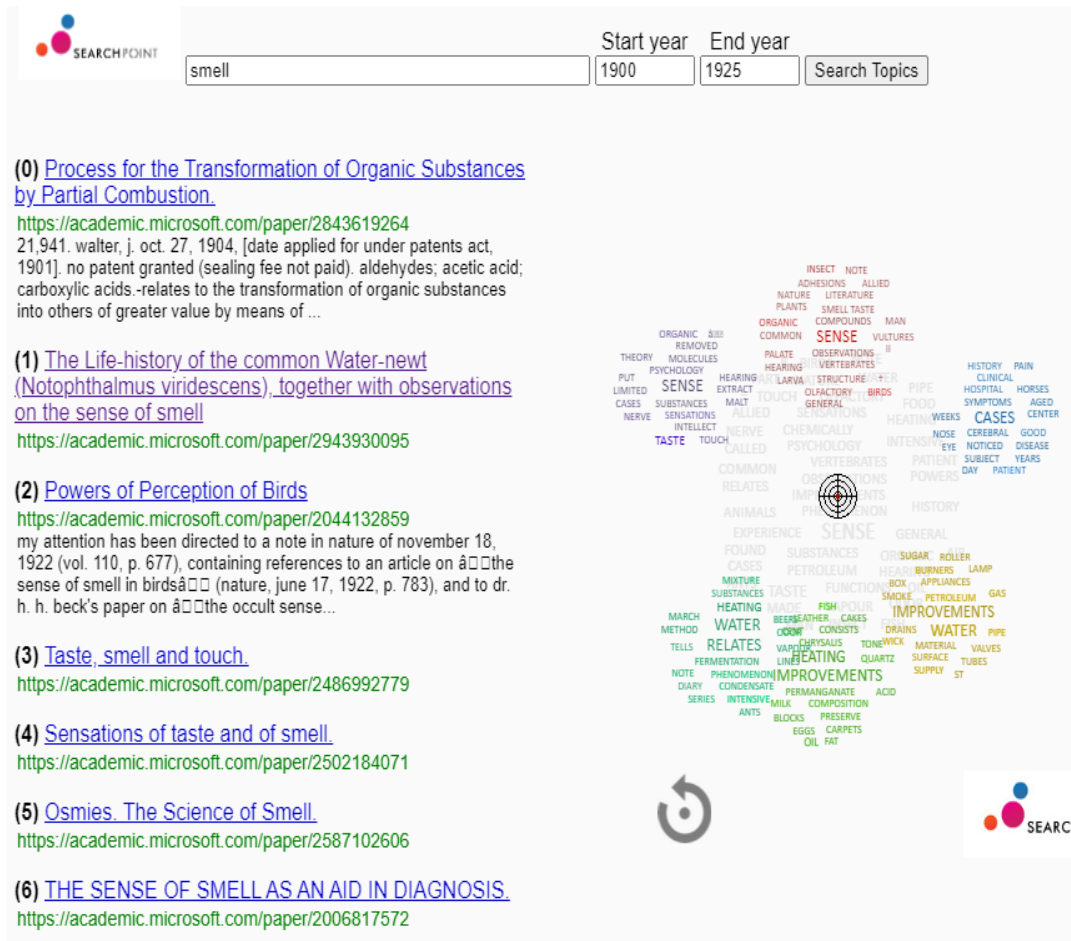
- This use case shows a **number of journals that had historical publications** about smells.
- The figure shows that **JAMA** and **Nature** journals are the most popular journals regarding historical olfactory publications.



Journals with Olfactory Publications in MAG (from year 1800 until year 1925, cumulative)

# Usage Scenarios: Contextual View

- The Research Explorer tool is a search engine that enables exploring the individual articles in the corpus of odor-related publications.
- The tool is built on Elastic Search and provides **search by keyword and by date**.
- Research Explorer supports **smart navigation** through the results by clustering the results and re-ranking the results by moving the focus of search through the cluster space.
- User experience is enhanced with **multiple rankings** of the results for each query.



SEARCHPOINT

Start year: 1900    End year: 1925    Search Topics

smell

(0) [Process for the Transformation of Organic Substances by Partial Combustion.](#)  
<https://academic.microsoft.com/paper/2843619264>  
 21,941. walter, j. oct. 27, 1904, [date applied for under patents act, 1901]. no patent granted (sealing fee not paid). aldehydes; acetic acid; carboxylic acids.-relates to the transformation of organic substances into others of greater value by means of ...

(1) [The Life-history of the common Water-newt \(Notophthalmus viridescens\), together with observations on the sense of smell](#)  
<https://academic.microsoft.com/paper/2943930095>

(2) [Powers of Perception of Birds](#)  
<https://academic.microsoft.com/paper/2044132859>  
 my attention has been directed to a note in nature of november 18, 1922 (vol. 110, p. 677), containing references to an article on "the sense of smell in birds" (nature, june 17, 1922, p. 783), and to dr. h. h. beck's paper on "the occult sense..."

(3) [Taste, smell and touch.](#)  
<https://academic.microsoft.com/paper/2486992779>

(4) [Sensations of taste and of smell.](#)  
<https://academic.microsoft.com/paper/2502184071>

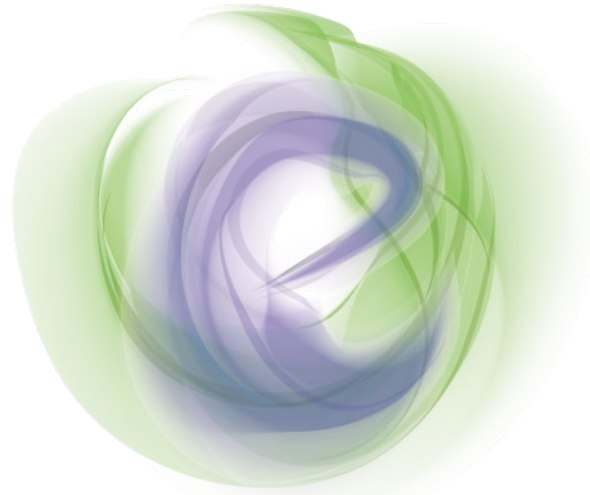
(5) [Osmies. The Science of Smell.](#)  
<https://academic.microsoft.com/paper/2587102606>

(6) [THE SENSE OF SMELL AS AN AID IN DIAGNOSIS.](#)  
<https://academic.microsoft.com/paper/2006817572>

Word cloud terms: INSECT, NOTE, ADHESIONS, ALLIED, NATURE, LITERATURE, PLANTS, SMELL TASTE, COMPOUNDS, MAN, ORGANIC, COMMON, SENSE, OBSERVATIONS, VULTURES, THEORY, PSYCHOLOGY, MOLECULES, PALATE, HEARING, HEARING, HEARING, VERTEBRATES, HISTORY, PAIN, PUT, LIMITED, CASES, SUBSTANCES, MALT, TOUCH, EXTRACT, LARVA, OLFACTORY, BIRDS, PIPE, FOOD, CASES, NERVE, SUBSTANCES, INTENSE, HEATING, WEEKS, CEREBRAL, GOOD, TASTE, TOUCH, NERVE, CHEMICALLY, PSYCHOLOGY, INTENSIVE, NOSE, NOTICED, DISEASE, COMMON, VERTEBRATES, PATIENT, POWERS, SUBJECT, YEARS, RELATES, IMPROVEMENTS, HISTORY, ANIMALS, IMPROVEMENTS, PHENOMENON, GENERAL, EXPERIENCE, SENSE, FOUND, SUBSTANCES, OR SUGAR, ROLLER, PETROLEUM, HEATING, BURNERS, LAMP, MIXTURE, SUBSTANCES, TASTE, FUNCTION, SMOKE, PETROLEUM, GAS, HEATING, WATER, BEES FEATHER, CASES, CONSISTS, DRAINS, WATER, PIPE, MARCH, METHOD, TELLS, RELATES, VALVES, CHRYSALE, TONEWICK, MATERIAL, VALVES, TUBES, FERMENTATION, LINE, HEATING, IMPROVEMENTS, NOTE, PHENOMENON, IMPROVEMENTS, DIARY, CONDENSATE, PERMANGANATE, ACID, COMPOSITION, SERIES, INTENSIVE, MILK, PRESERVE, ANTS, BLOCKS, PRESERVE, EGGS, CARPETS, OIL, FAT.

List of Olfactory Publications in MAG (from year 1800 until year 1925) that contains the keyword "smell"





Odeuropa

**DEMO**

<http://odeuropa.ijs.si>

# Conclusion

- We demonstrated an **approach towards observing olfactory related information** in scientific publications, as recorded in the MAG.
- We presented an **Odor Observatory tool** that enables several usage scenarios for exploring historical and present olfactory research.
- The **future work** will include **the exploration of other textual datasets** applicable for olfactory research, with an accent on olfactory heritage information.
- In line with the Odeuropa project, the relevant information extracted from textual sources will be, following semantic web standards, aligned with the **'European Olfactory Knowledge Graph' (EOKG)**.

# Questions?



Rembrandt Harmenszoon van Rijn (1606–1669),  
The Unconscious Patient (Allegory of Smell)