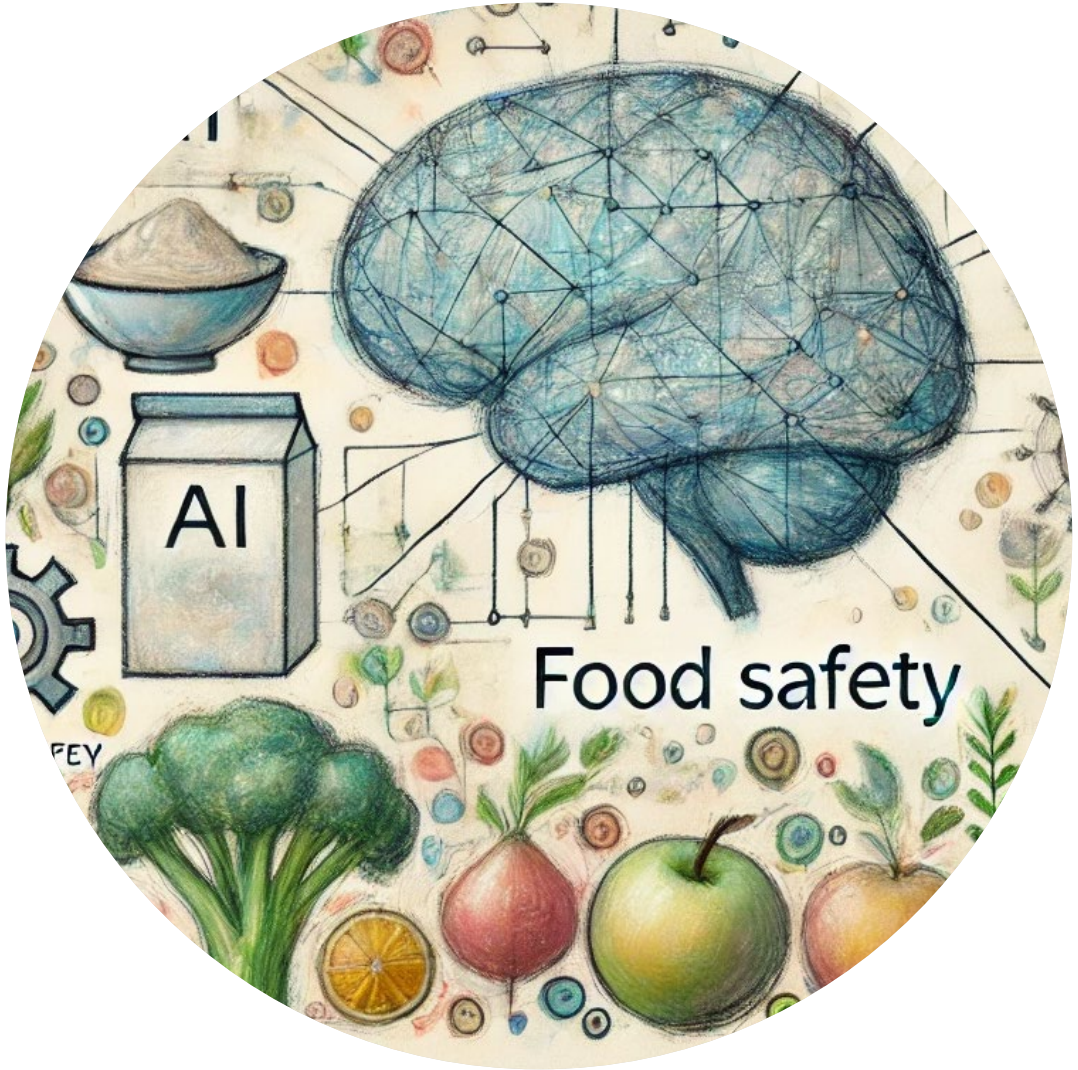
AI en data voor voedselveiligheid

dr.ir. Bas van der Velden

Head of Data Science

Wageningen Food Safety Research



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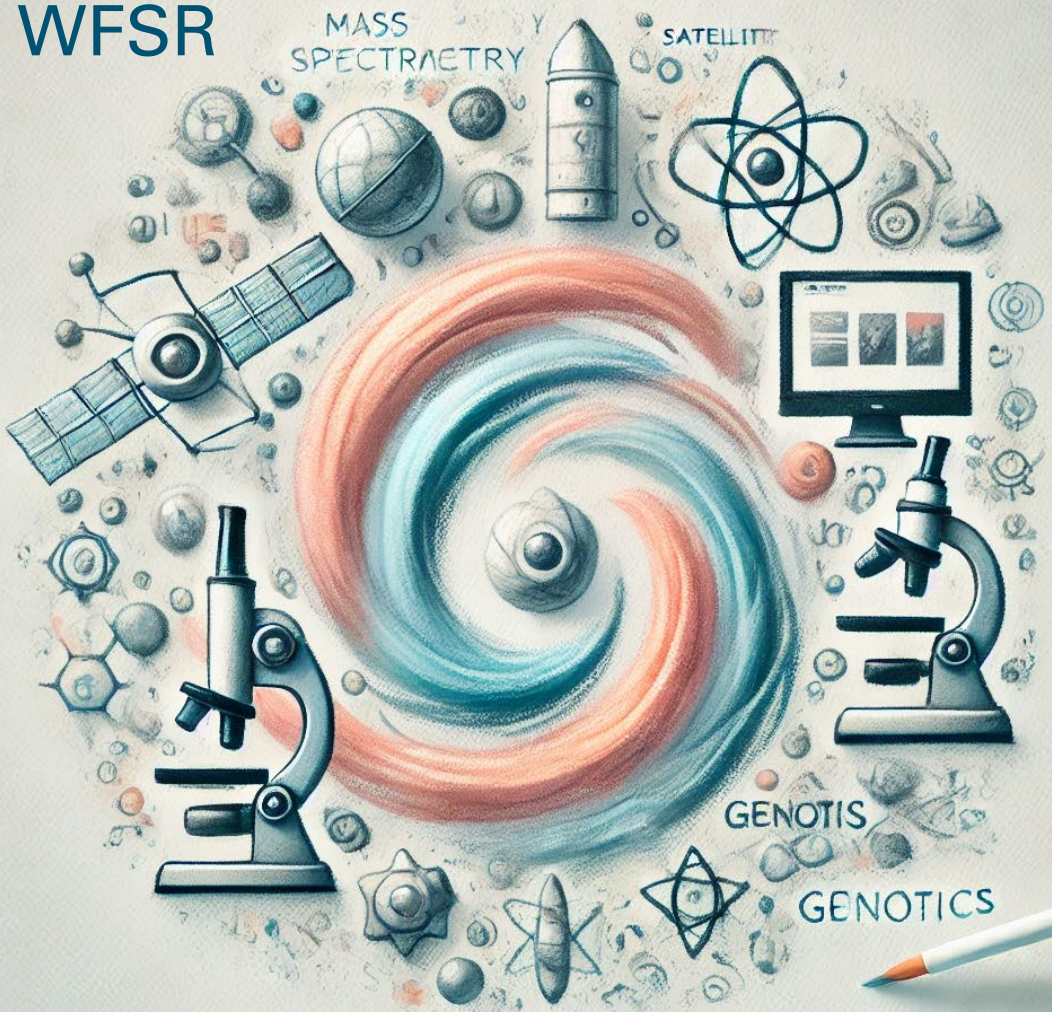
AI @ WFSR



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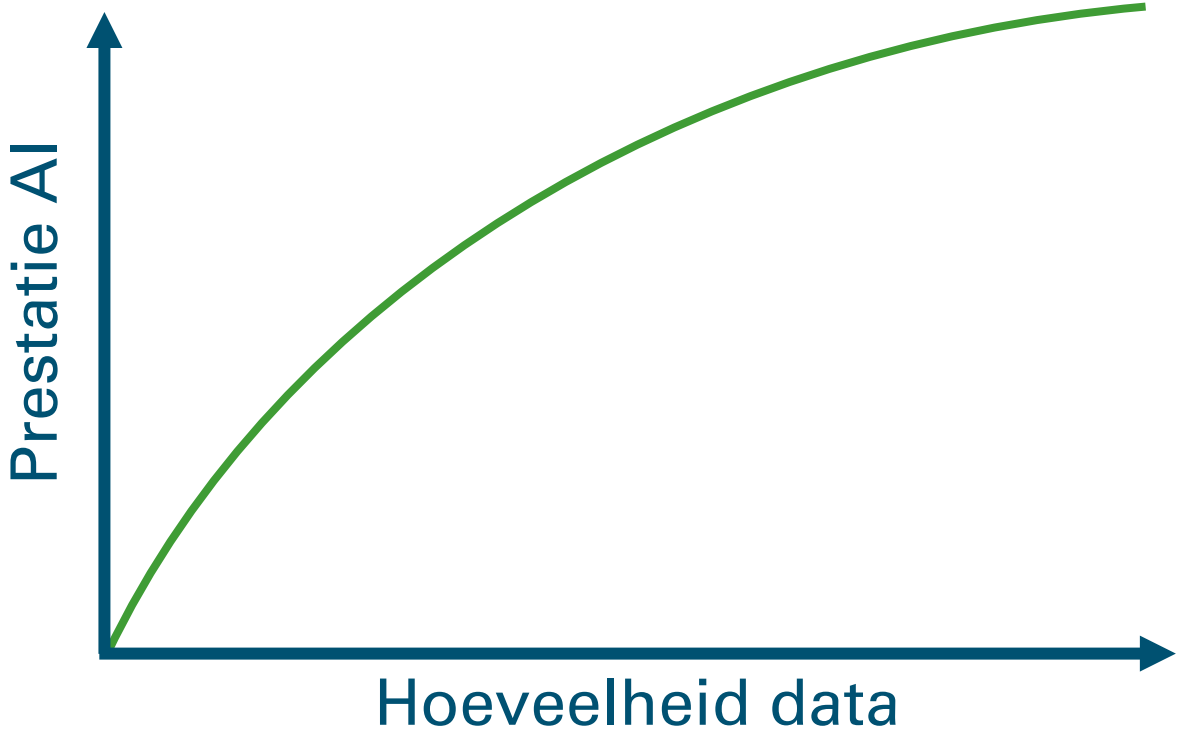
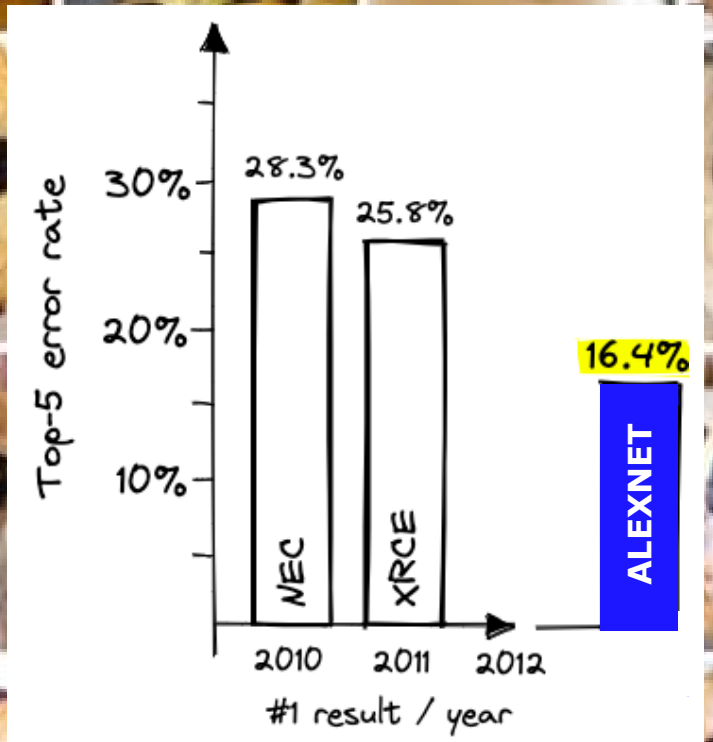
Data data data

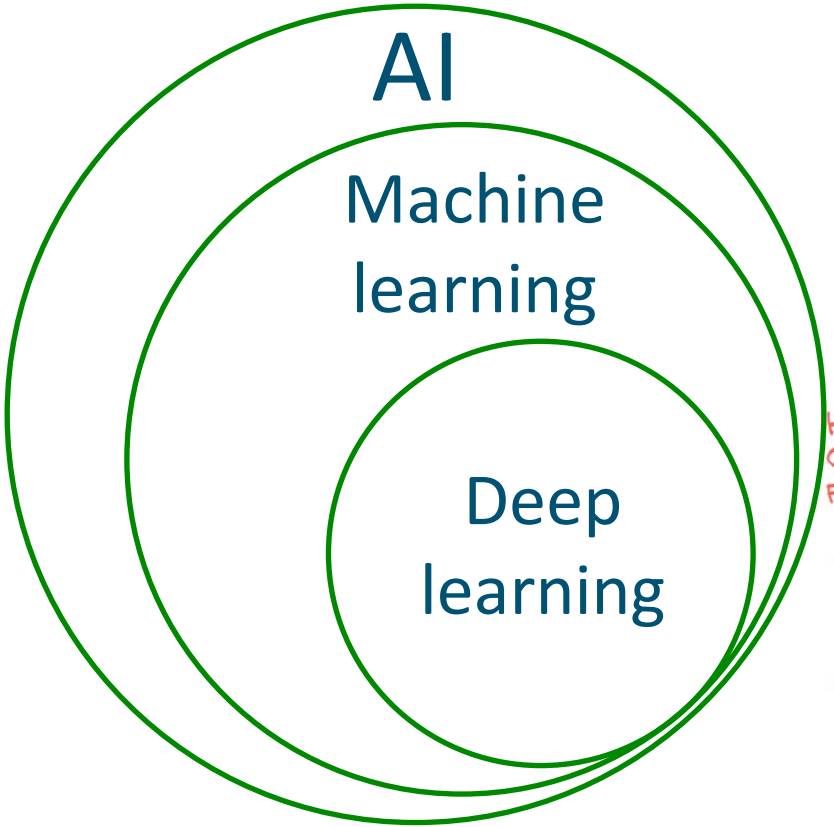


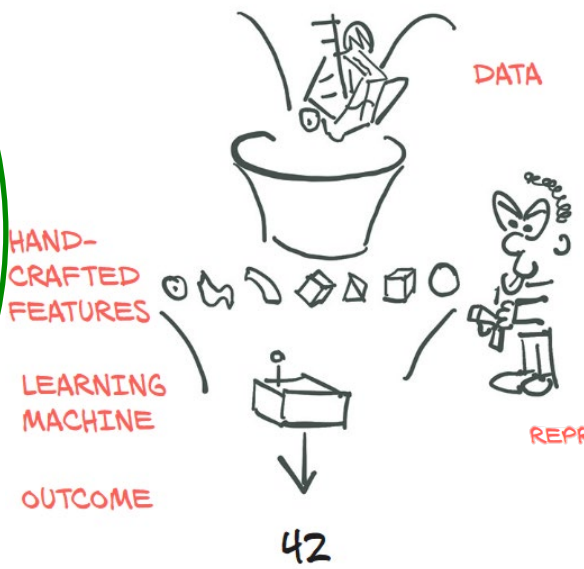
Deep learning

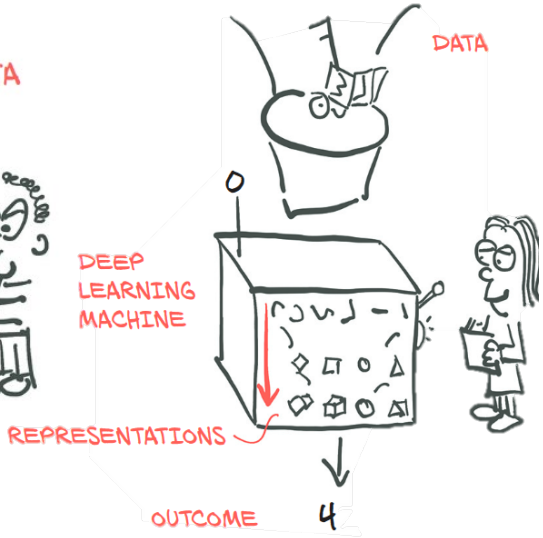


Deng et al. IEEE CVPR 2009; Krizhevsky et al. ACM 2012

Artificial Intelligence







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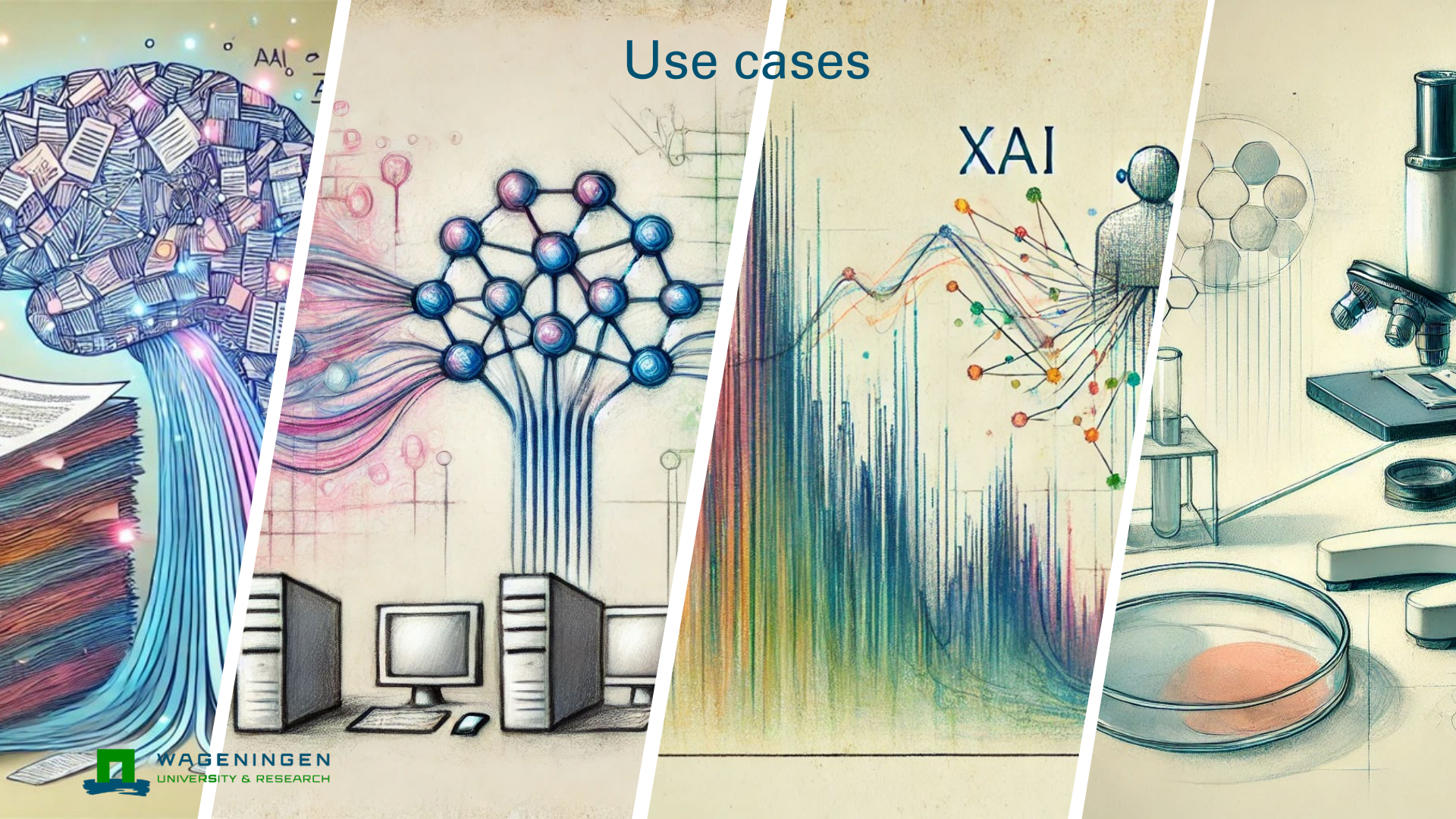
Use cases



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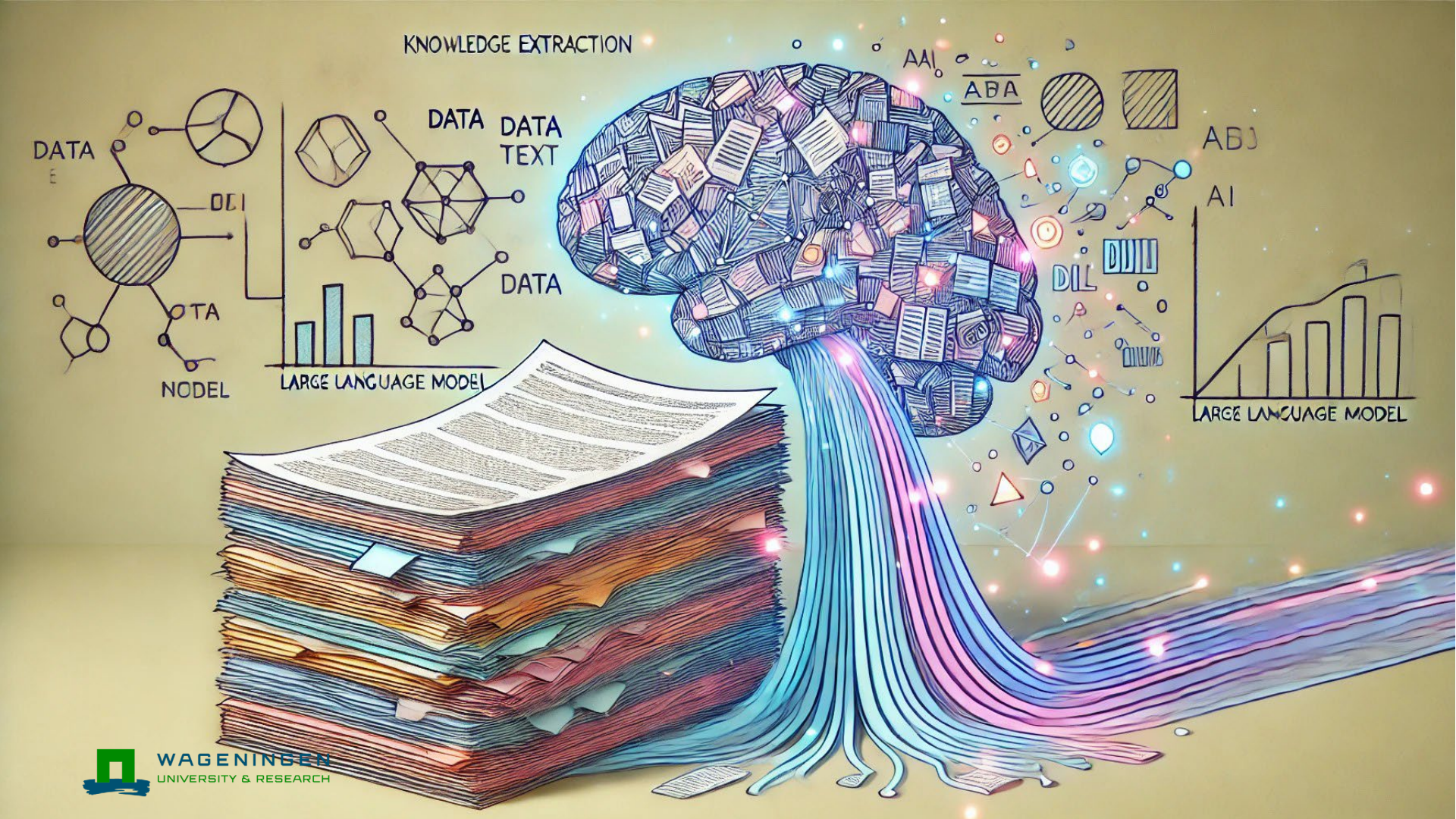
KNOWLEDGE EXTRACTION
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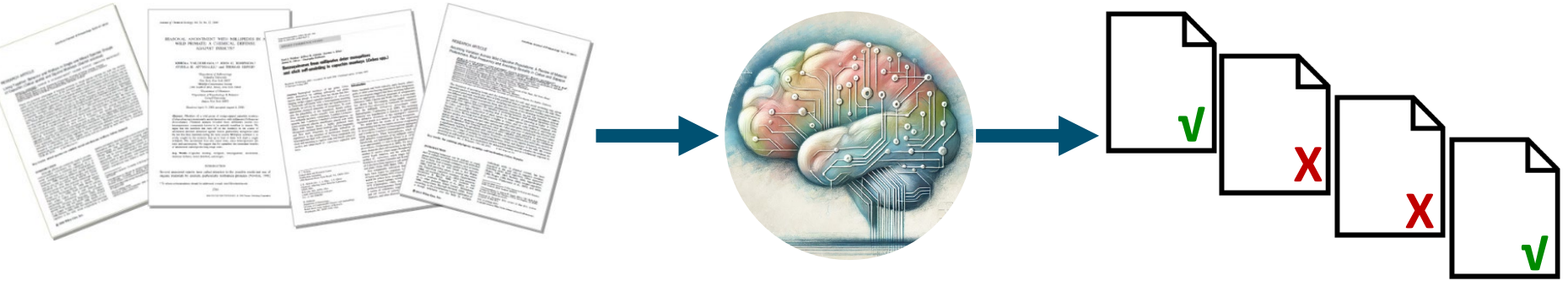
AI voor identificeren relevante literatuur



van den Bulk et al. Current Research in Food Science 5 (2022): 84-95.

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Dashboard instructions

Systematic Review Dashboard

This dashboard can aid in the updating of systematic literature reviews by displaying relevant scientific literature for the topics of existing systematic reviews and continuously updating it with the newest relevant literature classified automatically through machine learning. Please note that right now the literature is only retrieved from Scopus.

How to get the literature to Endnote

Select the desired topic in the control panel of this dashboard to only show the results of the literature that was deemed relevant for that specific topic. The literature can be dowloaded as a CSV file from the bottom of the table in the dashboard by exporting it as either 'Raw' or 'Formatted'. The CSV file can be converted to an Endnote file by importing the file in Endnote via our custom import filter. This custom import filter can be downloaded from this link. After downloading, double-click the file to open it in Endnote. In Endnote, the filter can be saved by clicking "File" in the top bar and choosing "Save as". Then, create a new Endnote library where you want to import the CSV file into. Import the CSV file by clicking "File" and choosing "Import". Select the downloaded CSV file under "Import File" and select the installed filter under "Import Option". The literature will be loaded into your Endnote libary in the correct format.

Questions?

If you have any questions about the data or the dashboard, please send them to leonieke.vandenbulk@wur.nl.

Dashboard controls

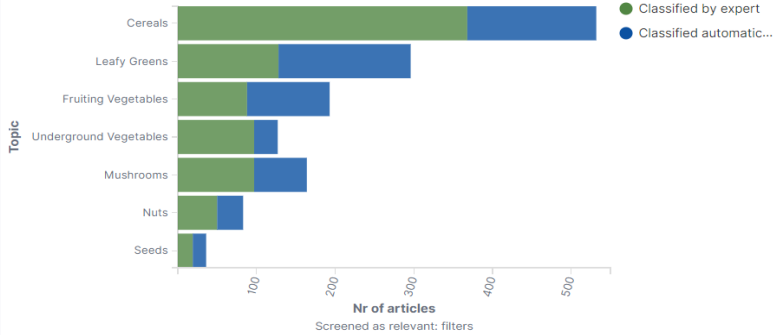
Topic

Select...

Information on irrelevant articles

Click here for information on articles that were classified as not relevant

Number of relevant articles per topic

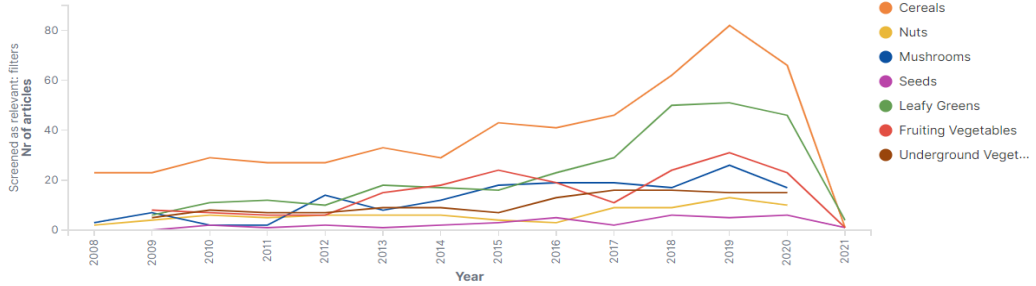


Automatically classified articles

865

- Number of articles that have been classified automatically -

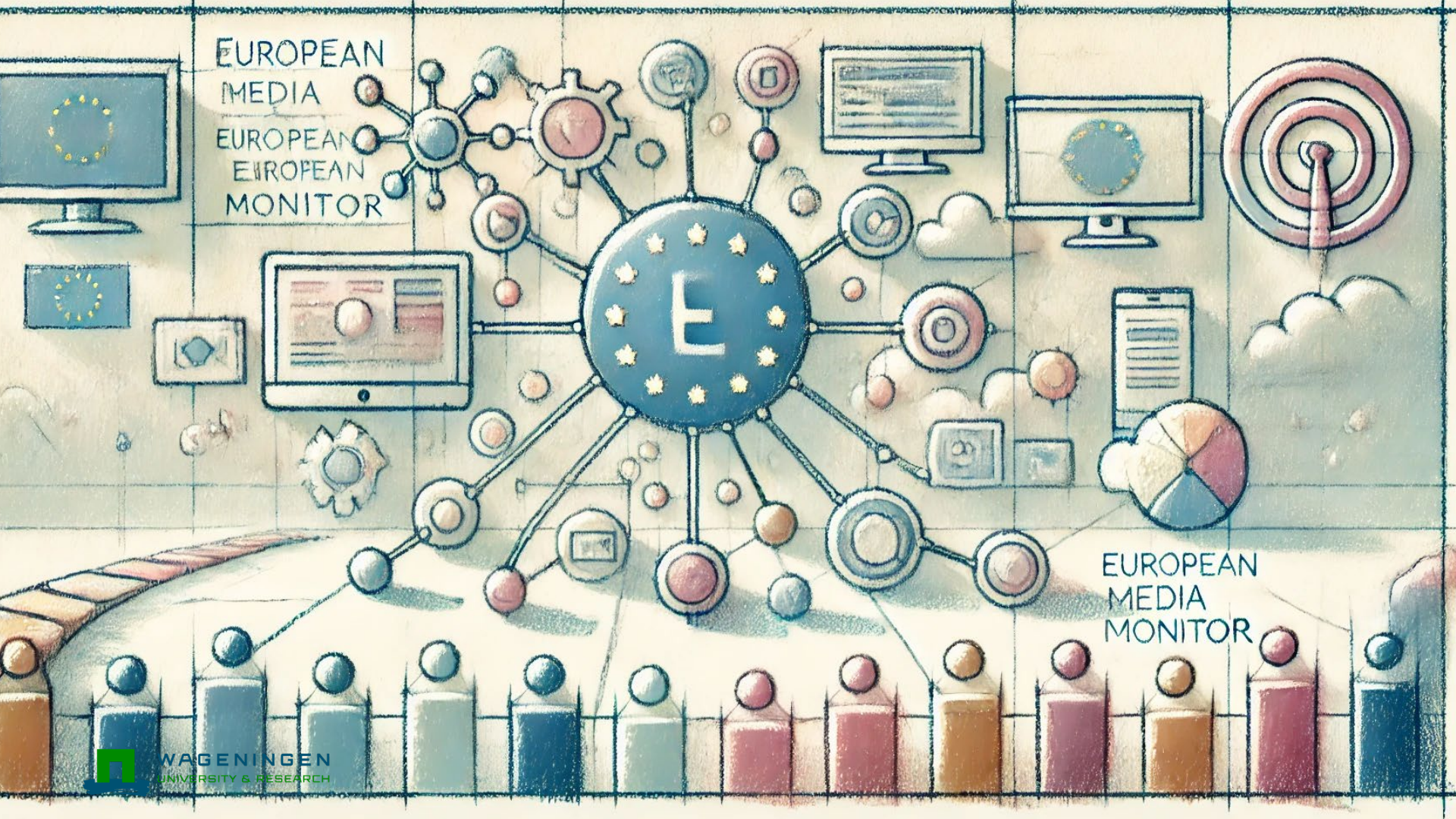
Number of relevant articles per year



Literature table

Relevant literature:

Topic	Title	Year	BibTeX
Cereals	'Emerging'	2013	@article{Journal Article, author = {Vaclavikova, M. and Malachova, A. and Veprikova, Z. and Dzuman, Z. and Zachariasova, M. and Hajslova, J.}, year = {2013}, title = {'Emerging' mycotoxins in cereals processing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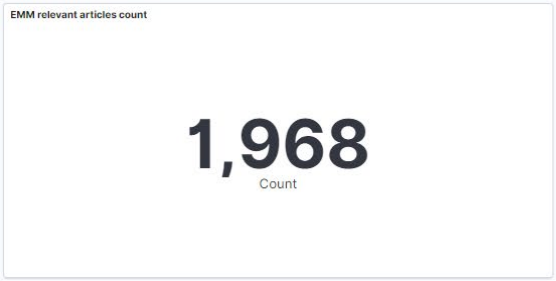
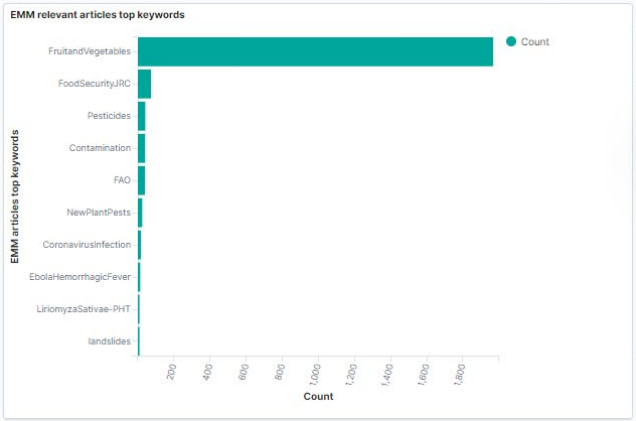
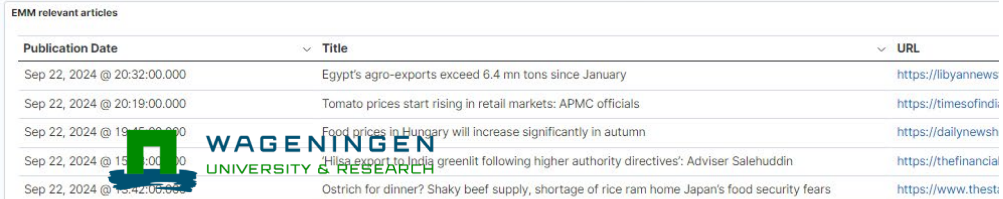
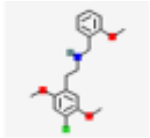
Opkomende risico's identificeren







Detected 10 "unknown" compounds used as stimulant in food supplements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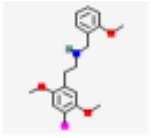
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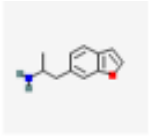
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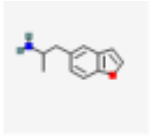
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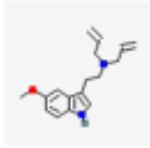
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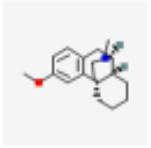
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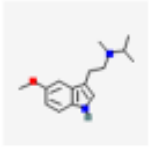
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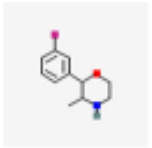
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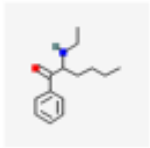
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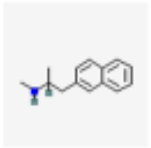
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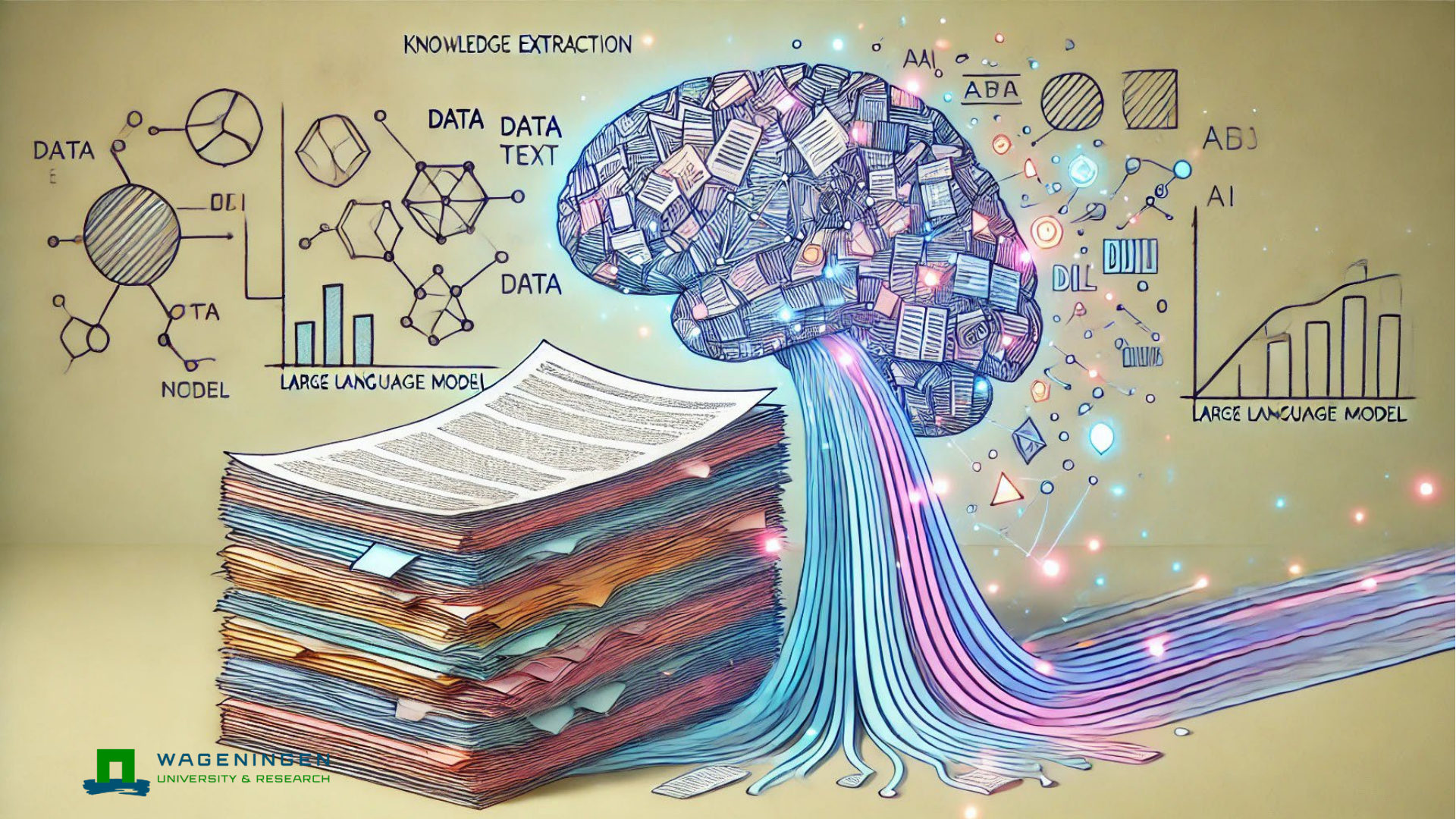
KNOWLEDGE EXTRACTION
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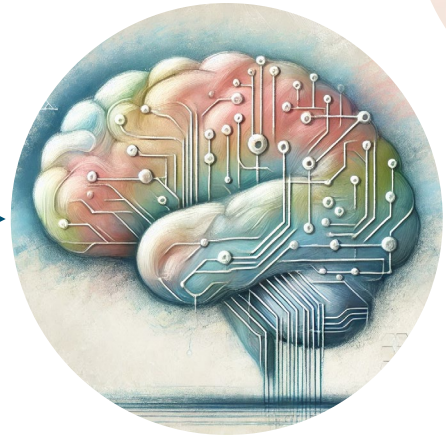
LLM voor kennisextractie



Product: Spinazie

Contaminatie: Cadmium

Özen et al. Food research international, *submitted*

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Prompt engineering

Simple prompt

```
Extract foods and chemicals that are mentioned to be a food safety hazard
for one of the foods, to contaminate one of the foods or to have the
potential to pose risk for human health via consumption of one of the foods
in the text delimited by triple backticks.
Provide the output in dictionary format with each different food as a
separate key and the chemicals that are expressed to be hazardous,
contaminant or to have the potential to pose risk for human health via
consumption of the food as the value of the key.

I want to warn you against some pitfalls. First, make sure that you bring
each chemical name that is mentioned to be a contaminant, hazard,
potentially harmful for human health via food consumption, especially make
sure not to skip the specific compound names. Another thing is if chemicals
are mentioned both with their names and abbreviations, make sure to return
the full name of the chemical instead of its abbreviation. Next warning -
only provide foods and chemicals that are mentioned in the text provided,
do not return any food or chemical that is not mentioned in the text. Also,
do not try to provide more specific foods or chemicals if the foods or
chemicals in the text are only mentioned in their general category. Another
thing - refrain from providing irrelevant noun phrases or sentences in
values just because they contain chemical names, limit the values of your
dictionary to the names of relevant chemicals. Also, return an empty
dictionary if you do not identify any chemical in food as contaminant,
hazardous, potentially harmful for human health through consumption of
food. Finally, limit your answer to the dictionary, no other explanation or
justification is necessary.

```{ABSTRACT}```
```


I. *submitted*


```

Prompt engineering

Step by step prompt

```
Your task is to perform the following actions:
1. Identify the chemicals mentioned in the text below provided between
triple backticks and collect them in a list
2. Identify the foods mentioned in the text below provided between triple
backticks and collect them in a list
3. Create all combinations of foods and chemicals as tuples and collect the
tuples in a list
4. Go over each food-chemical combination in the list created at step 3 and
look whether the chemical is mentioned to be a food safety hazard for that
food, to contaminate that food or to have the potential to pose risk for
human health via consumption of that food. Store each food-chemical
pair where chemical is said to be hazardous, contaminant or to have the
potential to pose risk for human health via consumption of the food, in a
dictionary where foods are keys and chemicals that are expressed to be
hazardous, contaminant or to have the potential to pose risk for human
health via consumption of the food are values.
5. Once you go over every food-chemical pair, return the dictionary you
obtained.

I want to warn you against some pitfalls. First, make sure that you bring
each chemical name that is mentioned to be a contaminant, hazard,
potentially harmful for human health via food consumption, especially make
sure not to skip the specific compound names. Another thing is if chemicals
are mentioned both with their names and abbreviations, make sure to return
the full name of the chemical instead of its abbreviation. Next warning -
only provide foods and chemicals that are mentioned in the text provided,
do not return any food or chemical that is not mentioned in the text. Also,
do not try to provide more specific foods or chemicals if the foods or
chemicals in the text are only mentioned in their general category. Another
thing - refrain from providing irrelevant noun phrases or sentences in
```

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et al. *submitted*

Prompt engineering

Pseudo code prompt

```
def identify_safety_hazards(text: str) -> dict:

    """Identify the chemical and food items mentioned in the provided abstract. For each combination
    of chemical substances and foods, look whether the chemical substance is mentioned to be a food
    safety hazard for that food, to contaminate that food, has possibility to pose risk for that food
    in future or has the potential to pose risk for human health via food chain. Keep food-chemical
    substance pairs where chemical substance is said to be hazardous, contaminant, potential future
    risk for the food or to pose risk for human health, in a dictionary where food items are keys and
    the hazardous, contaminant, potentially risky or potentially harmful for human health chemical
    substances are values. Once you go over every food-chemical pair, return the dictionary you
    obtained. I want to warn you against some pitfalls. First, make sure you bring each chemical
    substance name that is mentioned to be a contaminant, hazard, potential risk or harmful for human
    health, especially make sure not to skip the specific compound names. Another thing is if chemical
    substances are mentioned both with their names and abbreviations, make sure return the full name
    of the chemical instead of its abbreviation. Next warning - only provide foods and chemical
    substances that are mentioned in the text provided, do not return any food or chemical substance
    that is not mentioned in the text. Also, do not try to provide more specific foods or chemical
    substances if the foods or chemicals in the text are only mentioned in their general category.
    Another thing - refrain from providing irrelevant noun phrases or sentences in values just because
    they contain chemical substance names, limit the values of your dictionary to the names of relevant
    chemical substances. Also, return an empty dictionary if you do not identify any chemical substance
    in food as contaminant, hazardous, potentially risky or harmful for human health. Finally, limit
    your answer to the dictionary, no other explanation or justification is necessary."""

    #Create an empty dictionary
    chemical_hazards_per_food = {{}}

    #Identify the chemical items mentioned in the provided text and collect them in a list
    chemical_list = identify_chemicals_in_text(text)

    #Identify the foods items mentioned in the provided text and collect them in a list
    food_list = identify_foods_in_text(text)
```

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omitted

Articles

Assessment of Heavy Metals in Spinach (*Spinacia oleracea* L.) Grown in Sewage Sludge–Amended Soil

Vinod Kumar, A. K. Chopra & Sachin Srivastava

Pages 221-236 | Received 04 Feb 2015, Accepted 23 May 2015, Published online: 20 Jan 2016

Cite this article https://doi.org/10.1080/00103624.2015.1122799 Check for updates

ABSTRACT

The assessment of heavy metals in spinach (*Spinacia oleracea*) grown in sewage sludge–amended soil was investigated. The results revealed that sewage sludge significantly ($P < 0.01$) increased the nutrients and heavy metals such as cadmium (Cd), chromium (Cr), copper (Cu), manganese (Mn), and zinc (Zn) in the soil. The contents of metals were found to be below the maximum levels permitted for soils in India. The most agronomic performance and biochemical components of *S. oleracea* were found at 50% concentrations of sewage sludge in both seasons. The contents of Cd, Cr, Cu, Mn, and Zn in *S. oleracea* were increased from 5% to 100% concentrations of sewage sludge in both seasons. The order of contamination factor (Cf) of different heavy metals was Mn > Cd > Cr > Zn > Cu for soil and Cr > Cd > Mn > Zn > Cu for *S. oleracea* plants after application of sewage sludge. Therefore, use of sewage sludge increased concentrations of heavy metals in soil and *S. oleracea*.

KEYWORDS: Agronomical characteristics | contamination factor | heavy metals | sewage sludge | *Spinacia oleracea*

{'spinach': ['heavy metals', ‘cadmium’, ‘chromium’, ‘copper’, ‘manganese’, ‘zinc’]}

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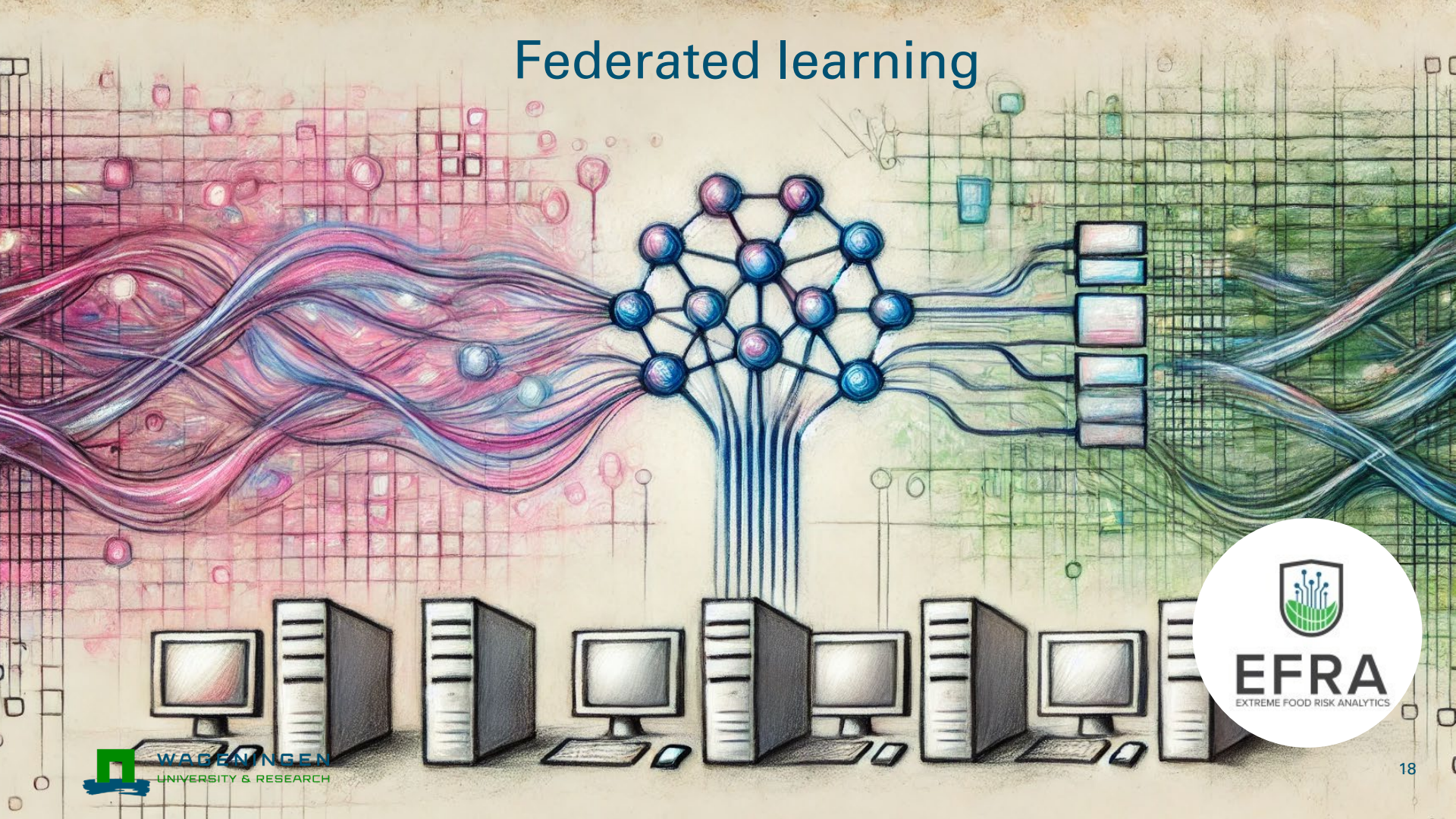
Özen et al. Food research international, *submitted*

Federated learning



EFRA
EXTREME FOOD RISK ANALYTICS

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Federated learning in pluimveebedrijven

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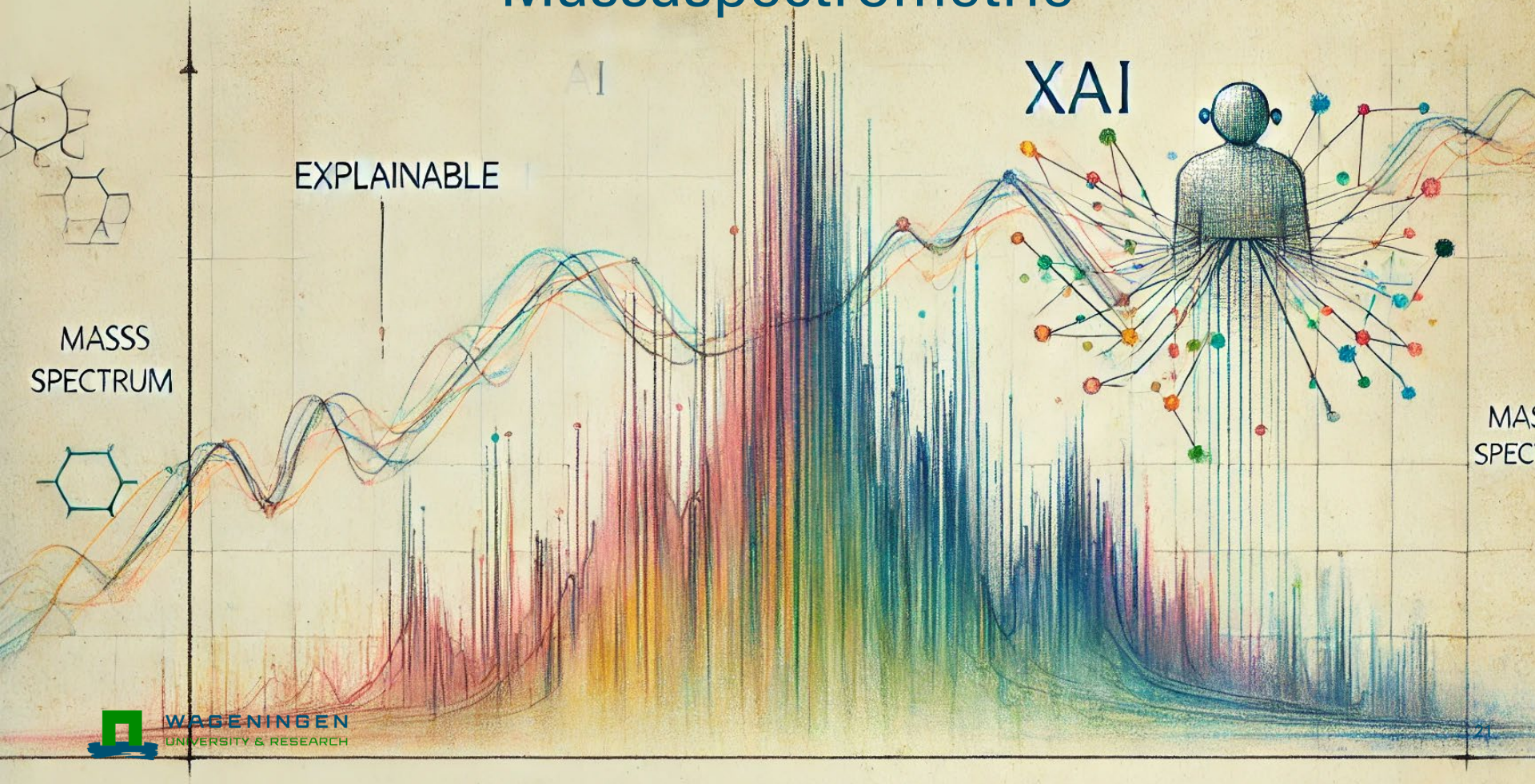
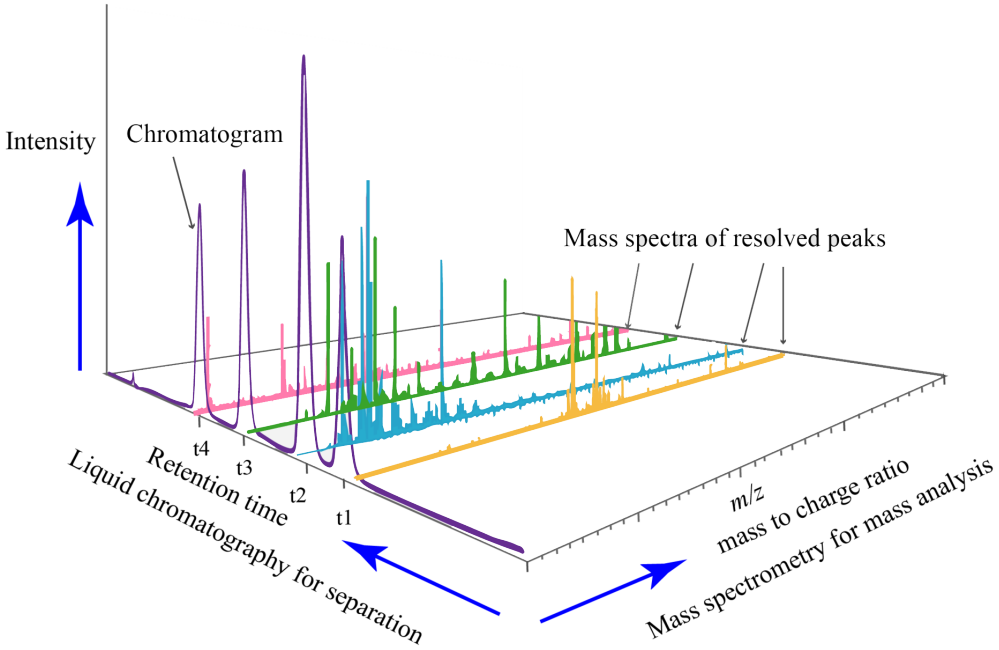
EFRA
EXTREME FOOD RISK ANALYTICS

Massaspectrometrie

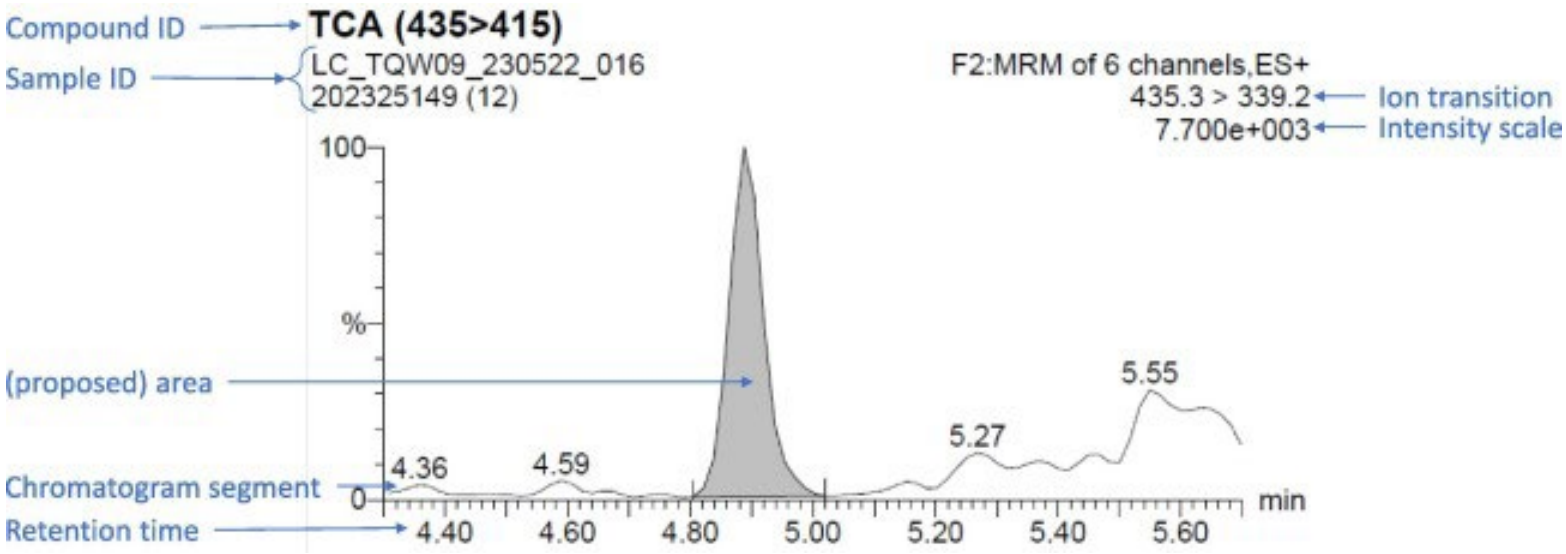


High-resolution tandem mass spectrometry (HRMS/MS)



Thermo Fisher Scientific, Wikipedia

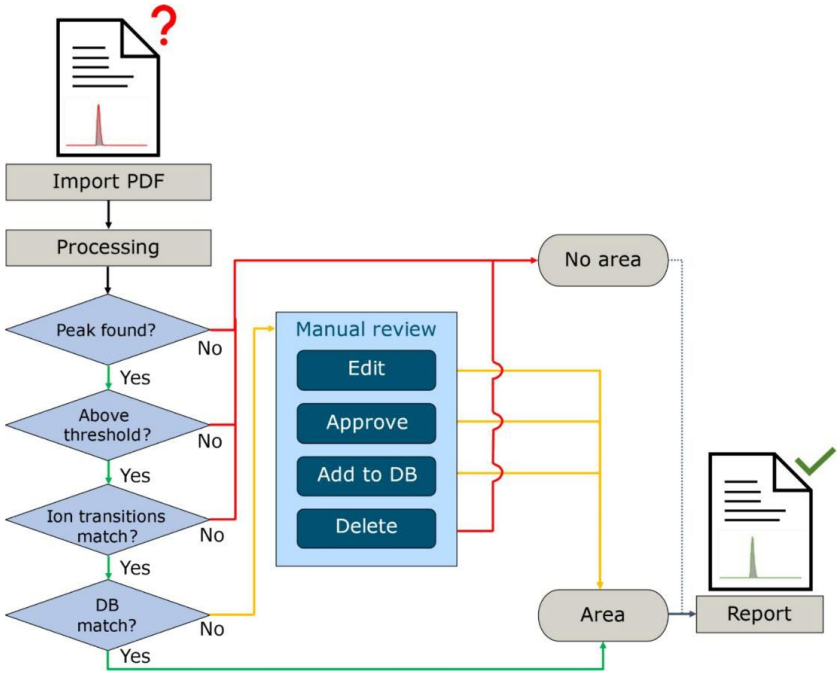
PEAR review: Peak Evaluation and Automated Review



Alewijn et al. Microchem J. 2024

PEAR review: Peak Evaluation and Automated Review

- Read PDF
- Process peak information
- Ion transition evaluation
- DB match
- Manual interaction
- Reporting



Alewijn et al. Microchem J. 2024

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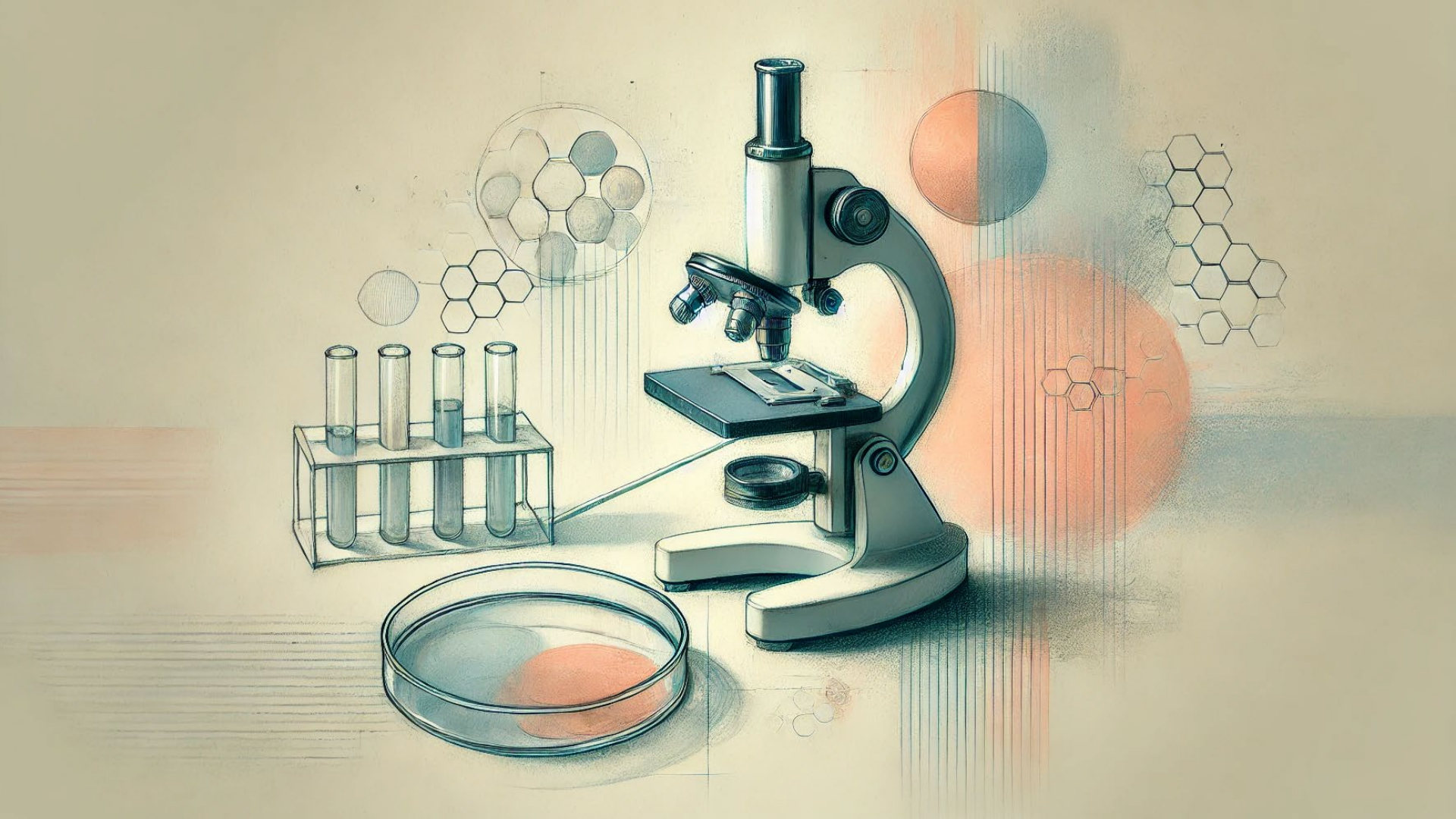

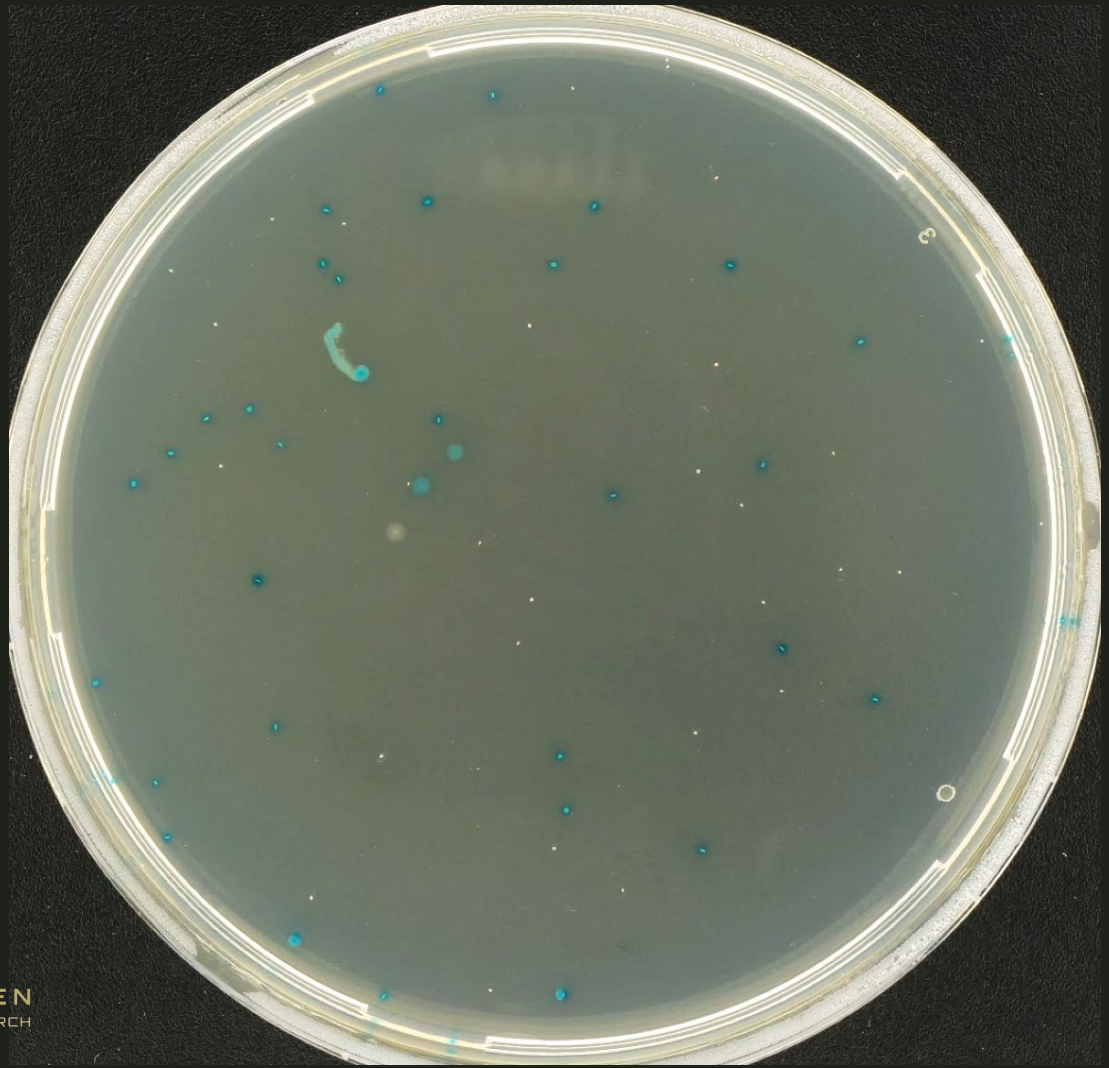

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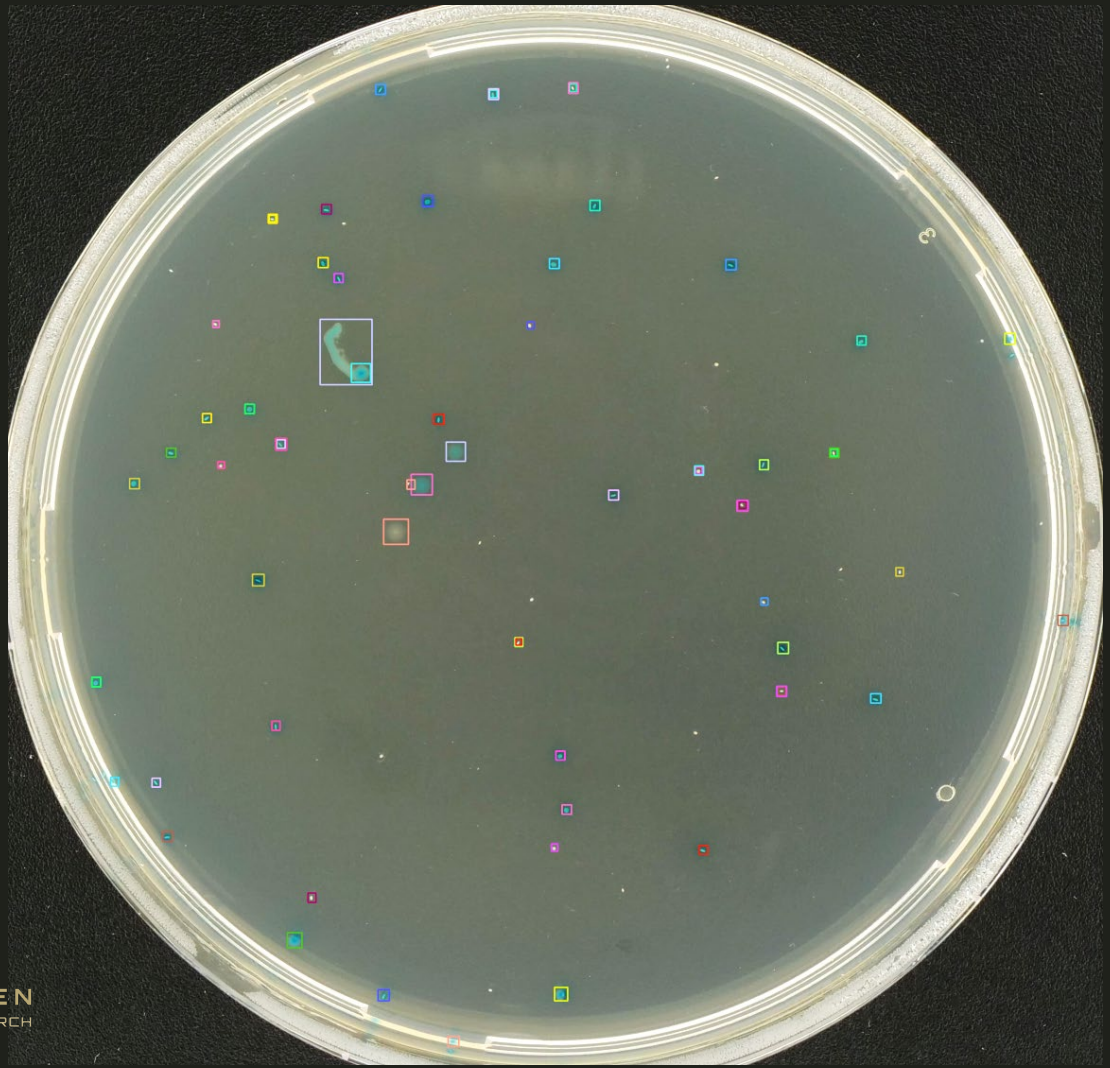

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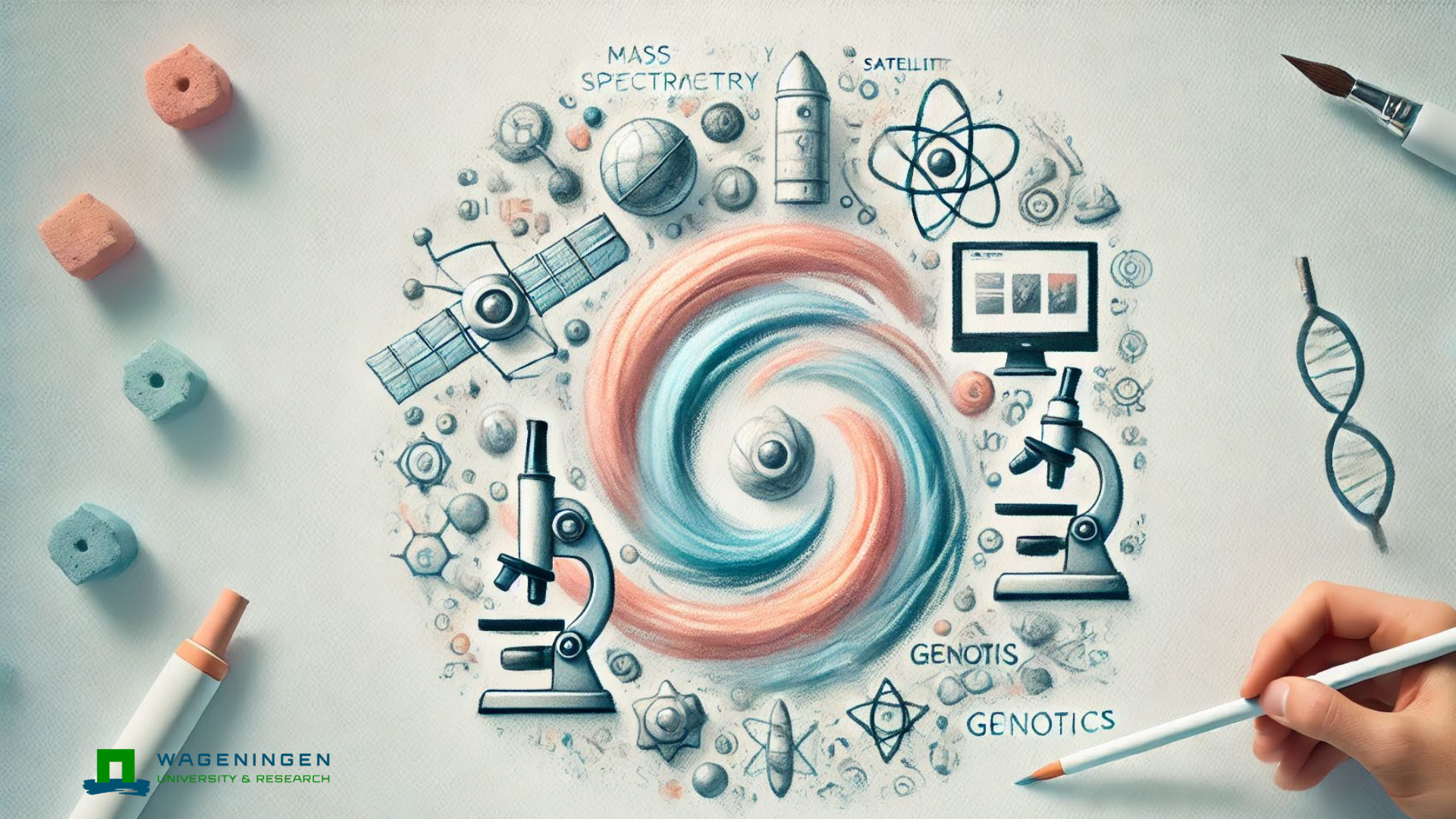

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