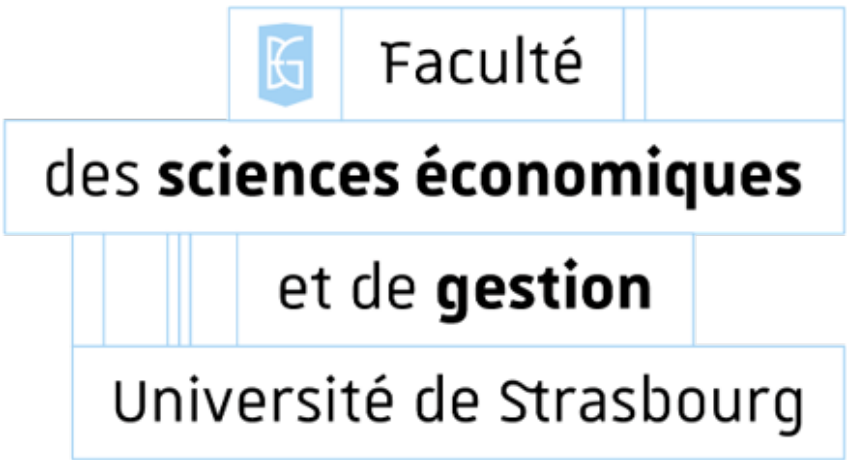
# Novelty Components of Scientific Productions
# -
# Data Visualization




**Supervised by:** Diletta Abbonato
**Authors:** Valentin Barthel, Adrien Busché, Diego Fracassi
valentin.barthel@etu.unistra.fr
adrien.busche@etu.unistra.fr
diego.fracassi@etu.unistra.fr

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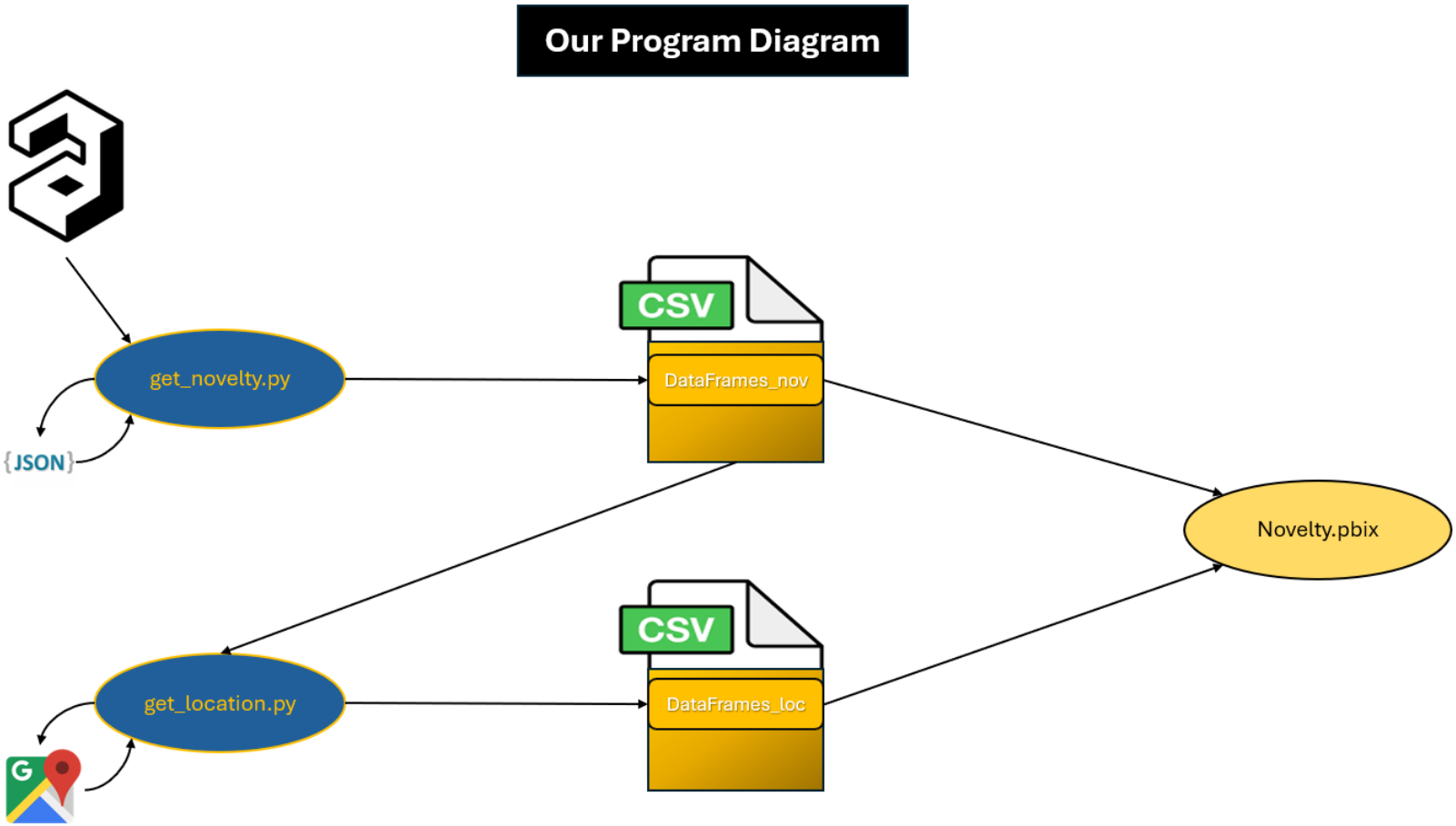
# Structure of the Project

**Arborescence of the Project :**

```
C:.
 get_location.py
 get_novelty.py
 Novelty.pbix
 README.md
 requirements.txt
 __init__.py
DataFrames_loc
 ...
DataFrames_nov
 ...
Presentation
NoveltySchema.png
Novelty_Support.pdf
```




$\Longrightarrow$ *Github*

# Co-occurrence Matrix

- The co-occurrence matrix represents how frequently two references (journals) appear together in a scientific article.
- Each cell $(i, j)$ contains the number of times journal $i$ and journal $j$ are cited together.

| **Reference** | **Journal A** | **Journal B** | **Journal C** | **Journal D** |
|---|---|---|---|---|
| **Journal A** | 10 | 3 | 2 | 0 |
| **Journal B** | 3 | 15 | 1 | 1 |
| **Journal C** | 2 | 1 | 12 | 0 |
| **Journal D** | 0 | 1 | 0 | 8 |

Table: Example of a co-occurrence matrix

$\Longrightarrow$ *get_novelty.py*

# Geocoding

The aim is to identify the geographical location of institutions linked to authors of scientific publications.
Functions:

- **get_city_state(*place_name*)**: Fetches geographic details (city, region, state, latitude, longitude) for a given institution name (Google maps API).
- **get_city_from_coordinates(*lat, lng*)**: Finds city, region, and state from latitude and longitude (Google maps API).
- **get_continent_from_country(*country_name*)**: Determines the continent for a given country (pycountry_convert).

$\Longrightarrow$ *get_location.py*

# Our Dashboard Structure

This dashboard allows you to explore the novelty indicators for scientific productions on the 17 SDGs since 2016. It consists of 5 pages providing a complete analysis of the current and past situation.

- **'Summary'**: This page provides information about a number of SDGs. We can see the number of citations, publications, and novelty indicator since 2016 for each author, area of expertise, type of production, and the evolution by year.
- **'Year View'**: A year-by-year analysis of each SDG. We can see changes in key indicators compared with the previous year, as well as the most active SDGs by type and institution.
- **'Mapping'**: This gives you a geographical view of the scientific output situation.
- **'SDG Comparison'**: Allows you to compare the key indicators for different SDGs. We offer a view by year, by region, and analyze the differences in the link between the number of contributors and the novelty indicator.
- **'Database'**: A page that allows the user to check the data by being able to sort it.

# Limitations of the Novelty Indicator

- **Dependence on citation patterns:** The indicator relies heavily on the availability and accuracy of citation data.
- **Field-specific dynamics:** It may not account for differences in citation practices across disciplines.
- **Computational limitations:** In very large datasets, constructing co-occurrence matrices and calculating frequencies can be resource-intensive.
- **Simplistic measure of novelty:** The indicator may not capture the full spectrum of creativity or innovation in the research being analyzed.

# Our Limitations

- **Keyword Queries:**
  - The use of multiple queries per SDG is limited due to error 403 restrictions.
  - The selected queries may not necessarily capture the most cited scientific production for the thematic area.
- **Computational and Sample Size Limitations:**
  - Each query is constrained by the frequency of the selected keyword's occurrence in scientific papers.
  - The available RAM (16 GB) is insufficient for the demands of a comprehensive scientometric approach.