Snowball Search and global quantification of the references

Setup

▶ Code

```
Thank you for using openalexR!
To acknowledge our work, please cite the package by calling
`citation("openalexR")`.
```

▶ Code

```

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

    filter, lag

The following objects are masked from 'package:base':

    intersect, setdiff, setequal, union
```

▶ Code

```

Attaching package: 'tidygraph'

The following object is masked from 'package:stats':

    filter
```

▶ Code

```
        R/plot_snowball.R R/to_xlsx.R
value   ?                 ?
visible FALSE             FALSE
```

▶ Code

Searches

OpenAlex

Setup OpelAnex usage and do snowball serarch

▶ Code

Save snowball as Excel file (`snowball_excel.xlsx`)

▶ Code

```
[[1]]
[1] "/Users/rainerkrug/Documents_Local/git/IPBES_data_tsu/Transformative Change/RMK - TfC Ch 5/data/ agric
re.xlsx"

[[2]]
[1] "/Users/rainerkrug/Documents_Local/git/IPBES_data_tsu/Transformative Change/RMK - TfC Ch 5/data/ dams.
"

[[3]]
[1] "/Users/rainerkrug/Documents_Local/git/IPBES_data_tsu/Transformative Change/RMK - TfC Ch 5/data/ ferti
r.xlsx"
```

The column are: (the Concept columns are not that relevant at the moment)

- **id**: internal id fromOpenAlex
- **author**: authors of the paper
- **publication_year**: publication year

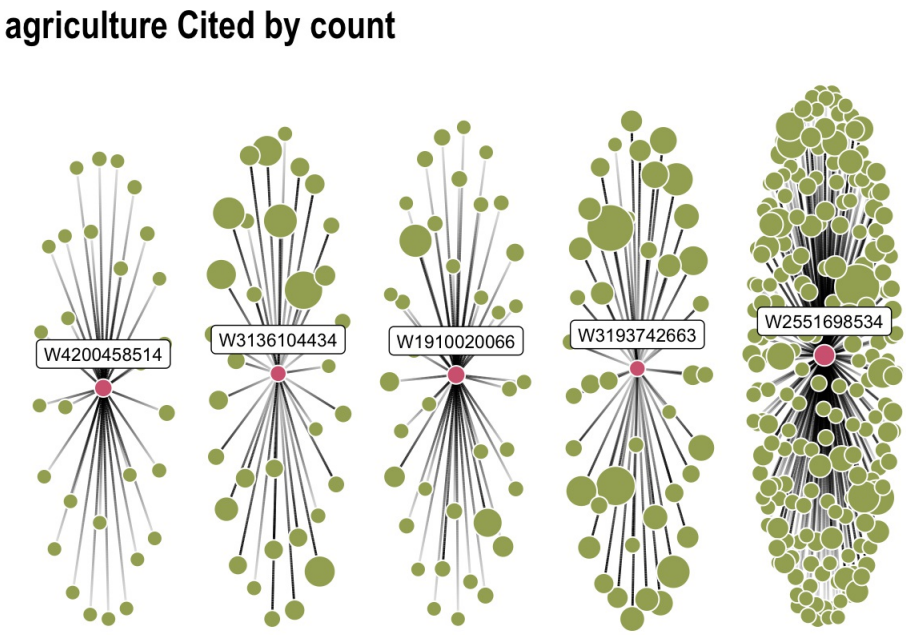
- **title**: title of the paper
- **doi**: doi of the paper
- **no_referenced_works**: number of references in the paper which are also in OpenAlex
- **cited_global**: Number of times the paper has been cited
- **cited_global_per_year**: standardised number of times cirted (cited_global / number of years published)
- **no_connections**: number of connections in the rgaph, i.e. either cited or citing a paper in the snowball corpus
- **concepts_l0**: Concept 0. level assigned by OpenAlex
- **concepts_l1**: Concept 1. level assigned by OpenAlex
- **concepts_l2**: Concept 2. level assigned by OpenAlex
- **concepts_l3**: Concept 3. level assigned by OpenAlex
- **concepts_l4**: Concept 4. level assigned by OpenAlex
- **concepts_l5**: Concept 5. level assigned by OpenAlex
- **author_institute**: Institute of the authors
- **institute_country**: Country of the institute
- **abstract**: the abstract of the paper

Graph of links between references

▶ Code

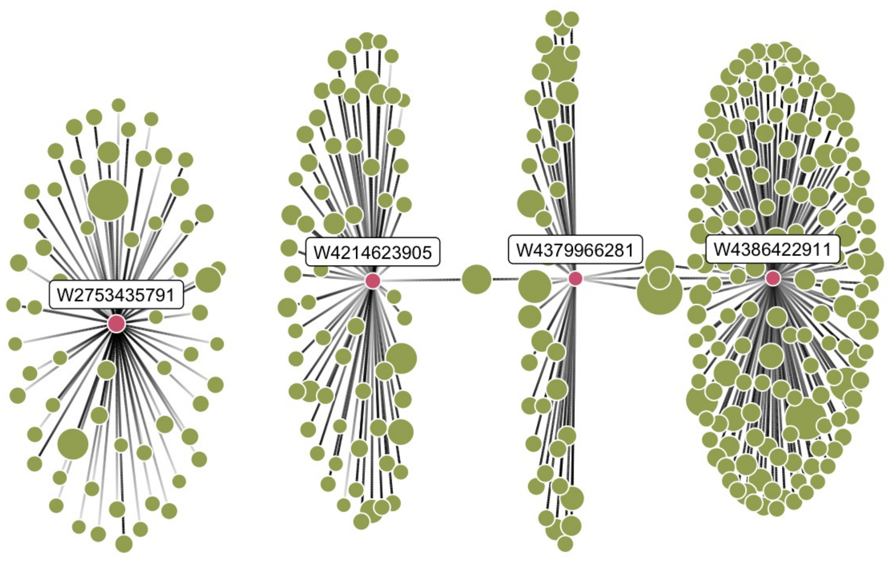
```
Warning: Using the `size` aesthetic in this geom was deprecated in ggplot2 3.4.0.
ℹ Please use `linewidth` in the `default_aes` field and elsewhere instead.

[[1]]
```



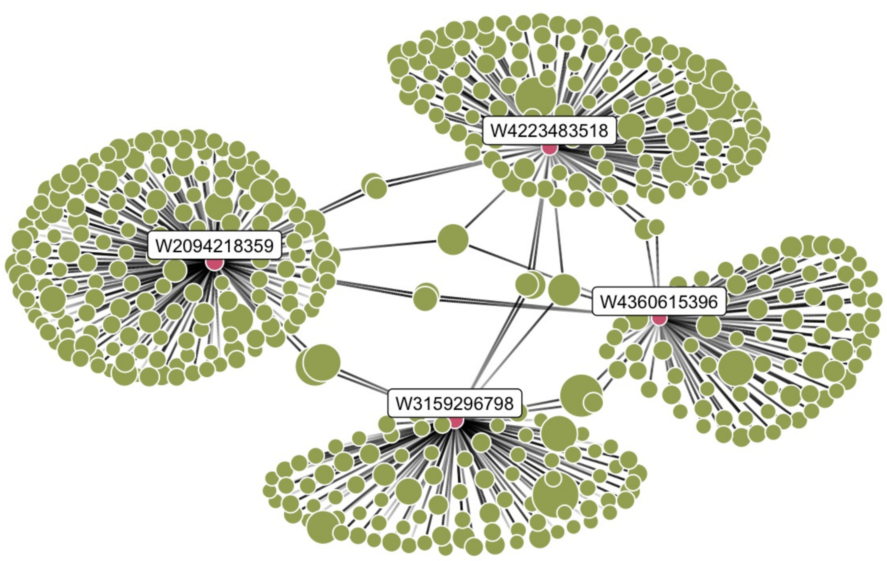

```
[[2]]
```

dams Cited by count



[[3]]

fertilizer Cited by count



Identification of references with more than one edge

This is the number of connections (`connection_count`) of the paper (`id`)

▶ Code

[[1]]

```
|id           |display_name
                        | publication_year|doi                                          | connection_count|
|:------------|:-----------------------------------------------------------------------------------------------------
--------------------|----------------:|:--------------------------------------------|----------------:|
|W2551698534 |Drought Tolerance and Water Use of Cereal Crops: A Focus on Sorghum as a Food Security Crop
ub-Saharan Africa    |             2016|https://doi.org/10.1111/jac.12191           |              207|
```

|W3193742663 |Adaptive Crop Management under Climate Uncertainty: Changing the Game for Sustainable Water
| 2021|https://doi.org/10.3390/atmos12081080 | 44|
|W1910020066 |ADVANCES AND CHALLENGES WITH MICRO-IRRIGATION
| 2013|https://doi.org/10.1002/ird.1704 | 38|
|W3136104434 |Sustainable alternative futures for agriculture in India—the energy, emissions, and resource
lications | 2021|https://doi.org/10.1088/1748-9326/abf0cd | 33|
|W4200458514 |The State of the World's Land and Water Resources for Food and Agriculture – Systems at brea
 point (SOLAW 2021) | 2021|https://doi.org/10.4060/cb7654en | 29|

[[2]]

|id |display_name
publication_year	doi	connection_count
W4386422911	A metasystem approach to designing environmental flows
2023	https://doi.org/10.1093/biosci/biad067	157
W4214623905	Do dams improve water security in India? A review of post facto assessments
2022	https://doi.org/10.1016/j.wasec.2022.100112	66
W2753435791	Assessing the feasibility of integrating ecosystem-based with engineered water resource gove
ce and management for water security in semi-arid landscapes: A case study in the Banas catchment, Rajasth
India	2018	https://doi.org/10.1016/j.scitotenv.2017.08.308	63
W4379966281	Optimizing environmental flow based on a new optimization model in balancing objectives amon
ver ecology, water supply and power generation in a high-latitude river
2023	https://doi.org/10.1016/j.jenvman.2023.118261	42
W2096113236	The Natural Flow Regime
1997	https://doi.org/10.2307/1313099	2
W2151941169	How much water does a river need?
1997	https://doi.org/10.1046/j.1365-2427.1997.00153.x	2
W2156113027	Environmental flows for natural, hybrid, and novel riverine ecosystems in a changing world
2014	https://doi.org/10.1890/130134	2
W2156353061	The ecological limits of hydrologic alteration (ELOHA): a new framework for developing regio
environmental flow standards
2010	https://doi.org/10.1111/j.1365-2427.2009.02204.x	2

[[3]]

|id |display_name
  | publication_year|doi
connection_count
W2094218359	Consequence of altered nitrogen cycles in the coupled human and ecological system under chan
climate: The need for long-term and site-based research	2014	https://doi.org/10.1007/s13280
-0545-4	177
W4223483518	Nitrogenous fertilizers: impact on environment sustainability, mitigation strategies, and ch
nges	2022	https://doi.org/10.1007/s13762
-04027-9	135
W3159296798	Spatially explicit boundaries for agricultural nitrogen inputs in the European Union to meet
and water quality targets	2021	https://doi.org/10.1016/j.scit
v.2021.147283	100
W4360615396	A better use of fertilizers is needed for global food security and environmental sustainabil
2023	https://doi.org/10.1186/s40066
-00409-5	89
W2020023668	How a century of ammonia synthesis changed the world
2008	https://doi.org/10.1038/ngeo32
3
W2097004990	The Nitrogen Cascade
2003	https://doi.org/10.1641/0006-3
2003)053[0341:tnc]2.0.co;2	3
W1999167944	Planetary boundaries: Guiding human development on a changing planet
2015	https://doi.org/10.1126/scienc
59855	2
W2019990444	Nutrient Imbalances in Agricultural Development
2009	https://doi.org/10.1126/scienc
70261	2
W2030467995	Global agriculture and nitrous oxide emissions
2012	https://doi.org/10.1038/nclima
58	2
W2089894319	Ecological and toxicological effects of inorganic nitrogen pollution in aquatic ecosystems:
obal assessment	2006	https://doi.org/10.1016/j.envi
006.05.002	2

```
006.05.002                      |                2|
|W2102235270 |The contribution of manure and fertilizer nitrogen to atmospheric nitrous oxide since 1860
                                                   |            2009|https://doi.org/10.1038/ngeo60
                                |                2|
|W2128888862 |Assessing planetary and regional nitrogen boundaries related to food security and adverse en
nmental impacts                                    |            2013|https://doi.org/10.1016/j.cosu
013.07.004                      |                2|
|W2132041826 |Nitrogen Pollution in the Northeastern United States: Sources, Effects, and Management Optio
                                                   |            2003|https://doi.org/10.1641/0006-3
2003)053[0357:npitnu]2.0.co;2 |                2|
|W2146323422 |Transformation of the Nitrogen Cycle: Recent Trends, Questions, and Potential Solutions
                                                   |            2008|https://doi.org/10.1126/scienc
36674                           |                2|
|W2149352713 |Nitrogen Cycles: Past, Present, and Future
                                                   |            2004|https://doi.org/10.1007/s10533
-0370-0                         |                2|
|W2175999181 |Nitrogen and Food Production: Proteins for Human Diets
                                                   |            2002|https://doi.org/10.1579/0044-7
31.2.126                        |                2|
|W2884859931 |Drinking Water Nitrate and Human Health: An Updated Review
                                                   |            2018|https://doi.org/10.3390/ijerph
1557                            |                2|
|W3158945551 |Reconciling food production and environmental boundaries for nitrogen in the European Union
                                                   |            2021|https://doi.org/10.1016/j.scit
v.2021.147427                   |                2|
|W3189362205 |Reconciling regional nitrogen boundaries with global food security
                                                   |            2021|https://doi.org/10.1038/s43016
-00366-x                        |                2|
```

Finalize

To convert to pdf run e.g.

▶ Code