Bibliometric analysis of TreesLab scientific production

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Overview

Introduction

- TODO.

What is bibliometric analysis?

- Bibliometrics is the measurement of physical units of publications, bibliographic citations, and surrogates for them [3].
- The bibliometric methodology encapsules the application of quantitative techniques (i.e., bibliometric analysis — e.g., citation analysis) on bibliometric data (e.g., units of publication and citation) [5].

Bibliometrix package

- R package for bibliometric analysis [1].
- It allows quantitative research in bibliometrics and scientometrics.
- Statistical analysis of publications.
- Useful for performance evaluation and policymaking.
- It includes a Web Application (biblioshiny) for non-programmers!

Bibliographic databases

- Scopus.
- Web of science.

ELSEVIER
Scopus

Clarivate
Web of Science™

Data pre-processing

1. Query Scopus and Web of Science.
2. Run analysis.
   - Bibliometrix: R coders (these slides!).
   - Biblioshiny: Non-coders.

Overview

Description	Results
Timespan	1982:2023
Sources (Journals, Books, etc)	277
Documents	532
Annual Growth Rate %	10.46
Document Average Age	10.5
Average citations per doc	17.69
References	16839
Author's Keywords (DE)	1320
Authors	1781
Authors of single-authored docs	16
Co-Authors per Doc	4.42
International co-authorships %	6.767

Documents by type

Description	Results
article	306
conference paper	152
review	11
article; proceedings paper	3
letter	1
note	1
short survey	1

Authors' productivity

Authors	Articles
KASISCHKE E	12
BARTALEV S	11
WANG L	11
WANG J	9
CALLE A	8
LI Z	8
ZHARIKOVA M	8
AVETISYAN D	7
LOUPIAN E	7
SHERSTJUK V	7
ZHOU Y	7

Authors	Articles Fractionalized
ZHARIKOVA M	3.00
LEBLON B	2.90
BARANOVSKIY N	2.83
BARTALEV S	2.76
WANG L	2.64
SHERSTJUK V	2.50
KASISCHKE E	2.35
WANG J	2.08
AVETISYAN D	2.06
AKYÜREK Ö	2.00
BOERNER W	2.00
DEMPSEY F	2.00

Most cited papers

Paper	TC	TCperYear	NTC
YUAN C, 2015, CAN J FOR RES	462	46.20	9.53
SOUZA JR CM, 2005, REMOTE SENS ENVIRON	261	13.05	11.06
MAKI M, 2004, REMOTE SENS ENVIRON	199	9.48	5.66
LI Z, 2000, INT J REMOTE SENS	193	7.72	4.39
HENDERSON SB, 2011, ENVIRON HEALTH PERSPECT	161	11.50	4.03
SCHROEDER TA, 2011, REMOTE SENS ENVIRON	159	11.36	3.98
CHU T, 2013, REMOTE SENS	157	13.08	7.44
KOETZ B, 2008, FOR ECOL MANAGE	149	8.76	8.19
YUAN C, 2017, J INTELL ROB SYST THEOR APPL	135	16.88	7.52
KASISCHKE ES, 1993, REMOTE SENS ENVIRON	130	4.06	2.02

Most relevant sources

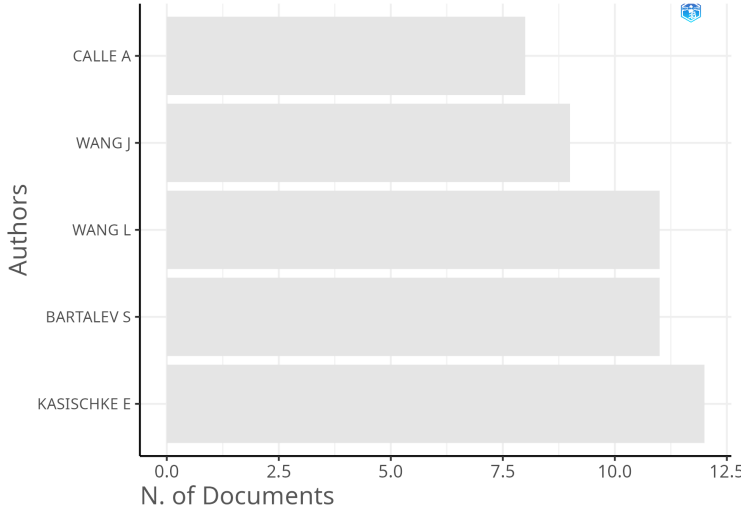
Sources	Articles
REMOTE SENSING	40
PROCEEDINGS OF SPIE - THE INTERNATIONAL SOCIETY FOR OPTIC...	30
INTERNATIONAL JOURNAL OF REMOTE SENSING	25
INTERNATIONAL GEOSCIENCE AND REMOTE SENSING SYMPOSIUM (IG...	21
REMOTE SENSING OF ENVIRONMENT	16
FORESTS	13
INTERNATIONAL ARCHIVES OF THE PHOTOGRAMMETRY REMOTE SENSI...	10
FOREST ECOLOGY AND MANAGEMENT	7
ENVIRONMENTAL MONITORING AND ASSESSMENT	6
IOP CONFERENCE SERIES: EARTH AND ENVIRONMENTAL SCIENCE	6
SOVREMENNYE PROBLEMY DISTANTSIONNOGO ZONDIROVANIYA ZEMLI ...	6

Most relevant keywords

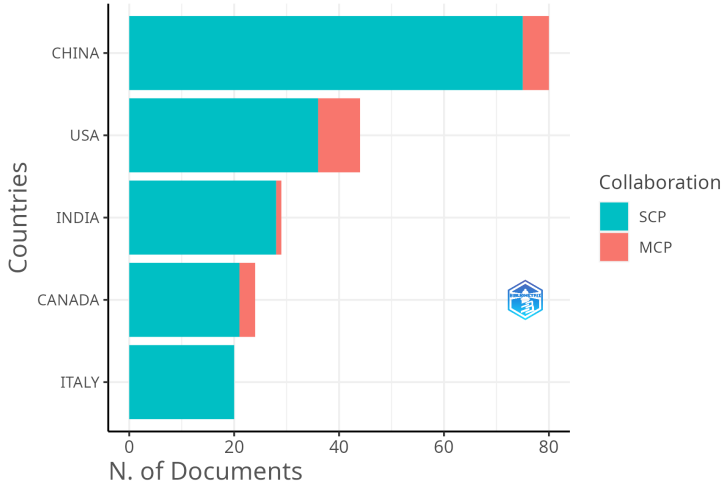
Author Keywords (DE)	Articles
REMOTE SENSING	137
FOREST FIRE	105
FOREST FIRES	43
MODIS	29
WILDFIRE	22
FIRE	21
GIS	21
LANDSAT	20
FOREST FIRE MONITORING	16
IMAGE PROCESSING	16

Keywords-Plus (ID)	Articles
REMOTE SENSING	416
FIRES	266
DEFORESTATION	238
FOREST FIRES	179
FIRE HAZARDS	125
FOREST FIRE	117
FORESTRY	115
MONITORING	76
SATELLITES	61
VEGETATION	60

Most Productive Authors

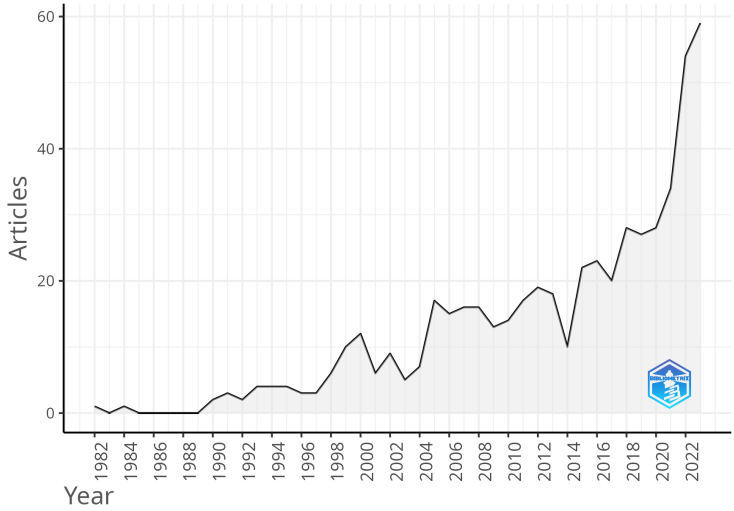


Most Productive Countries

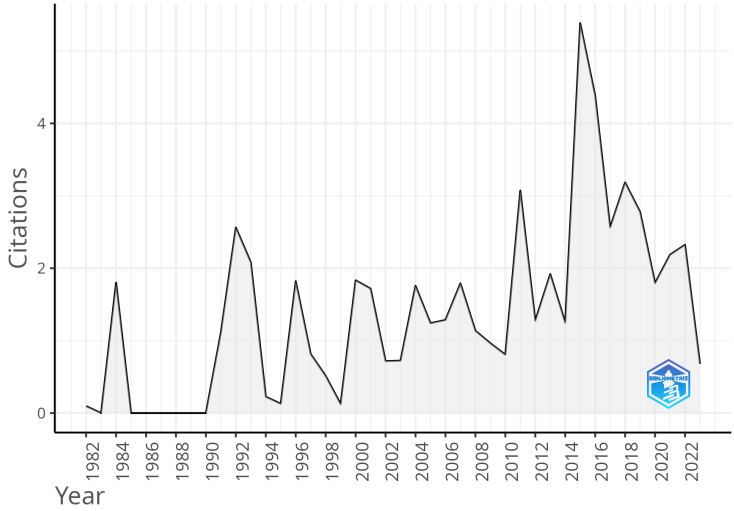


SCP: Single Country Publications, MCP: Multiple Country Publications

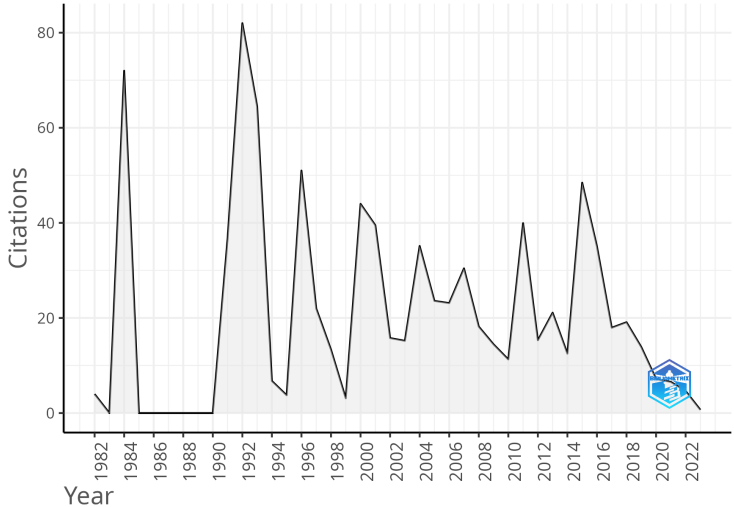
Annual Scientific Production



Average Article Citation per Year



Average Total Citation per Year



Structures of knowledge

- Science mapping aims at displaying the structural and dynamic aspects of scientific research [2].
- *Science mapping* allows investigating scientific knowledge from a statistical point of view:
  - *Conceptual*: What science talks about.
  - *Intellectual*: How the work of an author influences a given scientific community.
  - *Social*: How authors, institutions, and countries interact each other.

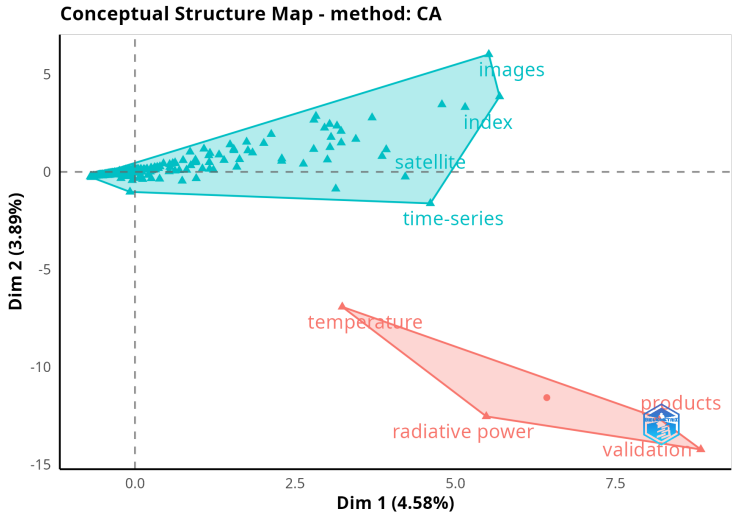
Conceptual structure

Represent relations among concepts or words in a set of publications.

Conceptual Structure - Map of words

- Clusters are identified by hierarchical clustering.
- Each color corresponds to a topic.

Conceptual Structure - Map of words



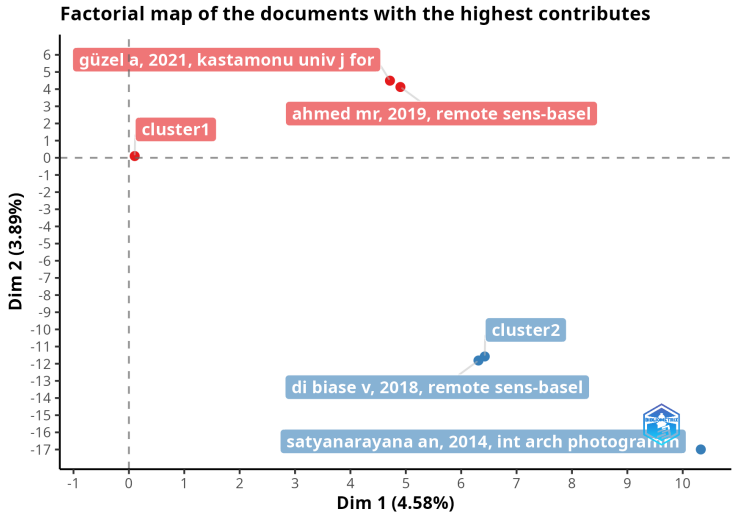
Factorial Map - Most contributing documents

- Identify the link between topic and documents.
- Plot the document associated to the highest absolute contribution.
- Absolute contributions measure the weight of each document in the information summarized by the two axes.
- The colors represent the clusters.

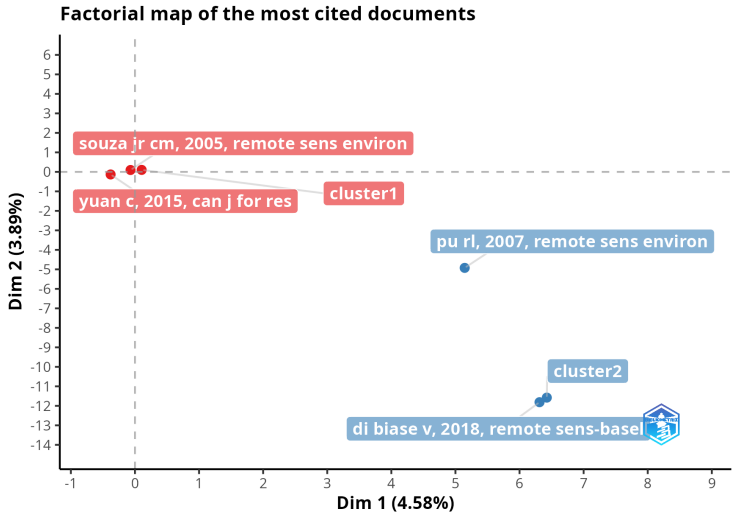
Factorial Map - Most contributing documents

- Identify the link between topic and most cited documents.
- Plot documents associated to the highest global citations.
- The colors represent the clusters.

Factorial Map - Most contributing documents



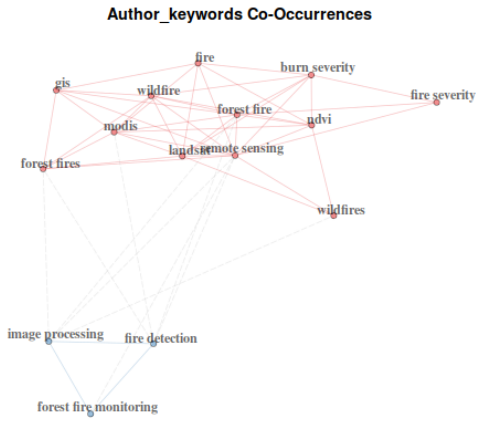
Factorial Map - Most cited documents



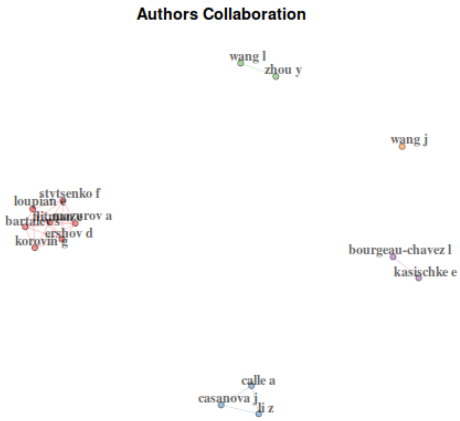
Network analysis

- A network is a representation of the co-occurrence matrix.
- Diagonal elements are the occurrences of each item in the collection.
- Non-diagonal elements are the co-occurrence of two item in a collection.

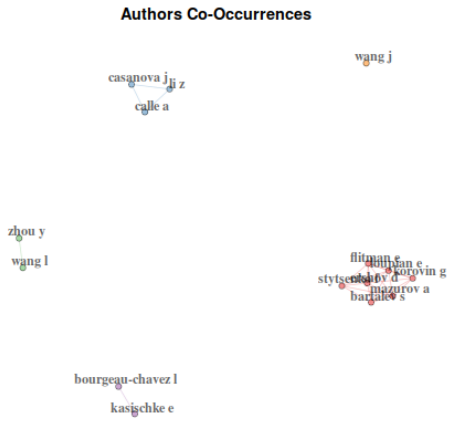
Network - Co-occurrences Authors-Keywords



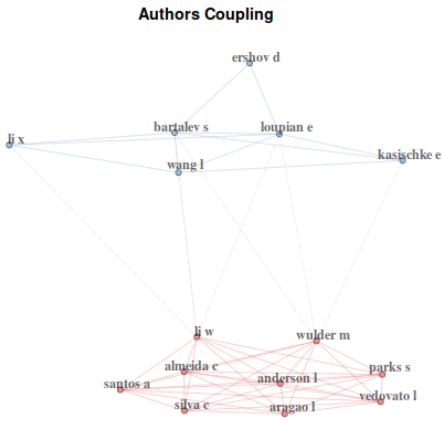
Network - Authors collaboration



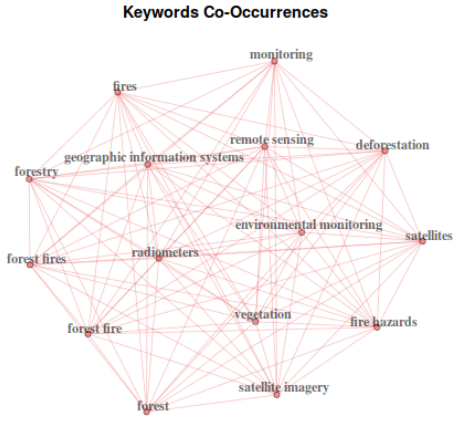
Network - Authors co-occurrences



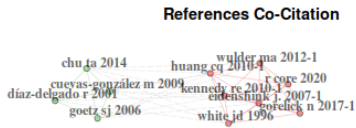
Network - Authors coupling



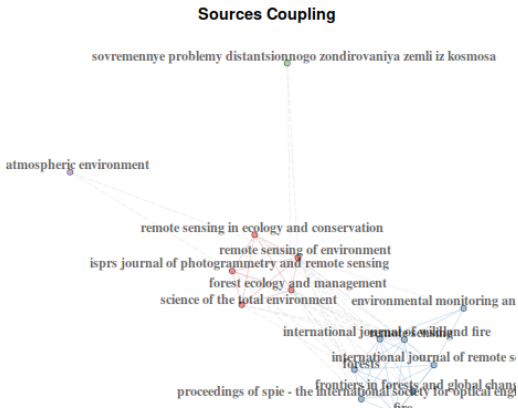
Network - Keyword co-occurrences



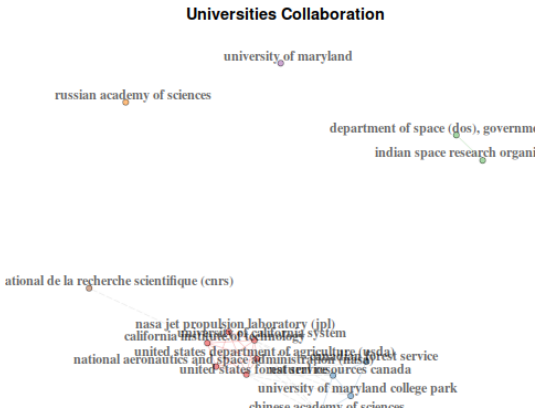
Network - References co-citation



Network - Sources coupling

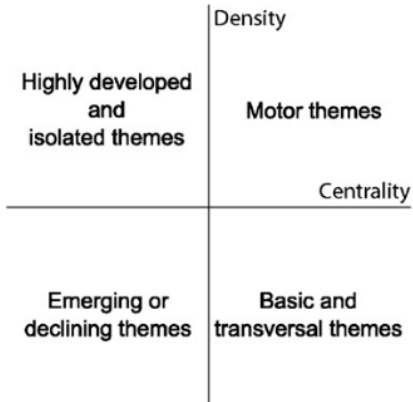


Network - Universities collaboration



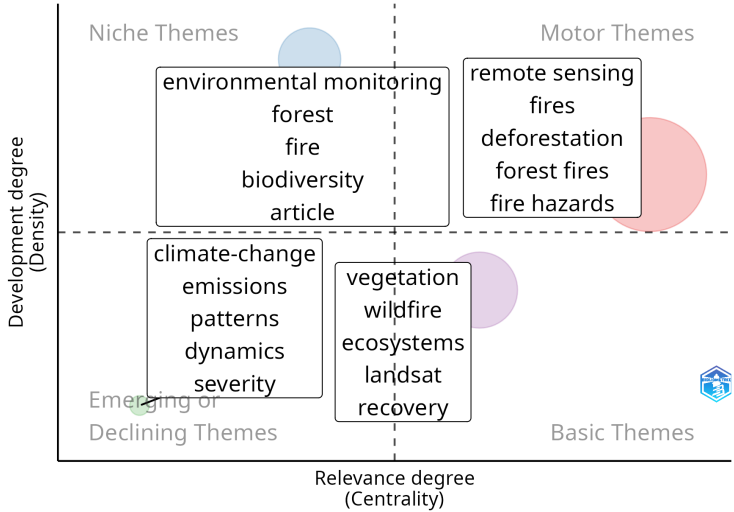
The strategic diagram [4]

- Upper-right: Themes are related externally to concepts applicable to other themes that are conceptually closely related.
- Upper-left: Well-developed internal ties but unimportant external ties; marginal importance for the field.
- Lower-left: Mainly represents emerging or disappearing themes.
- Lower-right: Important for a research field but are not developed.

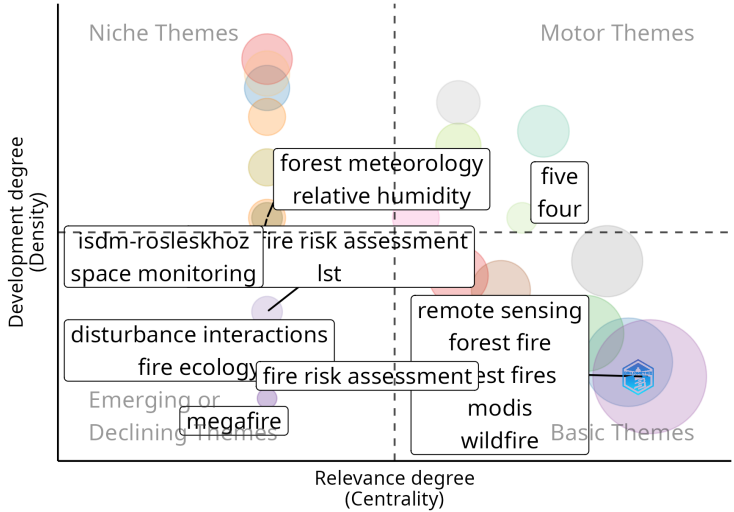


The strategic diagram. Source [4]

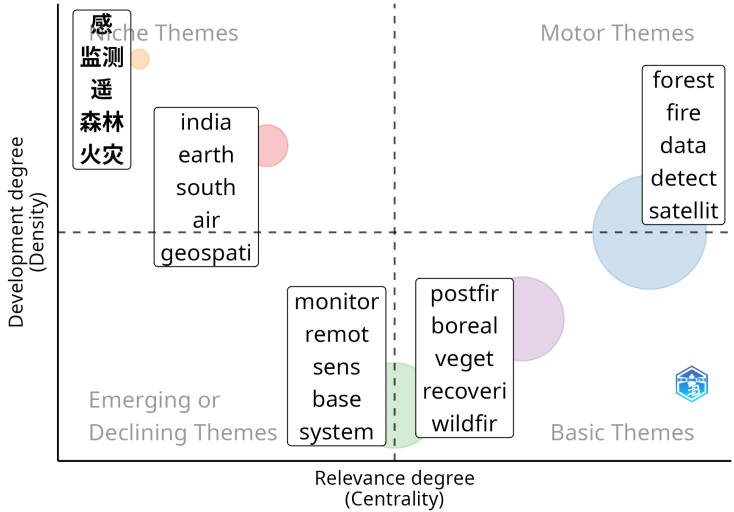
Thematic map (keyword plus)



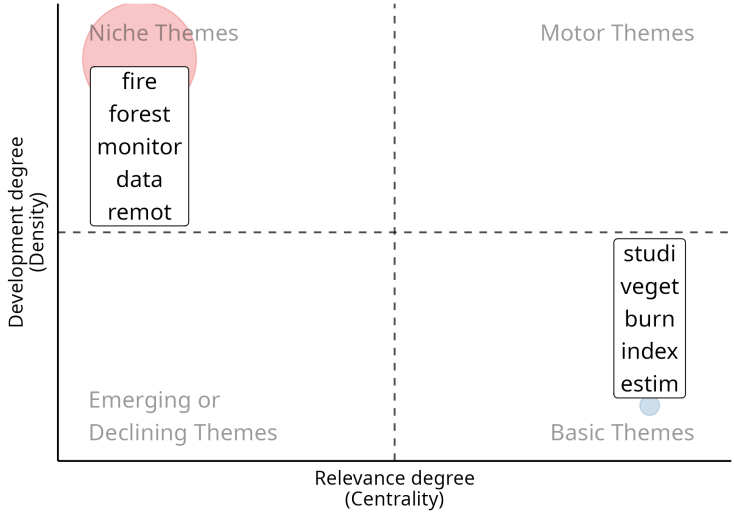
Thematic map (authors' keywords)



Thematic map (titles)



Thematic map (abstracts)



Take home message

- TODO.

References I

[1] Massimo Aria and Corrado Cuccurullo. "Bibliometrix : An R-tool for Comprehensive Science Mapping Analysis". In: *Journal of Informetrics* 11.4 (Nov. 2017), pp. 959–975. ISSN: 17511577. DOI: 10.1016/j.joi.2017.08.007. (Visited on 11/14/2023).

[2] Katy Börner, Chaomei Chen, and Kevin W. Boyack. "Visualizing Knowledge Domains". In: *Annual Review of Information Science and Technology* 37.1 (Jan. 2003), pp. 179–255. ISSN: 0066-4200, 1550-8382. DOI: 10.1002/aris.1440370106. (Visited on 12/21/2023).

[3] R. N. Broadus. "Toward a Definition of "Bibliometrics"". In: *Scientometrics* 12.5-6 (Nov. 1987), pp. 373–379. ISSN: 0138-9130, 1588-2861. DOI: 10.1007/BF02016680. (Visited on 12/19/2023).

References II

[4] M.J. Cobo et al. "An Approach for Detecting, Quantifying, and Visualizing the Evolution of a Research Field: A Practical Application to the Fuzzy Sets Theory Field". In: *Journal of Informetrics* 5.1 (Jan. 2011), pp. 146–166. ISSN: 17511577. DOI: 10.1016/j.joi.2010.10.002. (Visited on 12/27/2023).

[5] Naveen Donthu et al. "How to Conduct a Bibliometric Analysis: An Overview and Guidelines". In: *Journal of Business Research* 133 (Sept. 2021), pp. 285–296. ISSN: 01482963. DOI: 10.1016/j.jbusres.2021.04.070. (Visited on 12/11/2023).