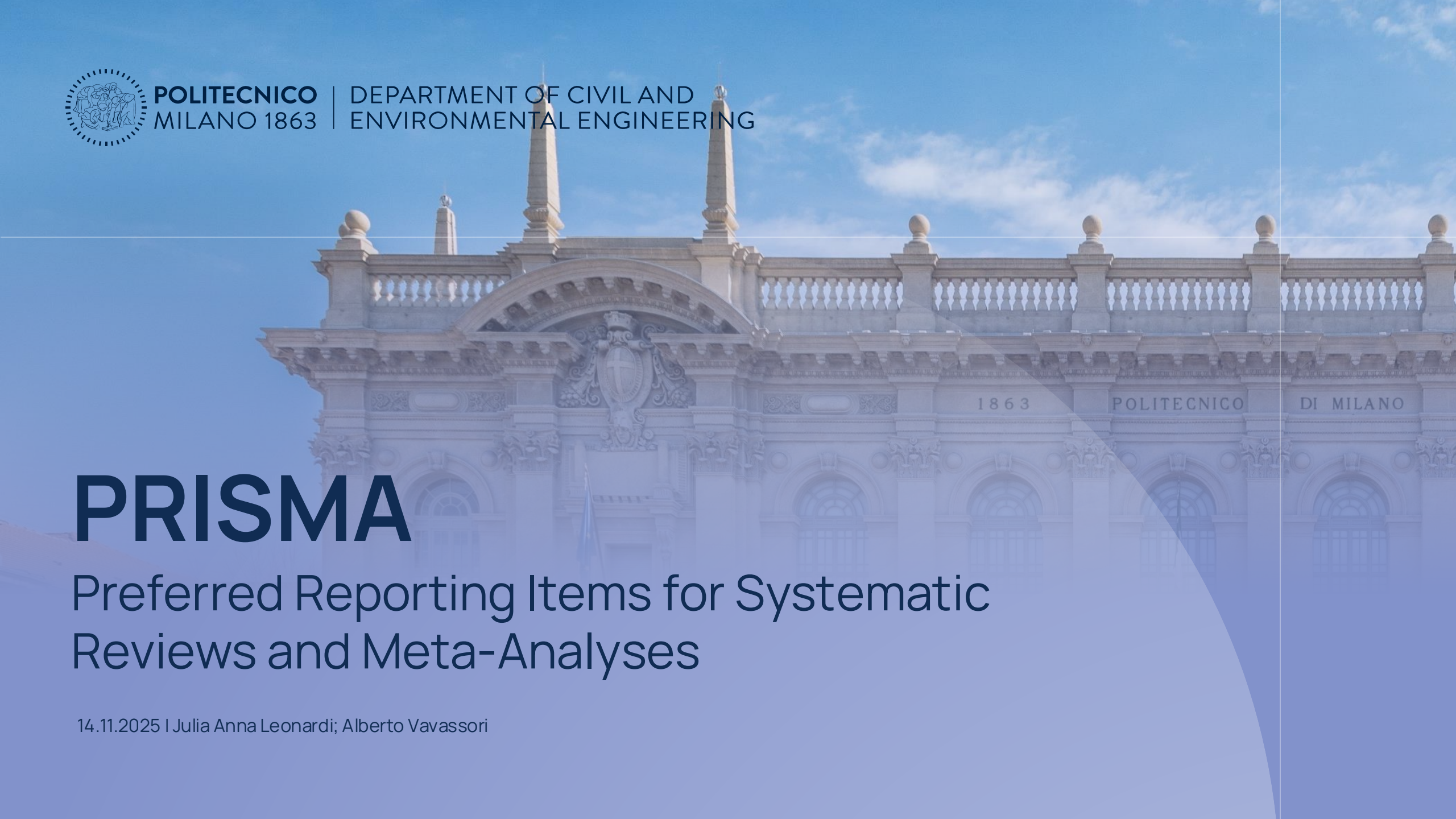


POLITECNICO MILANO 1863 | DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

PRISMA

Preferred Reporting Items for Systematic Reviews and Meta-Analyses

14.11.2025 I Julia Anna Leonardi; Alberto Vavassori

What is PRISMA?

A guideline for more standardized, reproducible, and transparent literature reviews.

Guidance for authors:

- **Why are we doing the review?**
- **What methods were used?**
- **What results were found?**

- M. J. Page *et al.*, "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews," *BMJ*, vol. 372, p. n71, Mar. 2021, doi: 10.1136/bmj.n71.
- M. J. Page *et al.*, "PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews," *BMJ*, vol. 372, p. n160, Mar. 2021, doi: 10.1136/bmj.n160.

The PRISMA checklist

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item
TITLE		
Title	1	Identify the report as a systematic review.
ABSTRACT		
Abstract	2	See the PRISMA 2020 for Abstracts checklist.
INTRODUCTION		
Rationale	3	Describe the rationale for the review in the context of existing knowledge.
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.
METHODS		
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item
RESULTS		
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.
Study characteristics	17	Cite each included study and present its characteristics.
Risk of bias in studies	18	Present assessments of risk of bias for each included study.
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.
	20c	Present results of all investigations of possible causes of heterogeneity among study results.
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.
DISCUSSION		
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.
	23b	Discuss any limitations of the evidence included in the review.
	23c	Discuss any limitations of the review processes used.
	23d	Discuss implications of the results for practice, policy, and future research.
OTHER INFORMATION		
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.
	24c	Describe and explain any amendments to information provided at registration or in the protocol.
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.
Competing interests	26	Declare any competing interests of review authors.
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.

https://static1.squarespace.com/static/65b880e13b6ca75573dfe217/t/67ad313f1c80aa5235fce0d0/1739403584136/PRISMA_2020_checklist.pdf
https://static1.squarespace.com/static/65b880e13b6ca75573dfe217/t/67e61c3b5d427f3ad2386ae8/1743133757230/PRISMA_2020_expanded_checklist.pdf

The PRISMA workflow

Before starting:

- **Sketch a response to the introduction questions**

- This will give you an overview what is important to your research and why.
- It will also help you define the inclusion and exclusion criteria for reviewed papers.

INTRODUCTION		
RATIONALE	**3**	**Item: Describe the rationale for the review in the context of existing knowledge.** Elements: • Describe the current state of knowledge and its uncertainties. • Articulate why it is important to do the review. • If other systematic reviews addressing the same (or a largely similar) question are available, explain why the current review was considered necessary. If the review is an update or replication of a particular systematic review, indicate this and cite the previous review. • If the review examines the effects of interventions, also briefly describe how the intervention(s) examined might work. • *If there is complexity in the intervention or context of its delivery (or both) (e.g. multi-component interventions, equity considerations), consider presenting a logic model to visually display the hypothesised relationship between intervention components and outcomes.*
OBJECTIVES	**4**	**Item: Provide an explicit statement of the objective(s) or question(s) the review addresses.** Elements: • Provide an explicit statement of all objective(s) or question(s) the review addresses, expressed in terms of a relevant question formulation framework. • If the purpose is to evaluate the effects of interventions, use the Population, Intervention, Comparator, Outcome (PICO) framework or one of its variants, to state the comparisons that will be made.

Define inclusion and exclusion criteria:

- Think about what are the crucial elements of a paper to include it in your review.
- What are the elements that would make a paper not relevant to your research?

METHODS		
ELIGIBILITY CRITERIA	**5**	**Item: Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.** Elements: • Specify all study characteristics used to decide whether a study was eligible for inclusion in the review, that is, components described in the PICO framework or one of its variants, and other characteristics, such as eligible study design(s) and setting(s), and minimum duration of follow-up. • Specify eligibility criteria with regard to report characteristics, such as year of dissemination, language, and report status (e.g. whether reports, such as unpublished manuscripts and conference abstracts, were eligible for inclusion). • Clearly indicate if studies were ineligible because the outcomes of interest were not measured, or ineligible because the results for the outcome of interest were not reported. • Specify any groups used in the synthesis (e.g. intervention, outcome and population groups) and link these to the comparisons specified in the objectives (item #4). • *Consider providing rationales for any notable restrictions to study eligibility.*

The PRISMA workflow

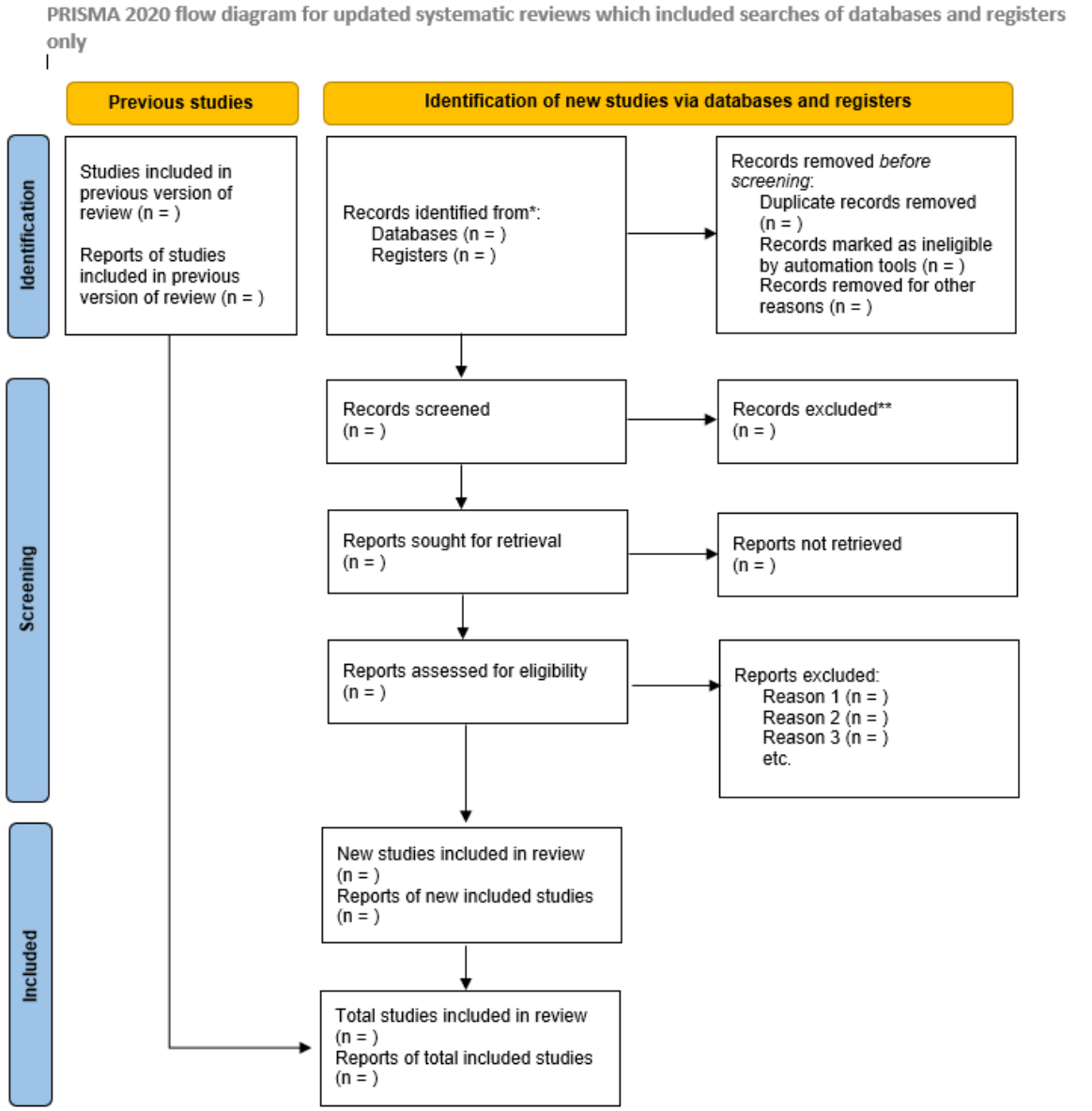
Define your search workflow

- **Where will you look?**
  - Databases: Web of Science, Scopus, ArXiV…
- **What is the search strategy?**
  - Queries used to retrieve papers, filters, limits used;
- **Selection process:**
  - Stages of selection: Initial identification, Screening, Full-text evaluation…

Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.

The Flow Diagram

- Helps to visualize the search strategy;
- Systematizes the inclusion of new records;
- Organizes the workflow so that it's reproducible by other researchers.



A practical example – a systematic review of hyperspectral deep learning methods

- Why is this review important?
- What are we trying to achieve?

- Where will we look?

Web of Science arXiv Scopus

- What are the queries we'll use?

Table 1: Queries used for the database search.

	Query
IISI review	("hyperspectral dataset" OR "hyperspectral image" OR "hyperspectral processing" OR "hyperspectral data source" OR "hyperspectral technique" OR ("large-scale dataset" AND "hyperspectral") OR ("self-supervised" AND "pre-training" AND "hyperspectral"))

- Defining inclusion and exclusion criteria.

Table 2: Eligibility criteria applied during different stages of the IISI review.

	Initial identification	Initial screening	Intermediate and final screening
Inclusion criteria	Studies presenting a novel hyperspectral dataset	Studies focusing on remote sensing applications	Studies presenting a novel spectral feature extraction technique
	Studies presenting a novel deep learning technique for hyperspectral data processing	Studies working on non-synthetic hyperspectral data	Studies focusing on the spectral–spatial data dynamics
	Time frame: 01.2020–05.2025		Review articles
	Language: English		
Exclusion criteria	Studies on hyperspectral data in medical or material science applications	Studies on hyperspectral data generation from RGB data	Studies that focused only on the spatial dimension for feature extraction
	Studies using traditional hyperspectral processing techniques	Studies focusing on hyperspectral image fusion	Studies that were not accessible through open access agreements (paywall)
	Studies not related to hyperspectral imagery		Studies that use traditional dimensionality reduction techniques, such as PCA

instructions.tx • | prithvi-related-com | run-validating-GPU | CINECA-instruction | CINECA-instruction | run-training.s • | scopus.bib

Plik Edytuj Wyświetl

```
@CONFERENCE{Beusen20241703,
        author = {Beusen, Bart and Ivashkovych, Xenia and Luyts, Andreas and Van Achteren, Tanja},
        title = {On-Board Hyperspectral Image Compression Using Vector-Quantized Auto Encoders},
        year = {2024},
        journal = {International Geoscience and Remote Sensing Symposium (IGARSS)},
        pages = {1703 - 1707},
        doi = {10.1109/IGARSS53475.2024.10642283},
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&md5=5524ce14f02bc03cc4721cd277937637},
        type = {Conference paper},
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}

@ARTICLE{Huang2022,
        author = {Huang, Lingbo and Chen, Yushi and He, Xin and Ghamisi, Pedram},
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}

@ARTICLE{Jayaprakash2020,
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        title = {Randomized independent component analysis and linear discriminant analysis dimensionality reduction methods for
hyperspectral image classification},
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@ARTICLE{Yang2022,
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...erspectral

Advanced query

...pectral image OR hyperspectral processing OR hyperspectral data source OR hyperspectral

... AND hyperspectral) OR (self-supervised AND pre-training AND hyperspectral))

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...dary documents

Analyze results

...ad Citation overview ••• More Show all abstracts Sort by Date (newest)

	Authors	Source	Year	Citations
...hical text classification for traffic	Minh, Q.T., Thai, D.T.	International Journal of Cognitive Computing in Engineering, 7(1), pp. 145–154	2026	0
...t Publisher Related documents				
...or Food Flavor Analysis: A ...Techniques, Applications and Future	Wu, Q., Yuan, J., Zhou, J., ... Liu, J., Cui, X.	Journal of Future Foods, 6(4), pp. 519–532	2026	2
...t Publisher Related documents				
... Models for Food Flavor Data Analysis	Yuan, J., Wu, Q., Zhou, J., ... Liu, J., Cui, X.	Journal of Future Foods, 6(4), pp. 533–544	2026	1
...t Publisher Related documents				

...eas

...y authors to have an early idea of upcoming research documents.

...e reinforcement with Q learning based | Pujari, J.S., Wasim, J., | Geoinformatica, 30(1), 3 | 2026 | 0

Tools to use

rayyan

- Import .bib files
- Remove duplicates
- First screening based on title/keywords

- Import .bib files of screened papers
- Structure within a library
- Have access to the pdfs of papers

- Extract information from papers
- Group them by theme
- More advanced analysis

How to use it for your thesis?

For the literature review of your thesis.

Have a more structure workflow of how to find relevant papers for your research.

Spend less time wondering if you found all the relevant papers and which ones to include.

Better structure, better reproducibility, better thesis!

Thank you!

juliaanna.leonardi@polimi.it