MetaInfoSci: Visualize trends and understand facts

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Introduction

The exponential growth of scientific literature has created an imperative need for effective analysis by understanding and analysing publication trends and to navigate the complex requirements of academics, research institutions, and policymakers (Jacob and Meek, 2013). The ability to gauge the growth of scientific disciplines, author collaboration, and institutional partnerships offers valuable insights that can inform research directions, funding decisions, and educational strategies (Bozeman, Fay and Slade, 2013). However, this requires users to possess technical expertise in data cleaning and formatting, which results in creating barriers to entry for researchers from diverse disciplines and their ability to comprehend the full scope of their fields.

Current bibliometric tools often fall short, providing quantitative outputs such as citation counts and co-authorship networks without the necessary interpretation to make these figures meaningful (Zupic and fater, 2015). This gap leaves researchers without a clear understanding of how their work contributes to broader scientific progress and a barrier for the adoption of these tools. Further, existing network platforms typically require users to input data in clean formats, which can be daunting for those lacking technical expertise. To bridge this gap, we propose the development of innovative MetaInfoSci, a comprehensive web tool designed to streamline both qualitative and quantitative analysis of research literature. It will not only automate data preprocessing and cleaning, making it accessible to non-technical users, but will also employ advanced AI algorithms to interpret and contextualise research findings.

Objective of the study

The MetaInfoSci web tool is designed as an all-in-one, user-friendly platform for conducting bibliometric, scientometric, and network analysis of bibliographic databases such as Scopus, WoS, and OpenAlex. It features real-time visualization updates and AI integration for result interpretation. Additionally, the tool will incorporate network science metrics, Gender API integration, Journal Quartile integration, and more.

Relevant Existing Tools

Table	1. shows	major	tools	with	their	purpose,	features,	, and	limitations.
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Tool Name	Purpose	Features	Limitations
VOSviewer, Van Eck	Bibliometric	Co-occurrence analysis,	Lacks advanced citation metrics,
and Waltman, 2017	visualization	Bibliographic coupling, Network visualization, Clustering	limited interoperability with other tools, steep learning curve for beginners

Gephi, Bastian,	Network	Graph visualization,	Resource-intensive for large
Heymann and Jacomy,	visualization	Network clustering,	networks, lacks built-in
2009)		Community detection,	bibliometric functions, steep
		Dynamic graph analysis	learning curve
ScientoPy, Ruiz-	Bibliometric	Trend analysis, Performance	Limited visualization options,
Rosero, Ramírez-	analysis	metrics, Bibliographic	requires manual data preparation,
González and Viveros-		coupling, Statistical analysis	lacks cloud-based accessibility
Delgado, 2019			
BibExcel, Persson,	Bibliometric	Bibliographic data	Not user-friendly for large
Danell and Schneider,	analysis	conversion, Excel output,	datasets, lacks real-time updates,
2009		Network preparation,	limited interactivity
		Citation analysis	
Biblioshiny, Aria and	Bibliometric	Shiny-based GUI,	Limited customization, requires R
Cuccurullo, 2017	analysis	Bibliometrix integration,	setup, lacks real-time bibliometric
		User-friendly statistical	updates
		visualization	

Demonstration



Figure 1. Uploading data and mapping columns.

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1029	Manageria Finance		Enerald Publishing	Article	English	NA
1004	Journal of Computational Social Science	,	laringer	Article	English	Al Open Access, Green Egen
1025	International Journal of Lightweight Materials and Manufacture	1	KaAi Publishing Communications USE	Article	English	All Open Access; Guid Open A
1004	Mailuring Intelligence and Planning		Emerald Publishing	Article	English	NEA
1024	Chinese Journal of Physics	4	Danier BX	Article	English	NA
1004	Modern Physics Letters 8	1	World Scientific	Article	English	NA
1025	Nano		World Scientific	Article	English	NA
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Figure 2. Displaying data and overview of data.

Publications Analysis



Figure 3. Under publication trends analysis tab, displaying year-wise trend analysis.

Journal Analysis



Figure 4. Under journal analysis tab, displaying bar plot of journal count.

Author's Analysis



Figure 5. Under author's analysis tab, displaying authors 'collaboration network.

How it is different from existing tools?

- 1. Interactive visualization tool box
- 2. AI-integrated result interpretation
- 3. Advanced network metrics and analysis
- 4. Advanced bibliometrix analysis like journal quartile, gender analysis, etc.

Conclusion

The proposed study aims to develop MetaInfoSci, an advanced web tool for both qualitative and quantitative research literature integrating bibliometric, analysis, scientometric, and network analysis. Unlike existing platforms, MetaInfoSci will unify data from multiple sources such as Scopus, Web of Science, OpenAlex, etc. into a single dataset. The tool will offer features like publication trend analysis, identification of key contributors, and detailed collaboration networks at the author, institution, and country levels. Powered by AI-driven algorithms, MetaInfoSci will provide meaningful context and interpretation for bibliometric data, enabling researchers to better understand the broader impact of their work. Additionally, it will incorporate outer datasets on journal quality metrics (e.g., Ouartiles, h-index, impact factor) and author gender, facilitating in-depth and customizable analysis with flexible visualizations. By automating data merging, cleaning, and analysis, MetaInfoSci will make bibliometric tools more accessible to non-technical users, while empowering researchers with advanced

analytical capabilities. The platform will also serve as a valuable training resource, equipping users with essential skills for

navigating the evolving landscape of research evaluation.

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