Letter to the Editor

Connecting the dots: New insights into visualising literature search

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Quick Response Code:

Sir,

Scientific literature search is the cornerstone of research and publication process. The process is aided by web-based search engines such as PubMed™, Web of Science™, Scopus™, Embase™ and other similar databases.[1] Good quality search relies on skilfully navigating the enormous amount of information available on the aforementioned databases and isolating pertinent search results. Use of appropriate keywords is helpful in obtaining appropriate search results. In addition to relevant keywords, popular databases such as PubMed™ provide 'advanced search' facilities[2] wherein different terms such as medical subject headings terms, authors, and journals can be added to the query box along with Boolean operators such as 'AND,' 'OR' and 'NOT' to filter out unrelated papers.[3] The process can be manually repeated with combination of different keywords and operators to increase the quantum of search results. For most of us, this remains the conventional way of literature search on the world wide web.

HARNESSING THE POWER OF ARTIFICIAL INTELLIGENCE

Recently, novel tools such as ResearchRabbit™, Inciteful™ and Connected Papers™ have come up that uses artificial intelligence and machine learning to provide an alternate perspective to search results. These tools provide the ability to generate literature maps/networks.

ResearchRabbit™

The resource is available at www.researchrabbit.ai.[4] The users need to create an account to log in and use the platform. This is followed by creation of collections and addition of papers to the same. Papers can be added manually or searched using medical literature databases such as PubMed. Once two or more papers are added to a collection, a network map is automatically created showing papers related to the papers added to the collection. The individual papers are represented as nodes connected to each other by lines. The users can download PDFs of the papers present in the network, if available. In addition, similar work can be viewed based on similarity or arranged in chronological order as 'timeline.'

The resource also provides the ability to generate network maps for authors and their collaborators.
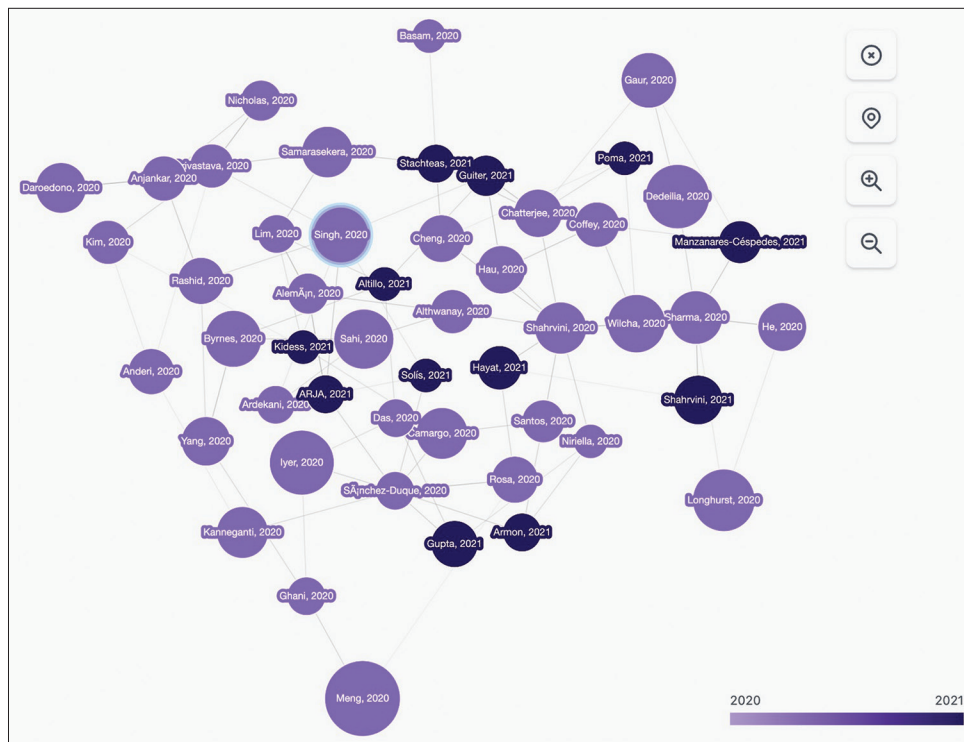
Figure 1: Interactive map of a publication generated by Inciteful tool Map generated using Inciteful tool. Data as on 27 November 2022. The central circle with blue halo (Singh *et al*., 2020) represents the original search query.[7]

Inciteful™

The tool is developed by Michael Weishuhn, a UK-based developer. It has been created using Rust programing language and is available at www.inciteful.xyz.[5] The tool utilises principles of graph theory to create plots of scientific literature – the 'seed paper' is the query entered by the user and papers citing the 'seed paper' are used to create a network map.[6] In addition, similar papers and page ranks are computed by artificial intelligence algorithms to fine tune the map. The search is derived from Semantic Scholar™, Unpaywall™, CrossRef™ and OpenCitations™. The user can add more papers to create more intricate maps, as per his/her requirement. A prototype map created for a search query[7] is shown in [Figure 1].

Connected papers™

This resource has been created by Eitan and colleagues and is available at www.connectedpapers.com.[8] It uses Semantic Scholar™ database to search for papers related to search query entered by the user. It is available under Creative Commons license ODC-BY. It utilises common citations and references to find related papers. This is performed using the techniques of co citation and bibliographic coupling.[9,10] While two papers that are 'bibliographically coupled' cite common sources, papers exhibiting 'co-citation' are cited by common sources. After identification of these techniques, proprietary algorithms build a network graph showing papers connected as nodes, with similar papers being closer and vice versa.

We believe that these new tools will provide researchers with new tools to navigate the intricate meshwork of the world wide web. As technology and algorithms continue to improve, aforementioned resources are likely to become more powerful and cutting-edge.

Another potential area of application exists at a larger level for institutes and organisations. Herein, these tools can help in scientometric analysis for individual researchers. Since these resources help in immediate identification of both citations and sources of citations, they will help in immediate identification of impact of authors and their works.

We propose that these tools will facilitate the process of scientific discovery and reduce the turnaround time of obtaining relevant information on the internet. Hence, they are likely to be very useful for the scientific community.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

Dr. Shival Srivastav is on the editorial board of the journal.

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