
SCOReD 2021
IEEE SABAH
Sustainable Engineering and Technology towards Industry Revolution
19th IEEE Student Conference on Research and Development
23-25 November 2021
Kota Kinabalu Malaysia
IEEE MALAYSIA SECTION
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Computer Science Research and COVID-19: A Review of Bibliometric Visualization and Proposed Method

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***Abstract*—The pandemic of COVID-19 has accelerated significantly, generating great concern throughout the world. As a result, the quantity of articles and journals published on COVID-19 has increase rapidly. However, these publications do not cover bibliometric visualisation sufficiently, particularly in the computer science field. Thus, the purpose of this article is to conduct a review of the literature on bibliographic visualisation. We analysed four websites that present COVID-19 bibliographic data. Additionally, we propose a framework for visually representing bibliometric data pertaining to computer science research and COVID-19. We believe that our method for bibliometric visualisation will considerably benefit future research by serving as a guide. It will serve as a significant way for conduction COVID-19 bibliometric visualization, in other areas, not limited to the field of computer science.**

Keywords—COVID-19, Bibliometrics, SARS-CoV-2, Pandemic, Human-computer interaction, Data visualization

I. INTRODUCTION

Since its fatal discovery in December 2019, the COVID-19 pandemic has developed into a serious concern. Since then, the rate of COVID-19 cases has skyrocketed, raising considerable fear throughout the world. Not only has it impacted the health industry, but also the education sector [1]. As a result, countries throughout the world have spent significant time and money to combating the pandemic [2].

Bibliometric visualisation is defined as a tool for determining the publication trends of a topic of study. It can identify the quantitative and qualitative information of research output [3]. The study of bibliometrics has grown in popularity as a method for evaluating worldwide research collaboration. Visualization approaches for scientific publication are also valuable for identifying publication trends across disciplines, not just for computer-related areas. This is particularly true in the present period, when thousands of unreferenced articles can be quickly uploaded and distributed to online pre-print archives [4].

Simultaneously, thousands of academic articles on COVID-19 have been published in a variety of scholarly journals. The number of publications published on COVID-19 has risen considerably in the aftermath of the outbreak [5]. However, as far as we are aware, no bibliometric analysis of the relationship between computer science and COVID-19 has been done. Some of the bibliometric analyses in the field of computer science did not cover COVID-19 research [6]. While bibliometric visualisation studies have been undertaken, there is an absence of bibliometric study on the connection between computer science and COVID-19 [7].

While some study has been conducted on COVID-19, there are currently only a few websites devoted to exhibiting the COVID-19 bibliometrics visualisation mapping. By having COVID-19 bibliometric data for computer science articles on one website, it establishes a credible information source for researchers, clinicians, and the public. The purpose of this article is twofold:

1. 1. To conduct a content analysis and visualisation of four websites focused to COVID-19 bibliometric visualization and analysis.
2. 2. To propose a method for visually representing bibliometric data pertaining to computer science research and COVID-19.

Additionally, the framework for bibliometric visualisation mapping described in this research will include methods for visualising bibliometric data that are not limited to the field of computer science. This paper examines the technical elements of bibliometric mapping using a framework developed from [8] and [9]. This initiative will serve as a vital resource for researchers, scientists, and physicians seeking precise information regarding COVID-19 bibliometric data in the field of computer science.

II. LITERATURE REVIEW

A. The importance of data visualization

The term 'visualisation' describes the process of graphically representing facts and information. Data visualisation makes use of trends and patterns in data to aid in the acquisition of necessary knowledge. It contributes to the creation of a more complete picture and enhances our comprehension. Data visualisation enables the exploration of data via interactive charts, infographics, and maps. Data visualisation is crucial for effectively communicating a message and presenting pertinent facts. Data visualisation enables us to get insights from huge amounts of data in the age of big data [10]. Table I summarises the significance of data visualisation as stated by many authors.

TABLE I. The importance of data visualization

Authors	The importance of data visualization
[11]	Graphically displays meaningful information about variables contained in tabular data.
[12]	It helps the viewer to observe and comprehend the underlying structure of a dataset.
[13]	Assists in avoiding misrepresentation in information communication.
[14]	Contribute to the dissemination of an informational, compelling, and artistic message.

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