

FOSS-Based Bibliometric System to Track the Evolution of Agrivoltaics Research – Preliminary Results and Roadmap

Introduction

A bibliometric system is being developed, which goals are:

1. Assisting the international agrivoltaics research community in assessing the status of agrivoltaics research worldwide;
2. Understanding how the community itself is structured in research groups and
3. Understanding how these groups and communities of groups are related and are interacting among them.

This bibliometric system is based on the use, adaptation, and development of Free Open-Source Software (FOSS) and available open access resources. Its development is open to contributions from anyone interested.

Approach

The bibliometrics system is being built as an ecosystem of tools composed, as much as possible, of already available tools and components. The emphasis is on the integration of the tools to achieve specific functionalities and on the increase automatization of the overall system. Key components of the system are the data sources, the database, the data adaptation tools, and the data analyses tools.

The set of bibliographical references is the critical data source. The representativeness of this set, in relation to the evolution and status of agrivoltaics research, is of paramount importance. The other data sources are ancillary sources used either to improve the information provided in a bibliographical reference or to add information related to it. The database is a standard relational database. Most of the data-adaptation tools are Python scripts, while the data analysis tools are based on different technologies

Status

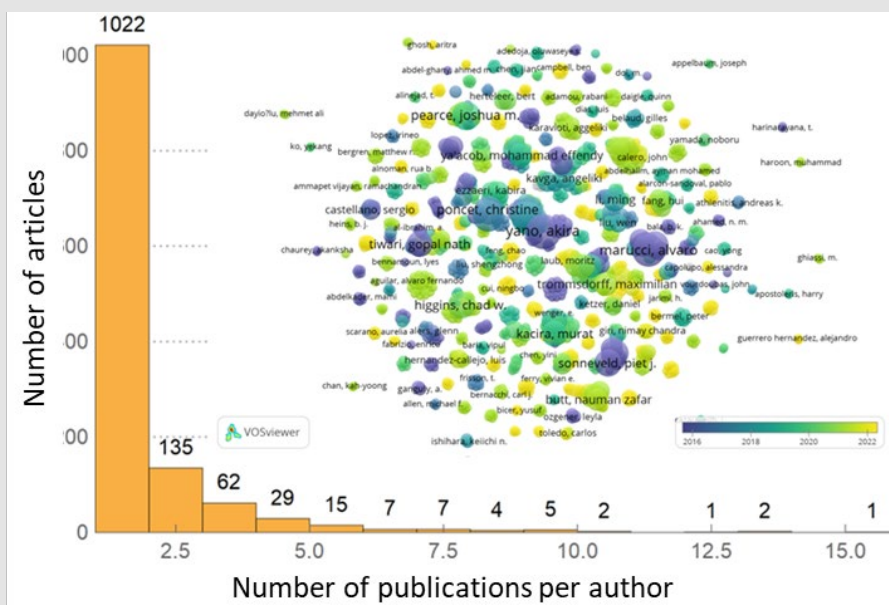
1. The core set of bibliographical references obtained.
2. The core structure of the relational database established, and the database defined and implemented.
3. Key data-adaptation tools developed and used to populate the database.
4. Key available open-source data-analysis tools identified and applied to analyze the data set.
5. A series of Mathematica notebooks developed to provide additional analyses of the dataset and as preliminary versions of the data-analysis tools to be developed in Python as fully open-source tools.

Preliminary Results

1. The core set of bibliographical references contains a total of 410 references, from 1982 to 2023.
2. The set is a closed set of references in the sense that, for any article in the set, the references in that article to any other relevant agrivoltaics articles are to be found within the set itself.
3. To build the closed set, the titles and abstracts of more than 7,000 documents were reviewed, following an iterative process consisting in exploring the references and citations of each document added to the set, identifying those that classify as agrivoltaics references and integrating them into the next iteration of the set.
4. It took seven iterations to reach the closed set. In terms of references, the documents in the set contain a total of 15,351 references, associated to 8,641 unique documents.
5. In terms of citations, the documents in the set have been cited 9,341 times so far, from a total of 3,919 documents.
6. Many different bibliographical analyses have been carried out, such as:
 - a) Frequency analyses;
 - b) Networks analyses and
 - c) Time domain analysis.

Roadmap

The next steps will be to increase the automation of the developed FOSS-based bibliometric system, make its results available to the international research community via a specialized website, and establish the endeavor as a full-fledge open-source project open to the contribution of anyone interested.



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