

FACS 2003-2023: On the bibliometric analysis

Olga Kouchnarenko¹[0000-0003-1482-9015] and Louis Robert²[0009-0004-3176-1264]

¹ Université de Franche-Comté, CNRS, Institut FEMTO-ST, F-25000 Besançon, France

² Université de Franche-Comté, SCD-UFC, Belfort F-90000, France.

FirstName.LastName@univ-fcomte.fr

Introduction This preface is dedicated to a bibliometric analysis of the proceedings of the eighteen editions of the International conference on Formal Aspects of Component Software (FACS), aka workshop and symposium for ten first editions, to perceive its achievements and evaluate its impact on the community.

Methodology Bibliographic and bibliometric data were collected from different but complementary resources. Three databases³—Dimensions, Scopus and Web of Science—allowed a first visualization of data, and afterwards complete extractions of the elements necessary for the study. In addition, to extend the period covered by those databases, search engines⁴—such as Lens, Semantic Scholar and openAIRE—were used. Moreover, these resources have been complemented by consultation using Springer-Link, ScienceDirect and DBLP⁵ for monitoring and enumeration purposes, namely by using digital object identifiers, DOI.

Our search queries, although adapted to the resource and engine used, are in general centred on the full title of the conference and its acronym (FACS), most interfaces require the use of the *all search* criterion (search in all fields), and of quotes to constrain the expression. The changing status of meetings (workshop, symposium and then conference) was covered by a regular expression when it was possible. In addition, let us note that most of the platforms require information concerning the document type, a disciplinary filter (e.g., computer science), and a filter on the period (2003-2023).

Results The FACS proceedings, either *Electronic Notes in Theoretical Computer Science* (ENTCS, 2005-2009) or *Lecture Notes in Computer Science* (LNCS, 2010-2022), contain 294 contributions by 476 authors from 36 countries. Starting from 2005, each volume contains 10 (2021) to 23 (2005, 2013, 2014) articles. In addition, 75 selected extended papers have been published in 13 special issues of *Science of Computer Programming* (SCP, 2010-2022) and *Software and System Modeling* (SoSyM, 2023) international journals. Let us note that in the databases used, the ENTCS volumes are not explicitly linked to the FACS workshop, making extractions partial with 170 records at most. On their side, the (manually built) DOI-based queries provide 263 records.

The data that caught our attention are the titles, keywords and abstracts. They have been the subject of text mining to highlight the topics and the themes covered, and of their evolution over the two FACS decades. The data processing was carried out thanks to the available export and analysis functions for the databases and the engines used. For result visualization, the VOSViewer tool [1] was also used, like in Fig.1.

³ <https://www.dimensions.ai/>; <https://www.scopus.com/>; <https://www.webofscience.com>

⁴ <https://www.lens.org/>; <https://www.semanticscholar.org/>; <https://explore.openaire.eu/>

⁵ <https://link.springer.com/>; <https://www.sciencedirect.com/>; <https://dblp.org/>

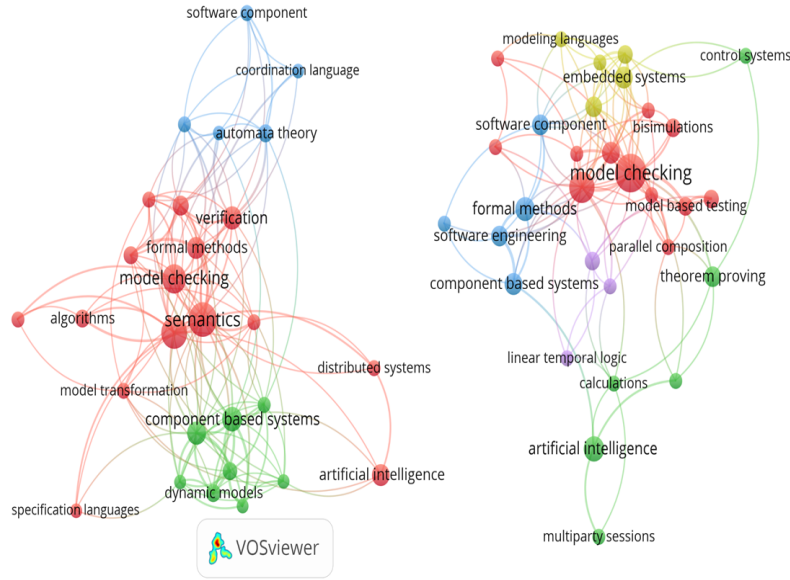


Fig. 1: Keywords co-occurrence: 2011-2016 vs. 2017-2022

By comparing the co-occurrence of the keywords with VOSviewer using a technique that categorizes the keywords in clusters, we found some interesting features of the topics landscape over the two past decades. First, formal aspects of component-based system development—design, specification, verification and validation— stay central to the FACS community over the years. Second, whereas the focus of the first editions was mainly on software components, it was then put on distributed, embedded and complex systems in general, and more recently on cyber-physical systems. Third, the artificial intelligence related topics were diffuse in 2015-2016, but now the artificial intelligence cluster is formed and anchored to systems’ analysis activities.

Discussion Bibliometric data provide a perspective on the visibility of the FACS conference. Open Access (OA) also provides a perspective for analysis on how important it has been over the last twenty years, and on how OA has increased the visibility of our work. The data on OA available in the databases, together with the possibility of sorting by citation, allowed us to provide a first attempt to address these questions, with the creation of top lists of the most cited FACS articles. For all the databases explored, more than 50% of the top 10, top 20 and top 30 articles are in Open Access.

References

1. N. J. van Eck and L. Waltman. Software survey: Vosviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2):523–538, 2010.