frontiers | Frontiers in Computer Science

TYPE Editorial
PUBLISHED 24 September 2024
DOI 10.3389/fcomp.2024.1466846

OPEN ACCESS

EDITED AND REVIEWED BY
Martin Shepperd,
Brunel University London, United Kingdom

*CORRESPONDENCE
Hector Florez
haflorezf@udistrital.edu.co

RECEIVED 18 July 2024
ACCEPTED 12 September 2024
PUBLISHED 24 September 2024

CITATION
Florez H, Galpin I and Yepes-Calderón F (2024) Editorial: Advances in software for data analysis. *Front. Comput. Sci.* 6:1466846. doi: 10.3389/fcomp.2024.1466846

Editorial: Advances in software for data analysis

Hector Florez[1]*, Ixent Galpin[2] and Fernando Yepes-Calderón[3]

[1]ITI Research Group, Universidad Distrital Francisco Jose de Caldas, Bogotá, Colombia, [2]Facultad de Ciencias Naturales e Ingeniería, Universidad de Bogota Jorge Tadeo Lozano, Bogotá, Colombia, [3]R&D Department, Science-Based Platforms LLC, Fort Lauderdale, FL, United States

KEYWORDS

artificial intelligence, business analytics, data analysis, decision systems, enterprise information systems, IT architectures

Editorial on the Research Topic
Advances in software for data analysis

The rapid growth of data generation in recent years, fueled by the proliferation of IoT devices and advanced computing systems, has revolutionized the data analysis landscape. This Research Topic in the *Software* section of *Frontiers in Computer Science*, entitled *Advances in software for data analysis*, delves into cutting-edge research and novel approaches in software development designed to manage, integrate, and extract valuable insights from massive data sets. This editorial introduces the significant contributions of the articles in this Research Topic, highlighting their impact on fields such as artificial intelligence, data science, and enterprise information systems.

In today's data-driven world, the ability to efficiently gather, process, and analyze vast amounts of information is paramount. When combining data from traditional sources with the influx of non-traditional ones, new opportunities and challenges arise. The need for versatile and innovative software solutions has never been greater, as organizations strive to harness the full potential of their data. This Research Topic addresses these needs by showcasing advancements in software that enhance data analysis through improved methodologies, algorithms, and integration techniques.

The five articles featured in this Research Topic exemplify the diversity and depth of current research in software for data analysis. Each contribution provides unique insights and solutions to pressing challenges in the field.

The first article, "*Hierarchical clustering-based framework for a posteriori exploration of Pareto fronts: application on the bi-objective next release problem*", authored by Casanova et al., presents an abstract framework utilizing hierarchical clustering to aid decision-makers in exploring Pareto fronts generated by multi-objective combinatorial optimization problems. The proposed extension for the bi-objective Next Release Problem, coupled with a user-friendly dashboard, demonstrates significant improvements in usability and performance. The framework's potential for application to new problems underscores its versatility and impact.

The second article, "*An application programming interface implementing Bayesian approaches for evaluating effect of time-varying treatment with R and Python*", by Chen et al., focuses on the complexities of time-varying treatments. The paper introduces an API that integrates Bayesian additive regression tree (BART) and Gaussian Process (GP) regression to estimate treatment effects. The application examples in juvenile idiopathic arthritis and a randomized pragmatic trial illustrate the API's robustness in handling adaptive and non-adaptive treatments, offering a powerful tool for comparative effectiveness research.

In the third article, entitled "*Discovering optimal resource allocations for what-if scenarios using data-driven simulation*", Bejarano et al. propose a method to automate the discovery of optimal resource allocations in data-driven simulation models. By integrating preference and collaboration allocation policies within a simulation environment, the method enhances the performance of what-if scenarios. Experimental evaluations demonstrate significant improvements, highlighting the importance of resource-based analysis in process simulation.

The fourth article, "*A scoping review of auto-generating transformation between software development artifacts*" by Siahaan et al., presents a review that examines the conformity of artifacts throughout the software development life cycle. By analyzing methods and tools used to ensure artifact conformity with requirements, the study identifies key applications, methods, and challenges. The insights provided are invaluable for practitioners seeking to maintain traceability, ensure software validation, and enhance software reuse.

Finally, the article "*High quality implementation for a continuous-in-time financial API in C#*" by Chakkour proposes an API developed in C# for continuous-time financial models. The API leverages the Task Parallel Library (TPL) to enhance data parallelism and improve system development life cycles. The detailed description of the API's design, data structures, and algorithms showcases its effectiveness in increasing structuring and readability, making it a valuable asset for financial data analysis.

The research presented in this Research Topic advances the field of data analysis software by addressing key challenges and introducing innovative solutions. The diverse approaches and methodologies featured in these articles not only improve data processing and integration but also pave the way for future research and development. The contributions highlight the critical role of software in transforming raw data into actionable insights, benefiting various domains from business analytics to artificial intelligence.

As we continue navigating the complexities of data analysis in an ever-evolving digital landscape, the advancements showcased in this Research Topic provide a solid foundation for future innovations. The insights and solutions presented here are poised to drive progress in data analysis, ultimately contributing to the broader goal of leveraging data for better decision-making and societal advancement. We invite researchers, practitioners, and industry professionals to explore these contributions and join the ongoing dialogue in this exciting field.

Finally, the guest editors of this Research Topic extend their heartfelt thanks to the chief editor of the journal, the dedicated team managing the publication, the diligent peer reviewers, and all the authors and contributors. Their invaluable efforts have been instrumental in bringing this Research Topic to fruition. We believe this Research Topic will greatly appeal to the scientific community and the diverse readership of Frontiers in Computer Science.

Author contributions

HF: Writing – review & editing. IG: Writing – review & editing. FY-C: Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note