EUSFLAT 2023 - AGOP 2023

13th Conference of the European Society for Fuzzy Logic

12th International Summer School on Aggregation Operators

September 4-8, Palma, Spain

BOOK OF ABSTRACTS

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Editors: Sebastia Massanet, Susana Montes, Daniel Ruiz-Aguilera and Manuel González-Hidalgo

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Preface

Almost 24 years ago, the 1999 EUSFLAT-ESTYLF Joint Conference was held in Palma. This conference, which took place from September 22 to 25, 1999, was organized by the University of the Balearic Islands and the European Society for Fuzzy Logic and Technology (EUSFLAT) and it was the first edition of the conferences of this society, after its foundation that same year. After the success of the first edition, this conference has been organized every two years in many European towns. Namely, Leicester (United Kingdom), Zittau (Germany), Barcelona and Gijon (Spain), Ostrava and Prague (Czech Republic), Lisbon (Portugal), Aix-Les-Bains (France), Milano (Italy), Warsaw (Poland) and Bratislava (Slovak Republic) have been the venue for subsequent editions. Now, on the eve of the 25th anniversary, it is time for the EUSFLAT conference to return to its origins, back to its roots.

The world has changed a lot since 1999. However, some facts remain stable. The aim of the conference, in line with the mission of the EUSFLAT Society, is to bring together theoreticians and practitioners working on fuzzy logic, fuzzy systems, soft computing, and related areas and to provide for them a platform for the exchange of ideas, discussing newest trends and networking. During these years and due to the successful development of fuzzy logic and the corresponding technology, interest in fuzzy logic has been growing steadily, and the EUSFLAT conference has been the main European conference in this scientific field. However, despite being a predominantly European conference, many researchers from other continents attend the EUSFLAT conferences edition after edition, recognizing that they constitute a reference point every two years for important advances in the lines of research associated with this field. In the specific case of the Balearic Islands, it should be noted that since the late 1980s an intense research in fuzzy logic has been developed within the framework of the research group led by Gaspar Mayor and Joan Torrens, who are now happily retired. The new generation took the baton and the responsibility of organizing this edition of the EUSFLAT conference.

This 2023 edition of the EUSFLAT conference was co-located for the second time with two traditional events, namely with AGOP 2023 - International Summer School on Aggregation Operators; and with FQAS 2023 - International Conference on Flexible Query Answering Systems. We would like to express our thanks to the management of these events for sharing the vision of the joint multiconference. Special mention should be given to the AGOP summer school, with which these proceedings are shared. The AGOP summer school is organized biannually by the AGOP working group of EUSFLAT, reaching this year its 12th edition after its birth in 2001 in Oviedo (Spain). This event focuses on aggregation functions, a family of operators which have numerous applications, including, but not limited to, data fusion, statistics, image processing and decision making.

Therefore, this volume constitutes the book of abstracts of the 13th Conference of the European Society for Fuzzy Logic and Technology (EUSFLAT) and the 12th International Summer School on Aggregation Operators (AGOP). The works included in the book of abstracts have been subject to a thorough review process by at least two highly qualified peer reviewers, by using a single-blind process. The volume contains very attractive and up-to-date topics in fuzzy logic and related fields, which will result in significant interest of the international research communities active in the covered areas. Special gratitude is due to the extremely relevant role of the organizers of the special sessions. Thanks to their vision and hard work, we have been able to collect many papers on focused topics which we are sure will result, during the conference, in very interesting presentations and stimulating discussions at the sessions. It should be noted that for EUSFLAT and AGOP 2023, 71 full papers and 90 abstracts (161 submissions in total) were submitted from which 61 full papers have been accepted.

Finally, we would like to express our gratitude to all chairs and the organizing team for making these conferences possible. We believe that we will experience an excellent and unforgettable conference. We hope that you enjoyed it and that it brought home many new fruitful ideas for your research, and also that you enjoyed this beautiful island, Mallorca, the largest island in the Balearic Islands, set in of the Mediterranean Sea, with its great beaches, amazing atmosphere and cultural richness.

September 2023

Sebastia Massanet
Susana Montes
Daniel Ruiz-Aguilera
Manuel González-Hidalgo

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Selection of Circular Economy Indicators through a Large-scale Comprehensive Minimum Cost Consensus Model

Á. Labella, D. García-Zamora, R. M. Rodríguez, and L. Martínez

Department of Computer Science, University of Jaén, Jaén, Spain

Since the publication of the first report on the Circular Economy (CE) in 2013, there has been a surge of interest in the topic from both society and the business community. This has resulted in the development of a substantial body of academic literature aimed at establishing principles that can serve as a theoretical foundation for the CE concept. Governments are seeking to understand how organizations are transitioning to the new production model. However, despite the efforts of researchers and companies to create effective measurement systems, it remains challenging to determine which aspects to measure and how intensely an organization is implementing the CE model. The existing measurement proposals rely on costly and time-consuming methodologies that combine different approaches [1]. To address this issue, we propose a comprehensive consensus model for large-scale group decision-making, which minimizes costs and adjusts experts' initial preferences to obtain accurate measurements of indicators on which all parties can agree. According to the agreement achieved and different rules, the indicators can be accepted or rejected. In this sense, the use of fuzzy thresholds in the acceptance/rejection rules can provide a more flexible selection process. Our research aims not only to provide a fast, useful, and accurate method for measuring CE but also to demonstrate its benefits and effectiveness by comparing its performance to a real-world case in the building industry.

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