OR Techniques for Conference Scheduling

Lead Research Organisation: [Lancaster University](#)
Department Name: Management Science
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Abstract

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Automating the process of conference scheduling has attracted the interest of many researchers and practitioners due to its NP-Hard nature. It is a real-world combinatorial optimisation problem in which numerous of hard and soft constraints are considered during the scheduling of resources and events into time slots. On top of that, the COVID-19 pandemic has significantly increased the complexity of conference scheduling problems. Many conferences switch to online and virtual conferences introducing new constraints for consideration, such as differences in time zones around countries. Despite the complexity of conference scheduling, there are only few research works addressing the problem and no work up to date considering the impact of COVID-19 on conference scheduling.

One of the most common approaches to NP-Hard combinatorial optimisation problems, such as conference scheduling problems, is the implementation of exact methods. Many problems of this nature have been successfully solved by exact operational research techniques, namely Branch-and-Bound, Linear Programming, Integer Programming, Mixed Integer Programming, Dynamic Programming, and Lagrangian relaxation. Another approach to tackle such NP-Hard problems is the implementation of heuristics. Examples include Local Search algorithms, Genetic algorithms, Simulated Annealing, Ant Colony Optimisation, Particle Swarm Optimisation, Reinforcement Learning algorithms, and Hyper-Heuristics. Some other approaches, such as Collaborative Combinations and Integrative Combinations, which combine exact and heuristic methods have also successfully solved combinatorial optimisation problems. While the former approach makes use of both exact and heuristic algorithms separately, the latter approach makes use of exact algorithms that embed heuristic algorithms or vice versa. Although these techniques are not that widely applied, their concept is of a great interest.

In this paragraph, some of the published works on conference scheduling problems are presented. Stidsen et al. (2018) tackled the scheduling of the largest OR conference in Europe EURO-16 in Poznan by implementing 5 Mixed Integer Programming models. Kim et al. (2013) created an online application, called 'Cobi', for conference scheduling. They used a move and swap heuristic approach as a solving tool combined with intelligent user interface and feedback. Nicholls (2007) implemented a simple heuristic approach for quick scheduling of small-to-medium-sized conferences. Eglese & Rand (1987) used a heuristic method, incorporating an annealing algorithm, to schedule a conference held in 1985. Further studies on conference scheduling include works from Sampson (2009), Ibrahim et al. (2007), and De Werra (1974). Some of the OR techniques have been implemented in the mentioned studies but there are still many techniques that could be

investigated. Moreover, the impact of COVID-19 on conferences have not been studied yet and there is no benchmark data available.

In summary, conference scheduling problems have been always extremely difficult to solve and has been an interesting topic for researchers and practitioners. Though, only few researches exist on the topic and many OR techniques have not been implemented yet on conference scheduling. The new ongoing challenges of COVID-19 pandemic has increased even more the complexity of conference scheduling and has provided more room for research on the topic. Thus, a study investigating further OR techniques for conference scheduling would increase the transparency of the process and including the impact of COVID-19 in the research would make it unique.

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Organisations

- Lancaster University (Lead Research Organisation)

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Publications

The following are buttons which change the sort order, pressing the active button will toggle the sort order
Author Name
descending (press to sort ascending)
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Studentship Projects

Project Reference	Relationship	Related To	Start	End	Student Name
EP/V520214/1			30/09/2020	31/10/2025	
2607030	Studentship	EP/V520214/1	30/09/2020	29/09/2024	Yaroslav Pylyavskyy

Data

The Data on this website provides information about publications, people, organisations and outcomes relating to research projects

APIs

A set of REST API's enable programmatic access to the data. Refer to the application programming interfaces GtR and GtR-2

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